Mental Math

Grade 11 Essential Mathematics

Manitoba

Mental Math

Grade 11 Essential Mathematics

Print copies of this resource can be purchased from the Manitoba Learning Resource Centre (formerly the Manitoba Text Book Bureau) (stock number 80729). Order online at www.mtbb.mb.ca.

This resource is also available on the Manitoba Education and Training website at www.edu.gov.mb.ca/k12/cur/math/supports.html.

Disponible en français.

While the department is committed to making its publications as accessible as possible, some of the mathematical formulas, equations, and graphics in this document are not fully accessible at this time.

Available in alternate formats upon request.

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Manitoba Education and Training gratefully acknowledges the contributions of the following individuals in the development of *Mental Math: Grade 11 Essential Mathematics.*

Introduction

I NTRODUCTION

Mental Math: Grade 11 Essential Mathematics is a complement to the Grade 11 Essential Mathematics curriculum and is intended to help students develop strategies that allow them to perform mental calculations.

Why Mental Mathematics?

Mental mathematics and estimation is one of the seven processes of the mathematics curriculum.

> Mental mathematics and estimation is a combination of cognitive strategies that enhance flexible thinking and number sense. It involves using strategies to perform mental calculations.

> Mental mathematics enables students to determine answers without paper and pencil. It improves computational fluency by developing efficiency, accuracy, and flexibility in reasoning and calculating.*

It is used by individuals in their daily lives at home and at work. Mental calculation requires students to call on their knowledge of numbers and mathematical operations. It not only calls on memory but helps improve it as well.

Mental calculation is at the root of the estimation process. It allows us to determine whether results obtained with a calculator are reasonable.

> Estimation is used for determining approximate values or quantities, usually by referring to benchmarks or referents, or for determining the reasonableness of calculated values. Estimation is also used to make mathematical judgments and to develop useful, efficient strategies for dealing with situations in daily life.*

Mental calculation is an important way of developing number sense and acquiring a better understanding of place value and mathematical operations. Students who have experience with mental math develop the ability to work with numbers. Mental calculation can be used to prepare for written work by providing an approximate answer to a problem. Using certain mental calculation strategies can eliminate some steps in written calculations and help simplify the process. In short, mental calculation skills are at the heart of numeracy.

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* Manitoba Education and Advanced Learning. *Grades 9 to 12 Mathematics: Manitoba Curriculum Framework of Outcomes, 2014* (Winnipeg, MB: Manitoba Education and Advanced Learning, 2014) 9.

Mental calculation is used almost daily in life. We often have to do quick mental calculations at times when we do not have paper, a pencil, or a calculator handy. Mental calculation is therefore a very practical skill. Teachers should provide opportunities for their students to use mental math and estimation on a daily basis. They should encourage their students to find examples of the usefulness of mental calculation in their lives, such as when shopping, doing home renovations, estimating mileage, or working at their jobs.

Strategies

Teachers should promote a variety of mental mathematics strategies. They are encouraged to make students aware of the strategies described in the Strategies section of this document. The strategies that are most effective for mental calculation are often not the same strategies that are most effective for written calculation. Most students are able to develop strong mental calculation techniques, but often need help in doing so. Students may discover and use some mental calculation techniques by themselves but need to be taught other techniques to increase their mental calculation effectiveness. Regular mental calculation activities should be included in all mathematics curricula at all grade levels.

Document Features

The document includes three main sections: this introduction, a section describing strategies, and a series of mental mathematics questions organized by units.

The teacher will find mental mathematics questions relating to a specific substrand of Grade 11 Essential Mathematics as written in *Grades 9 to 12 Mathematics: Manitoba Curriculum Framework of Outcomes*. The *Mental Math: Grade 11 Essential Mathematics* document consists of seven (7) units related to specific substrands and one unit with a review of all substrands:

Unit	Number of Pages
A: Interest and Credit	11
B: 3-D Geometry	9
C: Statistics	5
D: Managing Money	5
E: Relations and Patterns	8
F: Trigonometry	2
G: Design Modelling	6
I: Review (All Units)	16

The units may be taught in a different order as determined by the teacher. Every unit consists of several pages of mental math questions.

The unit of study is identified on each page. The questions on each page are divided into three different categories: six (6) general or review questions; four (4) questions related to the unit of study; and two (2) blanks for teachers to insert their own questions.

The answers to the questions are provided in the column on the extreme right-hand side of each page. Sometimes students are asked to provide the one right answer and at other times they are to provide an estimate where a range of values would be correct.

Teachers may want to prepare additional questions to better meet the needs of their students. A section at the bottom of each page entitled Other Questions has been set aside for this purpose. A blank template is also provided in a section titled Reproducible Sheets. Teachers may use it to prepare additional question sheets.

A file in Word format is available in the Mathematics Group on the Maple (Manitoba Professional Learning Environment) site at www.mapleforem.ca. The Word file does not contain the Strategies section of this document but it does contain the section with the Mental Math Questions by Unit. It is provided to enable teachers to add or modify questions to suit the needs of their students.

Immediately following this introduction is a section describing mental calculation strategies along with examples. Some students may already have an inventory of strategies that they can apply; others may not. Teachers can use the strategies information given in this document to help students expand their strategy knowledge.

Methodology

Given their usefulness, mental calculation exercises should be short and done frequently.

They should be short because they require sustained concentration. For example, the first five minutes or so of math class could be devoted to mental calculation exercises. This practice would also serve as a warm-up to the day's lesson. Alternatively, the mental math practice could be done at the end of a class as a wrap-up to the day's lesson. In addition, although mental calculation should be done within a certain period of time, it is preferable not to emphasize speed. Although speed is a factor, it is not a primary goal. It is obviously important to ensure that time spent on mental mathematics activities does not infringe on the time needed for instruction and other learning activities.

Establishing routines in the classroom also encourages students to get to work quickly at the beginning of each class or to continue to work through to the end of each class. Teachers could establish a process such as the following:

■ As soon as students arrive at the beginning of the class (or when instructed near the end of the class), they can take out a sheet of paper and write down the numbers 1 to 10 if there are 10 questions.

■ The teacher can project a mental math page, present questions orally, or distribute a page with written questions.

■ The students are given time to answer the questions.

■ If students are unable to find an answer to a specific question, they could leave an empty space on that question and go on to the next question. The goal is accuracy and the development of a bank of effective strategies.

■ The teacher should, on occasion, spend time discussing various strategies used by the students for one or more of the questions.

To ensure students gain confidence with a new strategy, it is important that they are given adequate opportunity to practise it. It is up to the teacher to provide an adequate number of exercises or problems to ensure that students are able to use the new strategies.

Assessment

Primarily, mental calculation exercises are used as assessment *for* learning. Mental calculation exercises should be done in a classroom environment in which students feel comfortable taking risks without being penalized when they make mistakes. However, teachers should ask students to do a self-evaluation by identifying the questions they had the most difficulty with or those they did not answer correctly. Periodically, teachers may choose to use the mental mathematics questions as assessment *of* learning by asking students to explain the strategy they used for a specific question or questions.

Mental calculation can allow students an opportunity to develop a better understanding of some mathematical concepts. Consequently, mental calculation activities should include periods for thought and discussion. During these periods, the teacher should encourage students to

- suggest a variety of possible solutions to the same problem
- explain the different methods used to come to the correct answer and their effectiveness
- explain the thought process that led to an incorrect answer

This type of discussion is very important in learning mental calculation strategies, because it is an effective way for students to present their thinking. Questioning, reflecting, and discussing, which are integral to the activities of mental calculation, are excellent ways of communicating mathematical ideas. This communication requires that students be clear and concise when explaining their thinking to others. It is often when students describe the strategy they used to solve questions that other students discover a new technique. These exchanges about the strategies as well as the results will allow the teacher to identify the difficulties encountered by some students. Subsequently, the teacher can help students discover new, relevant, useful, and important strategies.

Enjoy the mental mathematics experience!

Notes

Reproducible Sheets

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Unit:

General Questions	Answers
1.	
2.	
3.	
4.	
5.	

Unit Questions	
6.	
7.	
8.	

Other Questions	
9.	
10.	

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Unit:

General or Unit Questions	Answers
1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	
9.	
10.	

Other Questions	
11.	
12.	

Examples of Strategies

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Sample Strategies

Begin adding from the left

When you do addition questions using paper and pencil, you usually start from the right and work toward the left.

To do addition in your head, start from the left.

EXAMPLE 1

$$46$$
$$+\ 38$$

$40 + 30 = 70$

$6 + 8 = 14$

$70 + 14 = 84$

EXAMPLE 2

$$25.6$$
$$+\ 13.7$$

$20 + 10 = 30$

$5 + 3 = 8$

$\frac{6}{10} + \frac{7}{10} = 1 \text{ and } \frac{3}{10}$

$30 + 8 + 1\frac{3}{10} = 39.3$

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Sample Strategies

Break down numbers and add their parts

Here's another way of doing addition in your head.

$$63$$
$$+28$$

Break down the numbers, then add their parts.

EXAMPLE 1
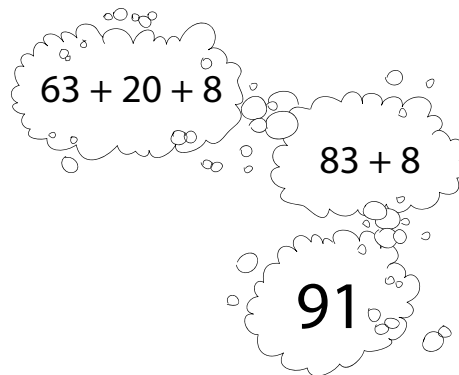
$$63$$
$$+\ 28$$

63 + 20 + 8

83 + 8

91

EXAMPLE 2

$$315$$
$$+\ 276$$

315 + 200 + 70 + 6

515 + 70 + 6

585 + 6

591

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Sample Strategies

S–3
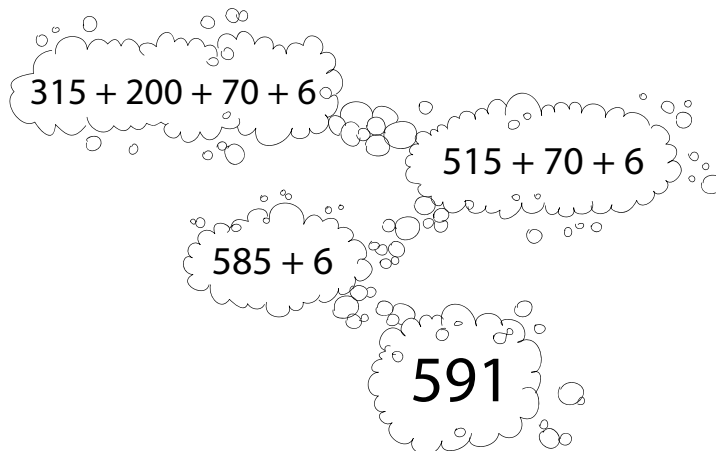
Finding compatible numbers

Compatible numbers are pairs of numbers that are easy to add in your head.

The following are examples of compatible numbers:

86   **14**
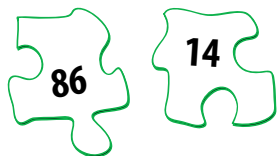
The sum equals 100

220   **380**

The sum equals 600

EXAMPLE 1 Find the pairs of compatible numbers that add up to 300.
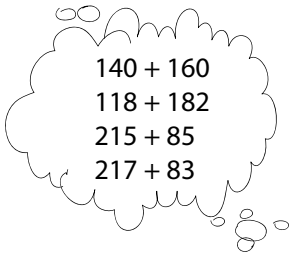
140	85	160
118	217	73
215	182	83

140 + 160
118 + 182
215 + 85
217 + 83

EXAMPLE 2 Find the pairs of compatible numbers that add up to 800.
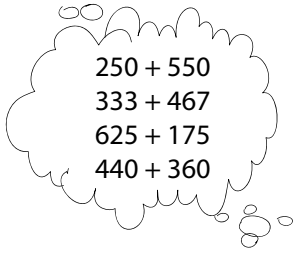
250	175	567
333	440	467
625	550	360

250 + 550
333 + 467
625 + 175
440 + 360

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Create your own compatible numbers

Sometimes it is easier to do addition in your head by creating your own compatible numbers and adjusting the total.

EXAMPLE 1

650
$+ 375$

$650 + 350 + 25$

$1000 + 25$

1025

EXAMPLE 2

1250
$+ 753$

$1250 + 750 + 3$

$2000 + 3$

2003

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Sample Strategies

S–5

Subtract starting from the left

Here's a technique that works well when doing subtraction questions that do not require grouping.

To do subtraction in your head, start from the left and think of your answer one part at a time.

EXAMPLE 1

468
− 323

$400 - 300 = 100$

$60 - 20 = 40$

$8 - 3 = 5$

$100 + 40 + 5 = 145$

EXAMPLE 2

9514
− 6203

$9000 - 6000 = 3000$

$500 - 200 = 300$

$14 - 3 = 11$

$3000 + 300 + 11 = 3311$

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Sample Strategies

Subtract one part at a time

When you do a subtraction question that requires a grouping, subtract one part at a time.

EXAMPLE 1

$$132$$
$$- \quad 59$$

$132 - 50 = 82$

$82 - 9 = 73$

Check your answer by adding the following in your head:
$73 + 59 = 120 + 12 = 132$

EXAMPLE 2

$6.25 - 3 = 3.25$

$$6.25$$
$$- \ 3.15$$

$3.25 - 0.15 = 3.10$

Don't forget to check your answer doing a mental addition.

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Sample Strategies

Balance subtraction with whole numbers

When you add the same number to the two elements of a subtraction question, the difference between the two does not change.

By adding to both elements, you balance the subtraction.

That makes it easier to find the answer in your head.

EXAMPLE 1

$$76$$
$$-\ 28$$

76 + 2 = 78

28 + 2 = 30

78 − 30 = 48

EXAMPLE 2

$$660$$
$$-\ 185$$

660 + 15 = 675

185 + 15 = 200

675 − 200 = 475
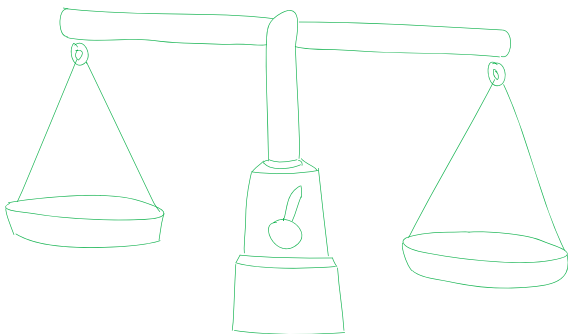
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Sample Strategies

Balance subtraction with decimal numbers

When you add the same number to the two elements of a subtraction question, the difference between the two does not change.
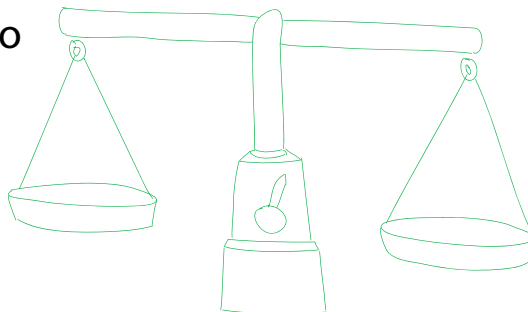
Adding to both elements balances the subtraction.

That makes it easier to find the answer in your head.

EXAMPLE 1

4.32
− 1.95

$4.32 + 0.05 = 4.37$

$1.95 + 0.05 = 2$

$4.37 − 2 = 2.37$

EXAMPLE 2

23.62
− 15.89

$23.62 + 0.11 = 23.73$

$15.89 + 0.11 = 16$

$23.73 − 16 = 7.73$

Remember that you have to make sure the second element (not the first) becomes a number that is easy to subtract.

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Sample Strategies

Multiply starting from the left

It is easier to multiply in your head when you break down a number and multiply starting from the left.

Add in your head as you multiply each part.

EXAMPLE 1

$$635$$
$$\times \ 4$$

$600 \times 4 = 2400$

$30 \times 4 = 120$

$5 \times 4 = 20$

$2400 + 120 + 20 =$

2540

EXAMPLE 2

$$528$$
$$\times \ 3$$

$500 \times 3 = 1500$

$20 \times 3 = 60$

$8 \times 3 = 24$

$1500 + 60 + 24 = 1584$

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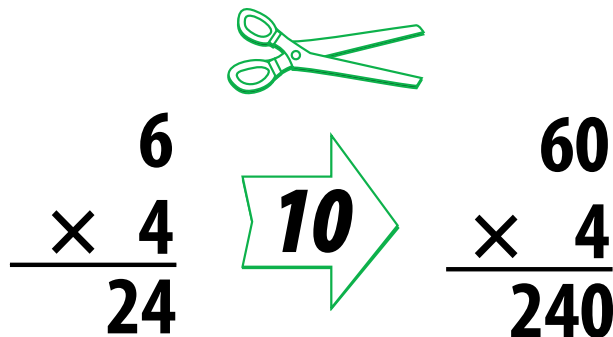
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Sample Strategies

Cut and paste the zeros

In multiplication, when one factor is multiplied by 10, the result is also multiplied by 10.

$$\begin{array}{r} 6 \\ \times\ 4 \\ \hline 24 \end{array} \quad \boxed{10} \quad \begin{array}{r} 60 \\ \times\ 4 \\ \hline 240 \end{array}$$
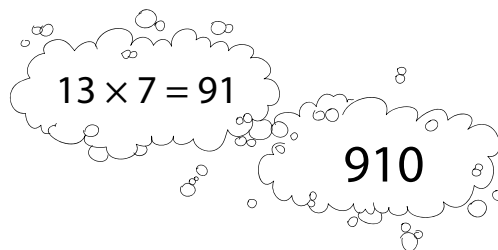
Knowing this concept, you can easily multiply by 10 in your head by following these steps:

1. Cut all the zeros at the end.
2. Multiply the remaining numbers.
3. Paste all the zeros back.

EXAMPLE 1

$$\begin{array}{r} 13 \\ \times\ 70 \end{array}$$
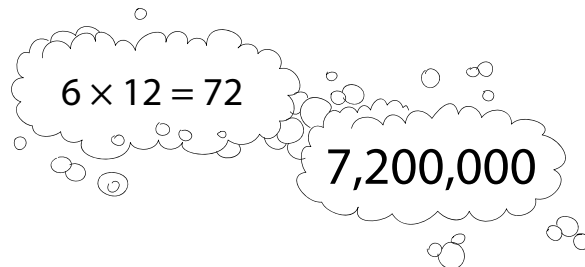
$13 \times 7 = 91$

910

EXAMPLE 2

$$\begin{array}{r} 6000 \\ \times\ 1200 \end{array}$$

$6 \times 12 = 72$

7,200,000

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Cut and paste the zeros

To mentally divide numbers that end in zero, follow these steps:

1. Cut all the zeros at the end.
2. Do the division.
3. Paste the zeros back.

EXAMPLE 1

$$2400 \div 6$$

$24 \div 6 = 4$

400

Check the answer by multiplying: $6 \times 400 = 2400$

EXAMPLE 2

$$45{,}000 \div 15$$

$45 \div 15 = 3$

3000

Check: $15 \times 3000 = 45{,}000$

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Sample Strategies

Cut the zeros in dividend and divisor

When dividing the dividend and divisor by the same amount, the quotient does not change.
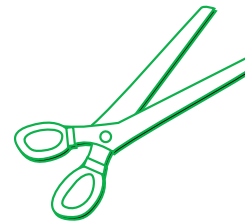
$$\frac{800}{\div\ 20} \Rightarrow \frac{80\cancel{0}}{\div\ 2\cancel{0}} \Rightarrow 40$$

Knowing this concept will help you do division in your head more easily when the dividend and the divisor both end in zero.

All you have to do is divide both the dividend and divisor by the same value, 10.

EXAMPLE 1

$$\frac{6300}{\div\ 90}$$

$630 \div 9$

70

EXAMPLE 2

$$\frac{4,500,000}{\div\ 500}$$

$45,000 \div 5$

9000

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Work with prices

The sale price of items is often a little less than an even number of dollars.

To work with prices in your head, round off to the nearest dollar. Then, do the calculation required by the problem and adjust your answer.

EXAMPLE 1

$$\$16.65 \\ +\ \$2.99$$

$16.65 + \$3 = \$19.65$

$19.65 - 1¢ =$

$19.64

EXAMPLE 2

$6 \times \$20 = \$120$

$$\$19.98 \\ \times\ \ \ \ \ 6$$

$6 \times 2¢ = 12¢$

$120 - 12¢ =$

$119.88

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Sample Strategies

Check your change

When you buy something, it is important to check that the amount of change returned to you is correct.

There is an easier way than subtracting in your head: **add to the purchase price**.

EXAMPLE 1 You buy a CD for $14.35 with a $20 bill. How much change should you get back?

Add starting from $14.35

$5

65¢

$15.00 + $5 = $20.00

$14.35 + 65¢ = $15.00

$5 + 65¢ = $5.65
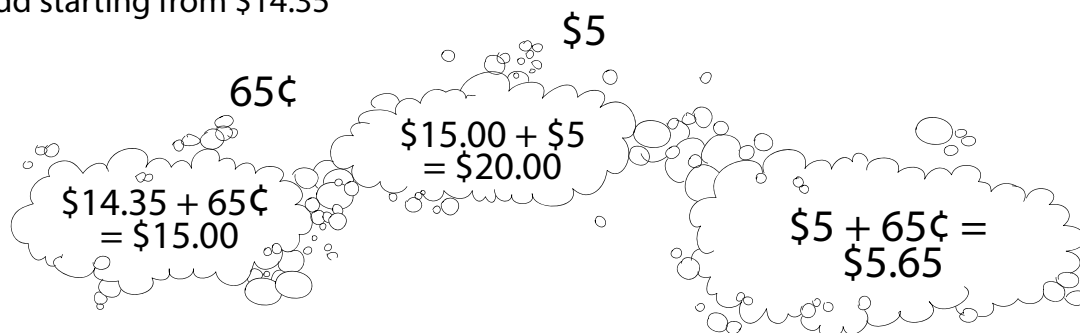
EXAMPLE 2 You buy a watch for $74.15 with a $100 bill. How much change should you get back?

Add starting from $74.15

$94.15 + $5.00 = $99.15

$99.50 + 50¢ = $100.00

$5

$74.15 + $20.00 = $94.15

$99.15 + 35¢ = $99.50

50¢

$20 + $5 + 35¢ + 50¢ = $25.85

$20

35¢
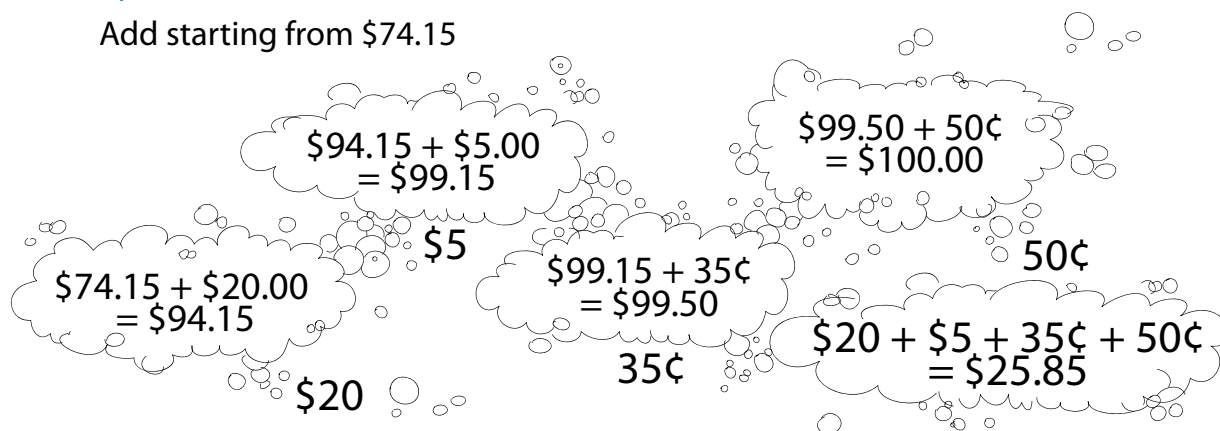
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Find the time difference

Mental math calculation is useful to find how much time is left before an event.

To find the difference between two given times, add by steps.

EXAMPLE 1   If it is 8:27 a.m., how long do you have to wait before lunch at noon?

8:27 a.m. to 8:30 a.m.
3 MINUTES

TO 9:00 a.m.
30 MINUTES

TO 12:00 noon
3 HOURS

3 HOURS
33 MINUTES
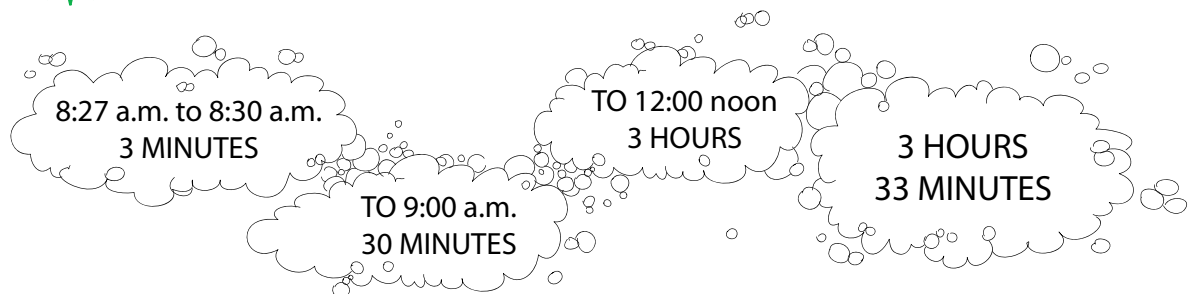
EXAMPLE 2   If it is 9:50 a.m., how much time is there before 8:15 p.m.?

9:50 a.m. to 10:00 a.m.
10 MINUTES

TO 8:15 p.m.
15 MINUTES

TO 8:00 p.m.
10 HOURS

10 HOURS
25 MINUTES
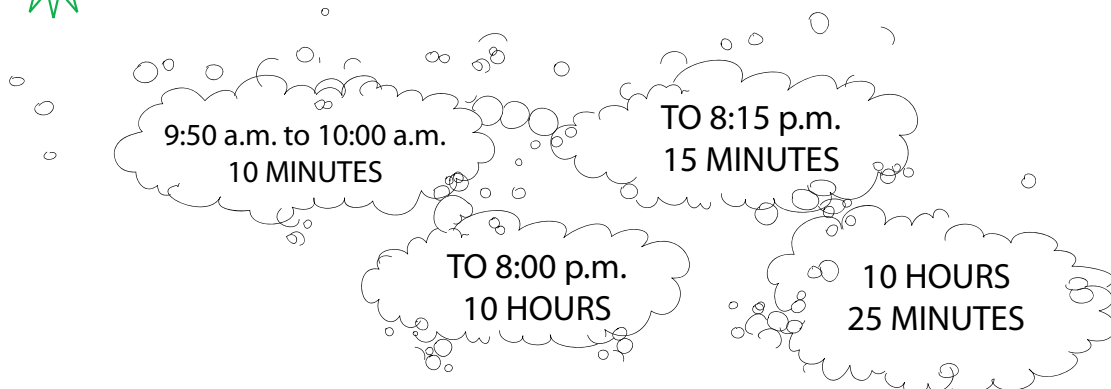
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Sample Strategies

Change quarter fractions to a decimal or a percent

When converting quarters, you can think of the context of money where 1 dollar is the whole and the fractions are the number of coins called "quarters." The fraction, $\frac{3}{4}$, is read, "three quarters." The value of three quarters is $0.75, which is $\frac{3}{4}$ of a dollar or 75% of a dollar. Similarly, you can do these conversions by thinking of the context of money:

$\frac{1}{4}$ = one quarter = 0.25 = 25% $\frac{2}{4}$ = two quarters = 0.50 or 50%

$\frac{4}{4}$ = four quarters = 1.00 = 100% $\frac{5}{4}$ = five quarters = 1.25 or 125%

You can also think of the context of dollars when dividing by quarters.

EXAMPLE 1 $\frac{3}{0.25} = 12$

Think of 3 dollars divided into a group of quarters. There are 12.

EXAMPLE 2 $\frac{5}{0.25} = 20$ or $5 \div \frac{1}{4} = 20$

Think of 5 dollars divided into a group of quarters. There are 20.

Another context that can be useful is time on a clock. Thinking of quarters can help you change fractions of an hour to minutes in time questions where the whole is 1 hour. There are 60 minutes in one hour and $60 \div 4 = 15$. Therefore, one-quarter of an hour is 15 minutes.

$\frac{1}{4}$ = one-quarter of an hour = 15 minutes

$\frac{3}{4}$ = three-quarters of an hour = 45 minutes

$\frac{2}{4}$ = two-quarters of an hour = half an hour = 30 minutes

EXAMPLE 3   Write 2 h, 15 min. in units of hours.

15 minutes is a quarter of an hour. It is equal to 2.25 hours.

EXAMPLE 4   Write 4.75 hours as hours and minutes.

0.75 is the same as three-quarters and three-quarters of an hour is 45 minutes. It is equal to 4 h, 45 min.

Mental Math Questions by Unit

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A–1

Unit A: Interest and Credit **Specific Learning Outcome: 11.E3.I.1**

General Questions	Answers
1. You go out for lunch with three friends. The bill comes to $21.00. If you divide the cost evenly, how much does each person pay?	$5.25
2. Evaluate: $\dfrac{3}{4} + \dfrac{1}{8}$	$\dfrac{7}{8}$
3. What words are represented by the B and S in the acronym BEDMAS?	B = Brackets () S = Subtract (−)
4. Using BEDMAS, evaluate $2(3 + 4) - 5$.	9
5. Using BEDMAS, evaluate $3^2 + 4 \div 2$.	11
Unit Questions	
6. What is $\dfrac{2}{100}$ as a decimal?	0.02
7. This week, Ahmed is working Monday, Wednesday, and Friday and he has soccer practice on Tuesday and Sunday. On which days does Ahmed have nothing scheduled?	Thursday and Saturday
8. You have $100 and you want to buy a shirt that costs $29.99 and pants that cost $59.99 before tax. Use rounding to figure out about how much it will cost to buy both items with 12% tax.	About $100 or exactly $100.78; you do not have enough money.
Other Questions	
9.	
10.	

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A–2

Unit A: Interest and Credit   **Specific Learning Outcomes: 11.E3.I.1/I.3**

General Questions	Answers
1. Evaluate for $y = 4$: $4y + (-6)$	10
2. A right triangle has sides with lengths of 12, 20, and 16. What is the length of the hypotenuse?	20
3. How many times do you have to reflect an image over a line so that you get the original image back?	Twice (or even number)
4. There is a square kite in a picture, drawn to scale. The scale ratio is 1 mm : 20 cm. If the kite has a side length of 3 mm, how large is the life-size kite?	60 cm
5. Denise earns 15% of her sales at her family restaurant. If she sells $1400 in food, how much money will she earn?	$210
Unit Questions	
6. Find the simple interest if the principal is $100, the rate is 10%, and the time is 2 years. ($I = Prt$)	$20
7. Find the principal if the simple interest is $50, the rate is 20%, and the time is 10 years. $\left(P = \dfrac{I}{rt} \right)$	$25
8. Find the interest rate if the simple interest is $100, the principal is $1000, and the time is 10 years. $\left(r = \dfrac{I}{Pt} \right)$	0.01 = 1%
Other Questions	
9.	
10.	

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Unit A: Interest and Credit   **Specific Learning Outcome: 11.E3.I.1**

General Questions	Answers
1. If $12 \times 15 = 180$, what is 13×15?	195
2. You are paid $9.50 per hour. If you work 20 hours this week, how much will you be paid?	$190
3. The base of a triangle is 4 cm. The height of the same triangle is 5 cm. What is the area of the triangle? $\left(A = \dfrac{1}{2} \times bh \right)$	10 cm^2
4. Convert the following decimal to a percent: 0.013	1.3%
5. Jordan is twice as old as Carly. Carly is one-third as old as Marc. If Marc is 18, how old is Jordan?	12 years old

Unit Questions	
6. If you invest $100,000 at a rate of 5%, compounded annually, how much money will you have after 1 year?	$105,000
7. Mr. Bond is investing in his retirement. He has $300,000 to invest but he cannot retire until his investment doubles. He finds an investment with a rate of 12%. In how many years can Mr. Bond retire?	6 years
8. What is the difference between simple interest and compound interest?	Compound interest pays interest on the interest made in previous periods. (Interest paid on interest.)

Other Questions	
9.	
10.	

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A–4

Unit A: Interest and Credit

Specific Learning Outcome: 11.E3.I.1

General Questions	Answers
1. Evaluate for $x = 5$: $3x - 8$	7
2. If 13×14 is 182, what is 13×15?	195
3. You are planting a garden in your backyard with the dimensions 1.5 m by 3 m. What is the area of your garden?	$A = 4.5$ m^2
4. Saloni goes to a restaurant and orders a \$5 sandwich, a \$2 drink, and a \$2 bag of chips. The cashier offers her the special, which includes a sandwich, drink, and chips for \$8.50. How much cheaper is the special?	\$0.50
5. Convert the following to a decimal: 38%	0.38

Unit Questions	
6. Without making any calculations, figure out which investment will make more money. Why?	Option B because the interest is compounded more often.
7. If you want to invest money but you cannot afford to lose much money, should you invest in a low-risk investment or a high-risk investment?	Low-risk investment
8. What is the main risk of putting money in a high-risk investment?	You could lose money very quickly.

For question 6:

Option A	or	Option B
4.25%		4.25%
Investment for 3 years.		Investment for 3 years.
Compounded annually.		Compounded monthly.

Other Questions	
9.	
10.	

Mental Math

Grade 11 Essential Mathematics (30S)

A–5

Unit A: Interest and Credit   **Specific Learning Outcome: 11.E3.I.2**

General Questions	Answers
1. Evaluate for $z = 3$: $6z - 9$	9
2. Heather is $\frac{4}{5}$ th the height of Crystal. Ashley is 15 cm taller than Heather. If Crystal is 150 cm tall, how tall is Ashley?	135 cm
3. You are having a day of shopping. At European Clothing you spend $38.00; at Discount you spend $10.00; at Micki's you spend $66.00; and at Alarms you spend $23.00. How much money did you spend altogether?	$137.00
4. Solve: $2d - 7 = 29$	$d = 18$
5. Evaluate: $\frac{2}{3} \times \frac{5}{7}$	$\frac{10}{21}$

Unit Questions	

6. John is going to university next year. Which option will save him more money? Explain.
  a) John pays for school with his credit card at a rate of 18% and invests his savings in a 5-year term at 3%.
  b) John pays for school with his savings and does not invest money.
	Option (b) is better because John would lose money paying 18% interest on his tuition.

7. Kim wants to buy a $10,000 car. She has three sources of money. Which of the following options is not a good choice and why?
  a) Savings account (She has $11,000.00 in her account.)
  b) Credit card (19%)   c) Personal loan (5%)
	Option (b) because the card has a very high interest rate

8. Kassem has a $3,000 line of credit with a 4% interest rate. He has a credit card with a $10,000 limit and a 19% interest rate. How can he purchase a $5,000 sofa and spend the least amount of interest?	He should put $3,000 on the line of credit and $2,000 on the credit card.

Other Questions	
9.	
10.	

Mental Math

Grade 11 Essential Mathematics (30S)

A–6

Unit A: Interest and Credit

Specific Learning Outcome: 11.E3.I.2

General Questions	Answers
1. Evaluate: $\dfrac{5}{6} + \dfrac{2}{3}$	$\dfrac{9}{6}$ or $\dfrac{3}{2}$
2. Sarah walked to school this morning, which is 2 km away from her house. She then walked 500 m to the convenience store after school before going home (1.5 km). How far did Sarah walk in total?	4 km
3. What is 10% of 1400?	140
4. You want to buy a gift for your sister. You get her some makeup, which costs $25.75 including tax. If you give the cashier $40, how much change will you get back?	$14.25
5. Your best friend wants to hang out this week. You work Monday, Tuesday, Thursday, and Saturday. You have soccer on Wednesday and Sunday. Is there any day that you are free?	Friday

Unit Questions	
6. Two types of credit are personal line of credit and overdraft protection. What are two other types of credit?	Personal loans and credit cards
7. In what circumstance is there a benefit for a person to borrow money to invest it?	Investment income is greater than the interest paid on borrowed money.
8. Kassem borrowed $1000 to invest. The tables show the terms. How much money did he lose/gain altogether?	He lost $90.

Kassem's Investment
$P = \$1000$, $r = 5\%$, $t = 3$ years
$I = Prt$
$= 1000 \times 0.05 \times 3$
$= \$150$
Kassem made $150.

Money Kassem Borrowed
$P = \$1000$, $r = 8\%$, $t = 3$ years
$I = Prt$
$= 1000 \times 0.08 \times 3$
$= \$240$
Kassem lost $240.

Other Questions	
9.	
10.	

Mental Math

Grade 11 Essential Mathematics (30S)

A–7

Unit A: Interest and Credit   **Specific Learning Outcome: 11.E3.I.3**

General Questions	Answers
1. Isabella does not want to walk around a parking lot with dimensions 30 m by 40 m. If she walks from corner to corner (diagonally), how far will she walk?	50 m
2. Fill in the blanks in the pattern: 1, 2, 4, 8, ___ , ____	16, 32
3. Write two equivalent fractions for $\frac{16}{28}$.	Possible answers: $\frac{4}{7}, \frac{8}{14}, \frac{32}{56}, \frac{12}{21}$
4. Solve: $c - 4 = 15$	$c = 19$
5. Jack and Jill climbed up a hill. They covered a distance of 400 m in eight minutes. How fast did they climb?	50 m/min.

Unit Questions

Use the table below to solve questions 6 to 8. **Hint:** This table is for a monthly payment per $1000.

Amortization Table					
Monthly Payment per $1000 Loan Proceeds					
Annual Rate	1 Year Monthly	2 Years Monthly	3 Years Monthly	4 Years Monthly	5 Years Monthly
6.00%	$86.10	$44.35	$30.45	$24.50	$19.35
6.25%	$86.20	$44.45	$30.55	$24.60	$19.45
6.50%	$86.30	$44.55	$30.65	$24.70	$19.55
6.75%	$86.40	$44.65	$30.75	$24.85	$19.70

6. Riley needs a loan of $1000 for home repairs. His credit union gave him a four-year loan at a fixed interest rate of 6.75%. How much will he pay monthly?	$24.85
7. Talia's car broke down and she needs to pay $500 in repairs. Her bank gave her a loan at 6.5% for four years. How much will she pay monthly?	$12.35
8. Angelica borrowed $2000 from her bank. She pays $60.90 a month for three years. What is the annual rate?	6.00%

Other Questions

9.	
10.	

Unit A: Interest and Credit   **Specific Learning Outcome: 11.E3.I.1**

General Questions	Answers
1. If 25% of a number is 680, what is 50% of the number?	1360
2. The sides of a right-angle triangle are 28, 45, 53. What are the two possible ratios for tangent?	$\dfrac{28}{45}$ and $\dfrac{45}{28}$
3. List four types of credit.	credit card, personal line of credit, personal/ consumer loan, overdraft protection
4. It is your friend's birthday. You collect $5 from each of your other friends to buy him a hoodie that costs $40.00, including tax. If you and nine other people pay $5 for the hoodie, how much will you have left over?	$10
5. Evaluate: $\dfrac{3 \times 4}{6} + 8$	10

Unit Questions	
6. Jaqueline buys a stove for $599 and fridge for $899. She is on a pay-later plan with no interest for a year. If she pays within the year, what is the pay-later price of the fridge and stove?	$1498 or about $1500
For questions 7 and 8, assume the taxes are included in the price.	
7. Annie wants to buy a $100 jacket but she doesn't have enough money. The pay-later price is $117. What is the percent finance charge?	17%
8. Olaf buys a TV surround system for $1000. The store charges 12% annual interest, compounded monthly. If Olaf pays for the system in one month, how much does he pay in total?	$1010

Other Questions	
9.	
10.	

Mental Math

Grade 11 Essential Mathematics (30S)

A–9

Unit A: Interest and Credit

Specific Learning Outcome: 11.E3.I.3

General Questions	Answers
1. Complete the pattern: 100 000, 10 000, 1 000, _____ , _____	100, 10
2. Estimate the taxes (at 13%) on a shirt that costs $15.00.	≈ $1.50 to $2.25
3. Germany, England, and Greece are in a group for a soccer tournament. Germany wins against Greece. Greece loses to England. Germany beats England. In what order do they finish? (First, Second, Third)	First = Germany Second = England Third = Greece
4. A watch chimes every hour, on the hour. Between 4:23 a.m. and 7:54 p.m., how many times does it chime?	15
5. Write two equivalent fractions for $\frac{45}{81}$.	Possible answers: $\frac{5}{9}$; $\frac{15}{27}$; $\frac{90}{162}$; ...

Unit Questions	
6. What is the carrying charge for a 45" flat-screen TV that costs $2500 cash or $100 a month for 24 months with $250 down? Assume taxes are included.	$150
7. Klein broke his cellphone. A new phone costs $599.99 ($671.99 after tax). If the carrying charge for the phone is $67, estimate the percent rate of the carrying charge.	≈ 10%
8. Odessa wants to buy a car and she can afford to pay $700 a month. Toyota has a deal on the Corolla. Payments are $600 a month for 60 months at 0% interest. Why should she buy the car now?	She can afford it and a 0% interest deal is the best anyone can get.

Other Questions	
9.	
10.	

Mental Math

Grade 11 Essential Mathematics (30S)

Unit A: Interest and Credit **Specific Learning Outcome: 11.E3.I.2**

General Questions	Answers
1. Evaluate: $5 - 3 + 6 \times 2 - 8 \div 4$	12
2. It is New Year's Eve, and you are excited for midnight. If it is 17:25 right now, how much time is there between now and midnight?	6 hours, 35 minutes
3. It has rained 354 mm in four hours. How much rain is this in cm?	35.4 cm
4. There are 195 countries in the world, and 19 of these countries have an ecological footprint larger than 5.0 gha/person. Estimate the percentage of countries that have an ecological footprint larger than 5.0 gha/person.	Between 9% and 10%
5. Solve: $3d - 2 = 25$	$d = 9$

Unit Questions	
6. What are three popular credit cards used in Canada?	Visa, MasterCard, and AMEX
7. What is one thing you should look for in a credit card contract to help save you money?	Low interest rate and low/no monthly fee
8. You can choose between two credit cards. Which would you choose and why?	Piza has a lower interest rate

Piza	or	Fastercard
$3000 limit		$3000 limit
16% interest		18% interest
compounded monthly		compounded monthly

Other Questions	
9.	
10.	

Mental Math

Grade 11 Essential Mathematics (30S)

A–11

Unit A: Interest and Credit

Specific Learning Outcome: 11.E3.I.2

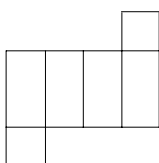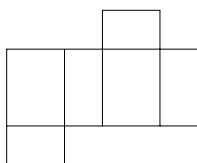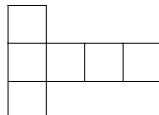| General Questions	Answers
1. Convert the following percent to a decimal: 14.5%	0.145
2. Your dad is in England for a business trip. In England, they are six hours ahead of us in Manitoba. If it is 4:30 p.m. here, what time is it in England?	10:30 p.m.
3. Dario went to the store to buy some new clothes for the next school year. He spends $16.71 on t-shirts, $48.13 on pants, and $24.42 on a sweater. Estimate how much Dario spends in total, to the nearest dollar (not including taxes).	Between $85 and $95
4. Evaluate for $x = 8$: $4x - 15$	17
5. The area of your property is 150 m². If the dimensions of your house are 8 m by 10 m, what is the area of your yard, not including the area taken up by your house?	70 m²
Unit Questions	
6. Kash forgot to pay his credit card balance for 20 days. If the daily interest charge is 0.01%, how much interest does he pay on $1000?	$2
7. Li has a credit card with an annual interest rate of 17%. What is the daily interest rate on this card as a fraction?	$\dfrac{17}{365}$
8. Anabella's credit card balance is $100. If her minimum monthly payment is 5% of the ending balance or $10 (whichever is greater), calculate her minimum monthly payment.	$10
Other Questions	
9.	
10.	

Mental Math

Grade 11 Essential Mathematics (30S)

B–1

Unit B: 3-D Geometry	Specific Learning Outcome: 11.E3.G.1

General Questions	Answers
1. If 12% of 250 is 30, what is 12% of 500?	60
2. There are 52 cards in a deck, 13 cards of each suit. If the suits are hearts (red), spades (black), clubs (black), and diamonds (red), what percentage of the cards are black?	50%
3. If $x = 2$, evaluate $4x - 18$.	−10
4. You earn $10 per hour plus 5% commission. If you work 20 hours this week and your sales are $400, how much will your gross pay be?	$220
5. There are five people assigned to a group. Sheniqua will not sit beside Arjun and Tapanga. Tapanga refuses to sit beside Soloman. Dejon wants to sit beside Tapanga. If they are sitting in a circle, who will be beside Sheniqua?	Soloman and Dejon

Unit Questions

For questions 6 to 8, match the 3-D pictures to the following net diagrams.

A   B   C

6.	C
7.	A
8.	B

Other Questions

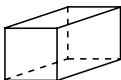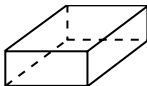9.

10.

Mental Math

Grade 11 Essential Mathematics (30S)

B–2

Unit B: 3-D Geometry   **Specific Learning Outcome: 11.E3.G.1**

General Questions	Answers
1. Travis invests $1500 for one year. The investment has an annual interest rate of 5%. How much will his investment be worth after one year?	$1575
2. Evaluate: $\dfrac{4}{8} \times 14$	7
3. Liu and Goh went out for dinner and the total cost of the meal was $28.50, including taxes. Goh pays by leaving $30 on the table to include the tip. How much is the tip?	$1.50
4. Fran has an accuracy rating of 60% in volleyball. Fran's accuracy in basketball is 20% higher than volleyball. In badminton, Fran's accuracy rating is half of his basketball rating. What is Fran's accuracy in badminton?	40%
5. Write two fractions that are equivalent to 0.20.	$\dfrac{20}{100}, \dfrac{2}{10}, \dfrac{1}{5}, \dfrac{3}{15}$
Unit Questions	
6. If the side value of a cube is 2 m, what is the surface area?	24 m^2
7. Estimate the base area of a cylinder if the diameter of the base is 10 cm.	$\approx$ 75 to 79 cm^2
8. Estimate the surface area of the ends of a cylinder if the radius is 2 inches and the cylinder height is 10 inches.	$\approx$ 24 to 25 in.^{2}
Other Questions	
9.	
10.	

Mental Math

Grade 11 Essential Mathematics (30S)

B–3

Unit B: 3-D Geometry	Specific Learning Outcome: 11.E3.G.3

General Questions	Answers
1. Sharmaine has to wake up at 5:00 a.m., and cannot function with less than nine hours of sleep. What is the latest time that Sharmaine should go to bed?	8:00 p.m.
2. A cube has a side length of 5 cm. What is the surface area of the cube?	150 cm^2
3. What is the mean of the following data? 4 6 8 2	5
4. Shannon is four years younger than Cheri. Cheri is double Karl's age. If Karl is 8 years old, how old is Shannon?	12 years old
5. There are five pieces of pepperoni per slice of pizza at Santa Monica's Pizza Parlour. If there are eight slices of pizza, how many pieces of pepperoni are on the whole pizza?.	40

Unit Questions	
6. Find the mistake in the following: Rectangular prism A has a surface area of 40 yd.^{2}. Rectangular prism B has each dimension of prism A × 3, so the surface area is 40 × 3 = 120 yd.^{2}.	SA is 40 × 9 = 360 yd.^{2}
7. The surface area of cone A is 3π m^2. What is the surface area of cone B?	3π × 16 = 48π m^2
8. The surface area of cylinder A is 36π ft.^{2}. What is the surface area of cylinder B?	36π ÷ 9 = 4π ft.^{2}

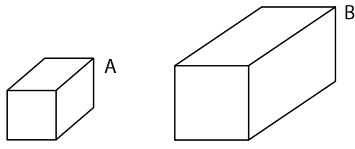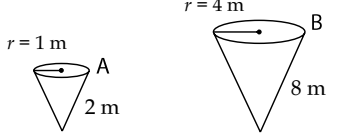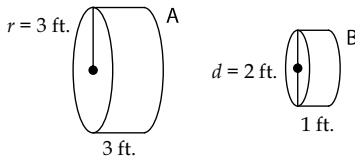| Other Questions	
9.	
10.	

Mental Math

Grade 11 Essential Mathematics (30S)

B–4

Unit B: 3-D Geometry **Specific Learning Outcome: 11.E3.G.1**

General Questions	Answers
1. You are buying a top for $10.00, a pair of pants for $25.00, and a sweater for $20.00. Everything in the store is 10% off. How much will your bill be before tax?	$49.50
2. A pack of three pens is $10, while a pack of five pens is $15. Which is the better deal?	Pack of 5 pens
3. Jai runs or cycles every day except Friday. If Jai runs on Monday, Wednesday, and Saturday how many days does Jai cycle?	3 days
4. Complete the pattern: 36, 33, 30, _____ , _____	27, 24
5. Solve: $3 - m = 10$	$m = -7$

Unit Questions	
6. Jake wants to paint the outside of a large box with dimensions 5′ × 5′ × 25′. What is the surface area that Jake will paint in square feet? The box does not have a lid.	425 sq. ft.
7. A can of paint covers about 300 sq. ft. How many cans of paint does Jake need to buy to paint the box?	2
8. Arius bought a new cabinet. The cabinet's dimensions are 30′ × 40′ × 84′. His front door is 32′ × 81′. How can Arius fit the cabinet through his front door?	Sideways: 30′ wide and 40′ high
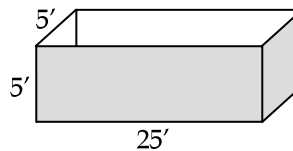
Other Questions	
9.	
10.	

Mental Math

Grade 11 Essential Mathematics (30S)

B–5

Unit B: 3-D Geometry	Specific Learning Outcome: 11.E3.G.2

General Questions	Answers
1. Bjork wants to buy a computer that costs $700 before taxes. If Bjork has only $750, will he be able to pay for the computer (taxes = 12% total)?	No
2. Marco is on page 150 of the book he has to read for English class. If the book has 500 pages, how many more pages until he has read half the book?	100
3. Ina is five inches shorter than Ra. If Ra is half a foot taller than Horus, then who is the shortest?	Horus
4. The score with one minute to go in a football game is 28 to 34. What is the minimum number of points the losing team must score in order to win the game?	7
5. Evaluate: $4x - 32$ if $x = 9$	4

Unit Questions	
6. Find the volume of the triangular prism. $\left(V = \dfrac{1}{2}bh_T \times h\right)$ 3 mm, 3.5 mm, 4 mm, 2 mm	12 mm^3
7. Estimate the volume of the cylinder. ($V = \pi r^2 \times h$) $d = 10''$, $10''$	$\approx$ 750 to 785 in.^{3}
8. Estimate the volume of the cone. $\left(V = \dfrac{1}{3}\left(\pi r^2\right) \times h\right)$ $r = 10'$, $50'$	$\approx$ 5000 to 5300 ft.^{3}
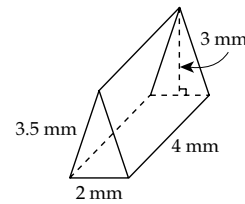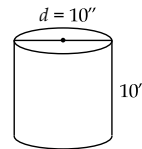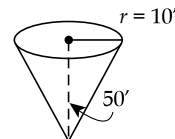
Other Questions	
9.	
10.	

Unit B: 3-D Geometry **Specific Learning Outcomes: 11.E3.G.2/G.3**

General Questions	Answers
1. Aesir works 25 hours per week and earns $11 per hour. Calculate Aesir's gross pay after two weeks.	$550
2. There are six red, four yellow, four orange, four green, and two purple candies in a package. What percentage of the candies are green?	20%
3. A triangle has an area of 20 m². If the base is 10 m, what is the height of the triangle?	4 m
4. After adding 20 songs to your smartphone, you have used up 100 MB (megabytes) of memory. What is the average number of megabytes per song?	5 MB
5. Evaluate: $3 + 5 - (8 \times 3) + 1$	-15

Unit Questions	
6. Find the mistake in the following: The volume of cylinder A is $V = \pi r^2 \times h = \pi 3^2 \times 10 = 90\pi$. Cone B has dimensions that are the same as cylinder A. The cone has 3 times the volume of the cylinder ($90\pi \times 3 = 270\pi$).	$90\pi \div 3 = 30\pi$
7. A cone and a cylinder have the same dimensions. If the cone has a volume of 47 in.³, what is the volume of the cylinder?	141 in.³
8. A cube has sides measuring 2 cm. A square pyramid has a base length and height of 2 cm. If the cube has a volume of 8 cm³, what is the volume of the square pyramid? Your answer can be a fraction.	$\frac{8}{3}$ cm³ or 2.67 cm³
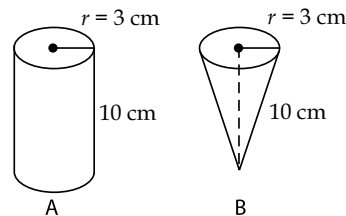
Other Questions	
9.	
10.	

Mental Math

Grade 11 Essential Mathematics (30S)

B–7

Unit B: 3-D Geometry   **Specific Learning Outcome: 11.E3.G.2**

General Questions	Answers
1. What is the mean of the following data? 5 8 2 7 3	5
2. Draco, Dora, and Luna have to share the $750 that their parents gave them for their trip to Europe. If it is split evenly among the three of them, how much will each get?	$250
3. Solve: $4q - 10 = 14$	$q = 6$
4. If 19% of a number is 200, what is 38% of the number?	400
5. The three sides of a right triangle are 3.7, 6.7, and 5.6. What is the length of the hypotenuse?	6.7
Unit Questions	
6. Volume is how much space a container takes up. Capacity is	. . . how much a container can hold.
7. Find the capacity of Jashandeep's toy box in litres. All wood sides are 3 cm thick including the base. (Capacity = *lwh*) Remember: 1000 cm³ = 1 L. 13 cm 16 cm 36 cm	$3000 \text{ cm}^3 = 3 \text{ L}$ (Measurements lose 3 cm or 6 cm due to wood thickness.)
8. Write the expression for the capacity of the semi-sphere with outside diameter of 7 yd. The thickness is 0.5 yd.	$\frac{4}{3}\pi(3)^3 \div 2$
Other Questions	
9.	
10.	

Mental Math

Grade 11 Essential Mathematics (30S)

Unit B: 3-D Geometry **Specific Learning Outcome: 11.E3.G.2**
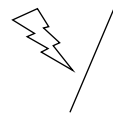
General Questions	Answers
1. How many reflections over the line do you need to return to the original position?	2 (any even number)
2. Solve: $8 - 2k = 2$	$k = 3$
3. The length of a book is $\frac{3}{4}$ of a foot. What is its length in inches?	9 inches
4. You finish school at 3:30 p.m. It takes you 20 minutes to get to work by bus. You work for five hours. You get a ride home, and this takes only 10 minutes. You do homework for an hour before going to bed. At what time do you go to bed?	10:00 p.m.
5. After having your car filled with gas, the total cost was $36.75. You handed the gas jockey $40.00 and asked for a toonie in return. How much did you tip the gas jockey?	$1.25

Unit Questions	
6. What is the formula for calculating the capacity of a cone?	$C = V = \frac{1}{3}\left(\pi r^2\right) \times h$
7. A pair of calipers is a tool used for: a) measuring the distance between two opposite sides of one object b) measuring the distance between two different objects	(a)
8. When measuring capacity, do you take outside or inside measurements of the object?	Inside

Other Questions	
9.	
10.	

Mental Math

Grade 11 Essential Mathematics (30S)

B–9

Unit B: 3-D Geometry   **Specific Learning Outcomes: 11.E3.G.2/G.3**

General Questions	Answers
1. Complete the pattern: 1, 4, 9, 16, _____ , _____	25, 36
2. At a hockey game, Murphy bought a hot dog for $3.50, a soft drink for $2.75, and some popcorn for $3.25. What is his total before tax?	$9.50
3. Murphy buys snacks for $10.75. He gives the cashier a $20 bill and gets $11 back. How much did the cashier overpay Murphy?	$1.75
4. At Deklin's school, they have 72-minute classes. If Deklin takes math every day this term, how much time will he spend in the math classroom in one week?	6 hours or 360 minutes
5. Solve: $4t - 8 = 0$	$t = 2$

Unit Questions	
6. A hockey puck is 1 inch thick. Carol uses the puck to guess the measurement of her water bottle. What do you call an object such as the hockey puck when it is used to help measure another object?	A referent
7. Ahmed has 16 boxes that measure $1' \times 1' \times 1'$. Show how he can fit the boxes in a shed that has 2″ thick walls and ceiling and measures 52″ wide × 29″ deep × 29″ high? (Draw a sketch.)	(4 boxes across = 4′ or 48″) (2 boxes high = 2′ or 24″)
8. Correct the mistake in the following work. Calypso buys 500 balls to fill her friend's car as a joke. Each ball has a capacity of about 5 fl. oz. If the car has a capacity of 2500 fl. oz., Calypso has just enough room for the balls because 500 × 5 = 2500 fl. oz.	The balls will have space between them, so she has too many balls.

Other Questions	
9.	
10.	
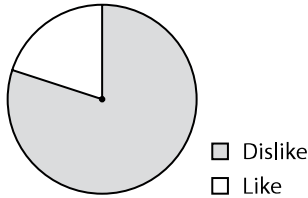
Mental Math
Grade 11 Essential Mathematics (30S)

C–1

Unit C: Statistics	Specific Learning Outcome: 11.E3.S.1

General Questions	Answers
1. Convert the following decimal to a percent: 0.005	0.5%
2. Convert the following percent to a decimal: 345%	3.45
3. Convert the following fraction to a percent: $\dfrac{4}{5}$	80%
4. For every 10 people in the world, four are Asian. Write this as a percentage.	40%
5. Yesterday, Malaki spent five hours in school, two hours in the gym, and nine hours sleeping. How many hours of the day are not accounted for?	8 hours

Unit Questions

Answer questions 6 to 8 using the following information.

In Mr. Innu's math class, there are 25 students. Of the 25 students, 20 students like math and 5 students dislike math.

Student Opinions of Math

☐ Dislike
☐ Like

Unit Questions	Answers
6. What is the mistake in the pie chart?	Dislike and Like need to switch colours.
7. What percentage of students dislike math?	20% or $\left(\dfrac{5}{25}\right)$
8. Based on this percentage, predict how many students would dislike math if there were 50 students.	10

Other Questions

9.

10.

Mental Math

Grade 11 Essential Mathematics (30S)

C–2

Unit C: Statistics   **Specific Learning Outcome: 11.E3.S.1**

General Questions	Answers
1. Dania invests $5000 and earns compound interest. It takes eight years to double. Using the rule of 72, estimate the interest rate.	9%
2. How much tax would you have to pay on an item that costs $99.99 if the PST = 7% and the GST = 5%?	$12
3. How long is the interest-free period if Zach buys a snowboard on November 27th and he does not have to pay until December 13th?	16 days
4. Are the following two fractions equal: $\frac{6}{8}$ and $\frac{13}{16}$?	No
5. Jeewon is at the movies with her friends. She spends $11.00 on her ticket, $4.00 on a drink, and $5.50 on ice cream. If she started with $25.00, how much does she have left?	$4.50

Unit Questions

Use the following bar graph to answer questions 6 to 8.

Three hundred people participated in the survey.

Favourite Movie Genre

Number of People (vertical axis: 0, 10, 20, 30, 40, 50, 60, 70)

Genres: Romance, Action, Drama, Animation

Legend: Children, Adults, Seniors
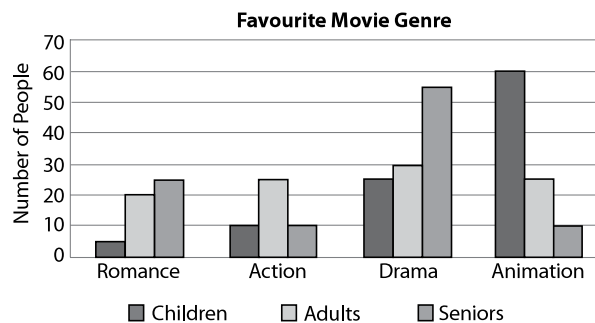
	Answers
6. Estimate how many people are interested in romance movies.	≈ 50
7. Which genre was the favourite of seniors?	Drama
8. What percent of the people are children whose favourite movie genre is animation?	20%

Other Questions

9.

10.

Mental Math

Grade 11 Essential Mathematics (30S)

C–3

Unit C: Statistics	Specific Learning Outcome: 11.E3.S.1

General Questions	Answers
1. Write two equivalent fractions for $\dfrac{9}{6}$.	Possible answers: $\dfrac{3}{2}, \dfrac{18}{12}, \dfrac{6}{4}, \dfrac{12}{8}, \cdots$
2. A cube is 1 m tall, 2 m wide, and 3 m deep. What is the volume of the cube?	6 m^3
3. From your house, you walk 10 m south, 8 m east, 10 m north, and 6 m west. How far are you from your house?	2 m east
4. A cylinder has a volume of 60 mm^3. What is the volume of a cone with the same radius and height?	20 mm^3
5. If 10% of people do not like the colour brown and there are five people in your family, how many people do you expect to not like the colour brown in your family?	1 or 0 (can't be half a person)

Unit Questions

Use the following bar graph to answer questions 6 to 8.

5 km Race Times

(Bar graph: Completed the Race In vs. Number of Participants)
- over 45 min.: 15
- 30 to 45 min.: 20
- 15 to 30 min.: 11
- under 15 min.: 4
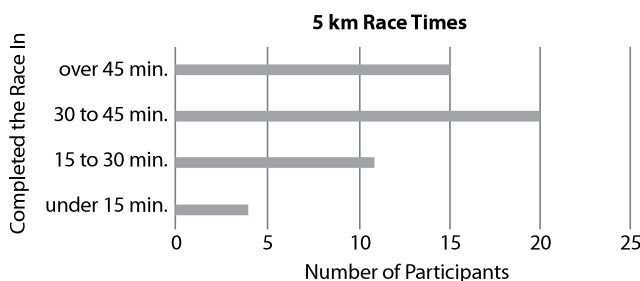
6. How many people finished in under 15 minutes?	4
7. There were 50 participants in the race. What percentage of people finished in over 45 minutes?	30%
8. If there were 200 participants, predict how many people would finish the race in 15 to 30 minutes.	44

Other Questions

9.	
10.	

Mental Math

Grade 11 Essential Mathematics (30S)

Unit C: Statistics **Specific Learning Outcome: 11.E3.S.1**

General Questions	Answers
1. Sara and Leon are sharing the cost of a car so that they don't have to use their parents' car anymore. If the car will cost $14,000, how much will each of them have to pay?	$7000
2. Are the following two fractions equal: $\frac{25}{100}$ and $\frac{7}{28}$?	Yes, both $\frac{1}{4}$
3. There are 18 marbles in a bag—6 green and 12 blue. Write the number of blue marbles as a fraction of the total number of marbles.	$\frac{12}{18}$ or $\frac{2}{3}$
4. Insu spent $45.75 at the mall on Boxing Day. If he used a $100 gift card to pay, how much money is left on the card?	$54.25
5. Your car has a hole in the dashboard for a stereo. The dimensions are 15 cm wide by 4 cm tall by 12 cm deep. The stereo you want to buy is 10 cm deep by 16 cm wide by 5 cm tall. Will this stereo fit into the dashboard?	No
Unit Questions	
Answer questions 6 to 8 using the following information. Jane is saving up money to buy a $5000 car. To motivate herself, she makes a graph of how much money she saves up weekly compared to days worked.	
6. What is the independent variable?	Days worked
7. If Jane saves up $57 in week one, $48 in week two, and $45 in week three, what is her average weekly savings?	$50/week
8. Based on her average savings, predict how much Jane will save in a year.	About $2500 or exactly $2600
Other Questions	
9.	
10.	

Unit C: Statistics	**Specific Learning Outcome: 11.E3.S.1**

General Questions	**Answers**
1. The volume of a square pyramid is 8 m^3. What is the volume of a prism with the same dimensions (length, width, and height)?	24 m^3
2. Seok Yong plays on a school sports team. Based on the following clues, decide whether he plays on the basketball team, hockey team, soccer team, or volleyball team. (a) He does not like to be cold. (b) There are no extra pads required. (c) He scored 34 points in their last game.	basketball
3. Convert the fraction to a percent: $\dfrac{25}{50}$	50%
4. There is a cube with each side length equal to 1 cm. What is the surface area of the cube?	6 cm^2
5. Complete the pattern. 10, 100, 1000, _____ , _____	10 000, 100 000

Unit Questions	
Answer questions 6 to 8 using the following two line graphs. Both graphs depict Squarebucks' Quarterly Profits in 2015.	
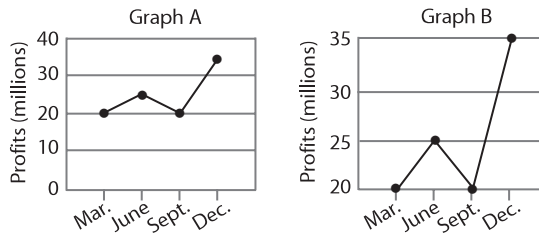
6. Using Graph A, what is the difference (in millions) between December's profit and June's profit?	$10 million
7. Using Graph B, what is the difference (in millions) between December's profit and June's profit?	$10 million
8. Why is Graph B misleading?	Profits axis doesn't start at 0.

Other Questions	
9.	
10.	

Mental Math

Grade 11 Essential Mathematics (30S)

D–1

Unit D: Managing Money　　　　　**Specific Learning Outcome: 11.E4.M.1**

General Questions	Answers
1. Jonghun has $50 to spend on groceries. He needs milk ($5.00), vegetables ($15.00), fruit ($15.00), and some sort of protein. Chicken costs $12.50, pork costs $15.50, and steak costs $20. Which type(s) of meat could he afford?	Chicken
2. Rewrite the fraction in lowest terms: $\dfrac{750}{500}$	$\dfrac{3}{2}$
3. On the Canadian flag, in addition to two points at the bottom, the maple leaf has three main segments. Each segment has three points on it. How many points are there in total?	11 points
4. When comparing team statistics, you can look at a team's record (how many games it has won, lost, or tied) as well as the goals for (the number of goals the team has scored) and the goals against (the number of goals other teams have scored against it). If a team has not won a game, is it possible for it to have more goals for than against?	Impossible. You can only get more goals for than against when you win.
5. Solve: $5g - 10 = -30$	$g = -4$
Unit Questions	
6. Karanbir's spending includes rent at $500 per month, groceries at $300 per month, personal care at $80 per month, entertainment at $120 per month, and university at $6000 per year. Calculate his monthly spending.	$1500
7. Karanbir spends $80 per month on personal care. What is his annual spending on personal care?	$960
8. Karanbir works two jobs. He makes $800 per month at a fast-food restaurant and $900 per month tutoring. How much does he make each month?	$1700
Other Questions	
9.	
10.	

Mental Math

D–2

Grade 11 Essential Mathematics (30S)

Unit D: Managing Money   **Specific Learning Outcome: 11.E4.M.1**

General Questions	Answers
1. Evaluate the following: $10 + 3 \times 6 - \dfrac{12}{2}$	22
2. Evaluate: 12×25	300
3. Write two equivalent fractions for $\dfrac{45}{90}$.	$\dfrac{1}{2}, \dfrac{3}{6}, \dfrac{4}{8}, \dfrac{5}{10}, \dfrac{15}{30}, \cdots$
4. High school students are collecting mittens for a shelter. If each student donates two pairs of mittens and there are 140 students at the school, how many pairs of mittens will the school donate?	280 pairs
5. A turkey must be roasted 15 minutes for every pound. If a turkey weighs 20 pounds, how long (in hours) would you have to roast it?	5 hours

Unit Questions

Answer questions 6 to 8 using the Monthly Budget Summary shown below.

5) **SUMMARY**
   1. AVERAGE MONTHLY INCOME............................. 1) $ _5,568.33_
   2. SAVINGS... 2) $ _556.83_
   3. TOTAL MONTHLY EXPENSES............................. 3) $ _4,212.00_
   4. TOTAL MONTHLY CONTRIBUTIONS .... 4) $ _294.66_
      TOTAL AMOUNTS 2 + 3 + 4 .... $ _5,063.49_
   5. AMOUNT AVAILABLE FOR OTHER
      SAVINGS OR EXPENDITURES (DEFICIT)   5) $ _504.84_

6. Do Nahum and Anne-Marie have extra money for savings or are they in a deficit?	They have extra.
7. Nahum's car breaks down and he has to get a new car costing him an extra $400 per month, including changes to his car insurance. How much will they now have left over for savings each month?	$104.84
8. Now that Nahum has a new car, he wants to buy a deck to put in it. He finds one for $226 (after tax). How many months will it take to save up for this item?	3 months

Other Questions

9.

10.

Mental Math

Grade 11 Essential Mathematics (30S)

D–3

Unit D: Managing Money	Specific Learning Outcome: 11.E4.M.1

General Questions	Answers
1. Convert the fraction to a decimal and a percent: $\frac{21}{84}$	0.25, 25%
2. To bisect an angle means to cut it in half. What is the name of the angle when you bisect a straight angle?	right angle
3. Jonah has $81 and he buys four DVDs for $15 each (tax included). How much money will he have left?	$21
4. Aldin's sales were $1500 over the past two weeks. If he makes 20% commission, how much will he be paid (gross)?	$300
5. Complete the pattern: 100, 75, 50, _____ , _____ , _____	25, 0, −25

Unit Questions

Answer questions 6 to 8 using the Monthly Budget Summary shown below.

```
5) SUMMARY
   1. AVERAGE MONTHLY INCOME...............................        1) $  5,568.33
   2. SAVINGS.................................................................   2)  $      556.83
   3. TOTAL MONTHLY EXPENSES..............................   3)  $   4,212.00
   4. TOTAL MONTHLY CONTRIBUTIONS ....................   4)  $      294.66
      TOTAL AMOUNTS 2 + 3 + 4 .....................................        $  5,063.49
   5. AMOUNT AVAILABLE FOR OTHER
      SAVINGS OR EXPENDITURES (DEFICIT)                 5) $     504.84
```

6. Nahum and Anne-Marie want to take a vacation on December 6th and it is now February 1st. How much can they save by December 6th?	$5048.40
7. The travel advisor tells Nahum that they must pay for the $4000 trip in advance. When can they pay the full trip amount?	October 1
8. Estimate the amount of spending money they will have on their trip.	≈ $1050

Other Questions	
9.	
10.	

Mental Math

Grade 11 Essential Mathematics (30S)

D–4

Unit D: Managing Money   **Specific Learning Outcome: 11.E4.M.2**

General Questions	Answers
1. In the year 2020, Tom will be 16 years old. Tara will be half Tom's age, and Tammy will be half Tara's age. What year was Tammy born?	2016
2. Evaluate the following: $10 + \dfrac{4}{(2 \times 3)} \times 12 - 50$	−32
3. From your house, you walk 10 paces straight before turning left, and then you walk 100 paces. You then turn left and walk 25 paces. Finally, you turn left again and walk 100 paces. How far are you from where you started?	15 paces
4. This past week (Monday to Friday) was crazy. Monday, you did not go to school because it was a snow day; Thursday was Remembrance Day, so you didn't go to school; and then on Friday the teachers had an in-service day. How many days did you go to school this week?	2 days
5. What fraction of days of the week begin with the letter T?	$\dfrac{2}{7}$
Unit Questions	
6. Karanbir uses his debit card regularly for groceries, gas, eating out, etc. His chequing account costs $5.00 and gives him 30 free debits. Any transactions over 30 costs $0.30 per transaction. If Karanbir is charged $6.80, how many times did he use his debit card?	36 times
7. If Karanbir was charged $8.00, how many times did he use his debit card?	40 times
8. An unlimited debit-use account costs $11.00. How many times can Karanbir use his card before his account costs him the same amount as the unlimited account?	50 debits a month
Other Questions	
9.	
10.	

Mental Math

Grade 11 Essential Mathematics (30S)

D–5

General Questions	Answers
1. Begin with 8 and multiply by 1, then divide your answer by 2.	4
2. Multiply your answer from question #1 by 3.	12
3. Divide your answer from question #2 by 4.	3
4. What is the pattern in the instructions?	Alternate multiplying and dividing; the number increases by 1 each time.
5. Write the next step in the pattern and find the next number.	Multiply by 5. 15
Unit Questions	
6. Angelica has $375 in her account. She writes two cheques, one for $50 and the other for $200. What is her new account balance?	$125
7. John Doe deposited $40 cash, $6.35 in coins, and a cheque for $12.78. He wants to get $10 cash back. What is the amount of the deposit?	$49.13
8. If John had $230 in his account, how much does he have after he makes a deposit of $78.10?	$308.10
Other Questions	
9.	
10.	

Mental Math

Grade 11 Essential Mathematics (30S)

E–1

Unit E: Relations and Patterns

Specific Learning Outcome: 11.E4.R.1

General Questions	Answers
1. Solve: $2h - 5 = 17$	$h = 11$
2. Solve: $\dfrac{m}{6} = \dfrac{9}{54}$	$m = 1$
3. Evaluate and reduce to lowest terms: $\dfrac{7}{4} \times \dfrac{2}{7}$	$\dfrac{1}{2}$
4. Complete the pattern: 1, 4, 9, 16, _____ , _____	25, 36
5. Samia has four brothers. Her parents had four sons and one daughter. How many sisters does Samia have?	None

Unit Questions

Use the following information to answer questions 6 to 8. The chart shows the size (ounces) and the cost (dollars) of Tom Houston's coffee.

Size	8	12	16	20
Cost		1.79	1.99	2.19

	Answers
6. State the dependent variable for the relationship of the size of a Tom Houston's coffee compared to the cost.	Coffee cost (depends on coffee size)
7. Assuming the relationship is linear, predict the cost of an 8-ounce coffee.	$1.59
8. How much would an extra-large, 24-ounce Tom Houston's coffee cost?	$2.39

Other Questions

9.

10.

Mental Math

Grade 11 Essential Mathematics (30S)

E–2

Unit E: Relations and Patterns   **Specific Learning Outcome: 11.E4.R.5**

General Questions	Answers
1. Complete the pattern: 1, 1, 2, 3, 5, 8, _____ , _____	13, 21
2. A computer costs $500. Find the cost including taxes (PST = 7%, GST = 5%).	$560
3. If 10% of a number is 36, then 25% of the number is _____ .	90
4. Evaluate and reduce your answer if possible: $\dfrac{2}{5} + \dfrac{8}{15}$	$\dfrac{14}{15}$
5. There are three available cubicles in a row at an office for Sam, Xan, and Laura. Sam won't sit next to Xan. Can Sam sit in the middle cubicle?	No, the middle cubicle is beside Xan.

Unit Questions

Use the 4 patterns shown to answer questions 6 to 8.

Pattern A	17, 13, 9, 5, . . .
Pattern B	1, 4, 9, 16, . . .
Pattern C	3, 6, 9, 12, . . .
Pattern D	1, 2, 3, 5, . . .

	Answers
6. Which patterns above demonstrate a linear relationship?	A and C
7. For Pattern A, what is the rate of change of the pattern number as the term number goes up by 1?	−4
8. Predict the next number in sequences B and C.	B = 25 C = 15

Other Questions

9.

10.

Mental Math

Grade 11 Essential Mathematics (30S)

E–3

Unit E: Relations and Patterns	Specific Learning Outcome: 11.E4.R.5

General Questions	Answers
1. Solve the following: $5 - \dfrac{4 \times 5}{2} + 8$	*3*
2. Write two equivalent fractions with smaller denominators: $\dfrac{20}{8}$	$\dfrac{10}{4}$ and $\dfrac{5}{2}$
3. At a street vendor, hot dogs cost \$4, pop costs \$1.50, and chips cost \$2.00. You have \$6 in your pocket. Will you be able to buy one of each item?	No
4. Which month can have a whole number of weeks (no decimal or fraction)?	February
5. Solve: $\dfrac{8}{r} = 2$	$r = 4$

Unit Questions	
Use the following information to answer questions 6 to 8. John is building a deck that costs \$3 per square foot. The cost (C) is dependent on the size in square feet (s). The formula is $C = 3s$.	
6. If the size of the deck is 200 sq. ft., how much will it cost to build the deck?	\$600
7. If John spends \$1200, how big is the deck?	400 sq. ft.
8. If John builds a 150 sq. ft. section and a 450 sq. ft. section, how much will the two-part deck cost?	\$1800

Other Questions	
9.	
10.	

Mental Math

Grade 11 Essential Mathematics (30S)

E–4

General Questions	Answers
1. Solve: $\dfrac{10}{d} = 20$	$d = \dfrac{1}{2}$
2. Sara has five nickels in her pocket; Damian has one quarter. Who has more money?	They have the same amount.
3. Kudus got 75% on his final exam in science. If the exam is worth 40% of his total grade, how many marks does his exam count toward his total grade?	30 marks
4. Elyce went to the grocery store to buy food for dinner. The total cost was $45.30 and she gave the cashier three $20 bills. How much change should she receive?	$14.70
5. A checkerboard alternates black and white squares. If a checkerboard is 8 squares wide by 8 squares long, how many squares are black?	32

Unit Questions

Use the graph to answer questions 6 to 8.

Car Speed

Distance Travelled (km) — vertical axis: 0, 10, 20, 30, 40, 50, 60
Time (min.) — horizontal axis: 0, 10, 20, 30, 40, 50, 60

Points: A, B, C, D
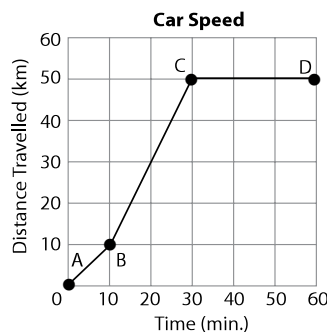
6. What is the slope of line segment AB (from point A to point B)?	1 km/min.
7. What is the slope of line segment BC?	2 km/min.
8. What is the slope of line segment CD?	0 km/min.

Other Questions

9.

10.

Mental Math

E–5

Grade 11 Essential Mathematics (30S)

Unit E: Relations and Patterns   **Specific Learning Outcome: 11.E4.R.1**

General Questions	Answers
1. 10 cm = _____ m	0.1 m
2. 12 ft. = _____ yd.	4 yd.
3. 15 s = _____ min.	0.25 min.
4. 0.53 km = _____ m	530 m
5. 1.5 ft. = _____ in.	18 in.

Unit Questions

Use the following information to answer questions 6 to 8. Ares is an old dog with joint problems. His owner decides to build him a ramp over the front steps.
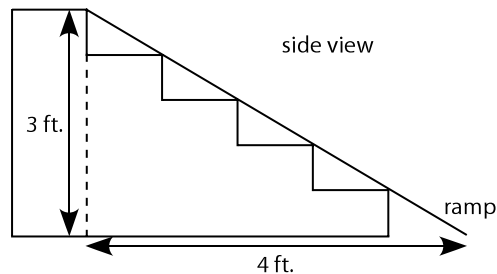
	Answers
6. What is the slope of the ramp as a fraction and as a decimal?	$\dfrac{3}{4} = 0.75$
7. What is the length of the ramp? **Hint:** $c^2 = a^2 + b^2$.	5 ft.
8. If the width of the ramp is 2 ft., what is the area of the rectangular ramp?	10 ft.^{2}

Other Questions

9.

10.

Mental Math

Grade 11 Essential Mathematics (30S)

E–6

Unit E: Relations and Patterns   **Specific Learning Outcome: 11.E4.R.2/R.3**

General Questions	Answers
1. The volume of a 2 by 2 by 2 cube is 8 units. How many times larger is the volume of a cube with dimensions 4 by 4 by 4?	8
2. Complete the pattern: 4, _____ , 16, 32, _____	8 and 64
3. There are 30 days in September, 31 days in October, 30 days in November, and 31 days in December. How many days are there between, but not including, September 1st and New Year's Eve?	120
4. How many cm^2 are equal to 310 m^2?	3 100 000
5. Evaluate: $\dfrac{4}{9} \times \dfrac{1}{2}$	$\dfrac{2}{9}$

Unit Questions

Use the following information below to answer questions 6 to 8. Indra is testing out the brakes on her golf cart. The graph shows her distance from the clubhouse as a function of time.

Golf Cart Brake Test
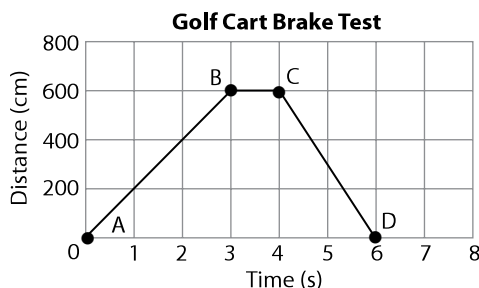
Unit Questions	Answers
6. Find the speed of the golf cart in cm/s during line segment AB (from point A to point B).	200 cm/s
7. What is the speed of the golf cart in m/s for line segment AB? **Hint:** 100 cm = 1 m	2 m/s
8. What is the speed of the golf cart in m/s for line segment CD?	−3 m/s or 3 m/s back to clubhouse

Other Questions

9.

10.

Mental Math

Grade 11 Essential Mathematics (30S)

E–7

Unit E: Relations and Patterns	Specific Learning Outcome: 11.E4.R.2

General Questions	Answers
1. How many hours are in 3 days?	72
2. Estimate 13% of $39.12.	≈ $5.10 or $5.20
3. If 8 students in a geometry class of 30 students can find Laos on a map, what is the fraction of the class that can find Laos on a map?	$\frac{8}{30}$
4. Evaluate: 25×16	400
5. What is the complementary angle to 45°?	45°
Unit Questions	
6. Convert 1500 m to km. (**Hint:** 1000 m = 1 km)	1.5 km
7. Convert 20 m/s to km/h. (**Hint:** 3600 s = 1 h)	72 km/h
8. Convert 36 km/h to m/s.	10 m/s
Other Questions	
9.	
10.	

Mental Math

Grade 11 Essential Mathematics (30S)

E–8

Unit E: Relations and Patterns   **Specific Learning Outcome: 11.E4.R.4**

General Questions	Answers
1. Simon says that in five years, his dad will be double Simon's age. If Simon's dad is 43, how old is Simon?	19
2. You spent a total of $300 on 25 pizzas. How much did each pizza cost?	$12
3. How many minutes are in a day?	1440
4. What is 10% of 43?	4.3
5. It is January 18th. In 14 days, what will the date be?	February 1

Unit Questions

Use the following information to answer questions 6 to 8. Mrs. Dill is visiting another school in Snow River. She rents a car to get to the school and back to the airport.

1 cm

1.5 cm

2 cm

Legend
♁ Airport
🚂 School
⛽ Gas Service

1 cm : 150 km
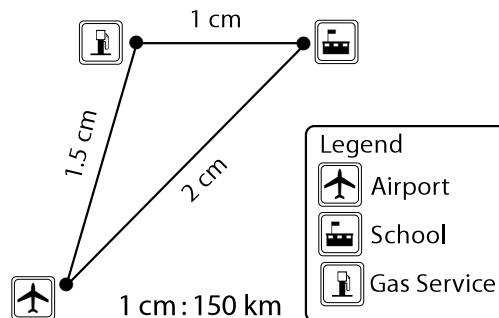
6. What is the real distance in kilometres from the airport to the school and then to the gas station?	450 km
7. What is the real distance in kilometres from the airport to the gas station and then to the school?	375 km
8. The rental car has a full tank of gas that will go 425 kilometres before it needs refilling. How many times does Mrs. Dill need to get gas?	Twice (airport to school is too far)

Other Questions

9.	
10.	

Mental Math

Grade 11 Essential Mathematics (30S)

F–1

Unit F: Trigonometry   **Specific Learning Outcome: 11.E4.TG.1**

General Questions	Answers
1. It is 11:00 a.m. on Monday. You have a chess tournament at 6:00 p.m. on Tuesday. How many hours do you have to wait?	31 hours
2. How much would you have to pay for an 8 ft. long piece of wood if the hardwood store charges $1.95 per foot?	$15.60
3. How many millimetres are there in 32 centimetres?	320 mm
4. Simplify the fraction: $\dfrac{6}{20}$	$\dfrac{3}{10}$
5. Solve: $\dfrac{10}{x} = \dfrac{5}{4}$	$x = 8$

Unit Questions

Use the right triangle ABC to answer questions 6 to 8.
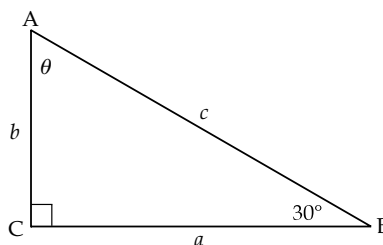
6. Find the missing angle (θ) in the above right triangle.	60°
7. If side b = 10 cm, what is the value of side c? **Hint:** $\sin 30° = 0.5 = \dfrac{1}{2}$	20 cm
8. If side a = 7 cm and side b = 4 cm, estimate the length of side c (to nearest whole number) using $c^2 = a^2 + b^2$.	8 cm

Other Questions

9.	
10.	

Mental Math

Grade 11 Essential Mathematics (30S)

F–2

Unit F: Trigonometry **Specific Learning Outcome: 11.E4.TG.1**

General Questions	Answers
1. What is $\frac{2}{3}$ of 180?	120
2. You cut off 17 inches of a 2 ft., 5 in. board of wood. How long is it now?	1 foot or 12 inches
3. Dagnus is 30 years old. What is his age in months?	360 months
4. Complete the pattern: 1, 2, 6, 24, 120, _____ .	720
5. How far would you travel if you drove 45 km/h for 20 minutes?	15 km

Unit Questions

Use the diagram to answer questions 6 to 8.
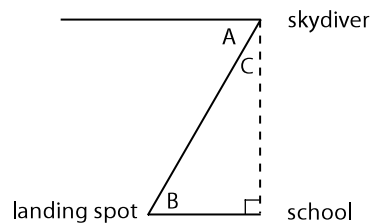
6. A skydiver is floating to the ground. He is looking down at his target landing spot at an angle of 60°. Where would you label 60° in the diagram above? (Angle A, B, and/or C)

   Answer: Angle A (also B)

7. The skydiver is directly over the school. The school is 300 ft. from the landing spot. How far away is the skydiver from the landing spot?

   Hint: $\cos 60° = 0.5 = \frac{1}{2}$

   Answer: 600 feet

8. Estimate the height of the skydiver at point A.

   Answer: $\approx$ 500 feet or 520 feet

Other Questions

9.

10.

Mental Math

Grade 11 Essential Mathematics (30S)

Unit G: Design Modelling   **Specific Learning Outcome: 11.E4.D.1**

General Questions	Answers
1. What is the lowest common multiple of 6 and 9?	18
2. How many metres are in 15.1 km?	15 100
3. Which letter comes next? J F M A M J J A S O N _____	D (for December)
4. Which two terms have the same value? 8, 4, 10, $\frac{12}{4}$, $\frac{20}{5}$, $\frac{8}{3}$	4, $\frac{20}{5}$
5. Your credit card has a balance of $450. The minimum payment will be $10 or 10% of your balance—whichever is more. How much is your minimum payment?	$45
Unit Questions	
6. A cube has a side length of 3 cm. What is the surface area?	54 cm^2
7. A rectangular solid has a length of 2 m, a depth of 3 m, and a height of 4 m. What are the areas of the front, side, and top faces?	8 m^2, 12 m^2, and 6 m^2
8. A rectangular solid has a length of 2 m, a depth of 2 m, and a height of 4 m. What is the surface area?	40 m^2
Other Questions	
9.	
10.	

Mental Math

Grade 11 Essential Mathematics (30S)

G–2

Unit G: Design Modelling   **Specific Learning Outcome: 11.E4.D.1**

General Questions	Answers
1. Evaluate: $\dfrac{3}{5} + \dfrac{4}{10}$	1
2. Solve: $4000 = \dfrac{k}{0.75}$	$k = 3000$
3. How many 125 g portions of corn are there in a 2 kg bag?	16
4. The perimeter of a square is 24 units. What is the area?	36 units^2
5. What is the complementary angle to 30°?	60°

Unit Questions	
For questions 6 to 8, all cubes have a side length of 2 in.	
6. What is the surface area of one cube?	24 in.^{2}
7. Two cubes are put side by side so that one side is touching as shown. What is the surface area? **Hint:** The sides that are touching are not counted in the surface area.	40 in.^{2}
8. Six cubes are stacked in two rows as shown. What is the surface area?	88 in.^{2}
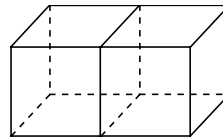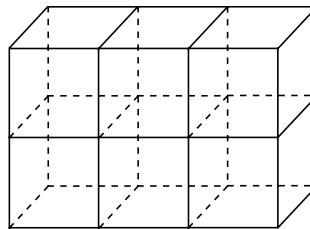
Other Questions	
9.	
10.	

Mental Math

Grade 11 Essential Mathematics (30S)

G–3

Unit G: Design Modelling	Specific Learning Outcome: 11.E4.D.1

General Questions	Answers
1. If seven oranges cost $1.82, how much does each orange cost?	$0.26
2. What is the average of the following numbers? 18, 19, 21, 22	20
3. Carmen spent 50% of her allowance for the month on a pair of shoes. Of her remaining money, she puts 50% in her bank account. If her allowance is $300, how much money does she have left?	$75
4. One movie theatre can accommodate 350 people. If there are three showings of Parry Halfoy at the same time and all three theatres are full, how many people are seeing the movie?	1050
5. Daris completed an average of 50 math questions per day for seven days before his exam. How many questions did he complete in total over the seven days?	350
Unit Questions	
For questions 6 to 8, each rectangle has dimensions of 1′ × 1′ × 2′.	
6. What is the surface area of the double box? **Hint:** The sides that are touching are not counted in the surface area.	18 sq. ft.
7. What is the surface area of the shape shown?	32 sq. ft.
8. What is the surface area of the shape shown?	44 sq. ft.
Other Questions	
9.	
10.	

Mental Math

Grade 11 Essential Mathematics (30S)

G–4

Unit G: Design Modelling	Specific Learning Outcome: 11.E4.D.2

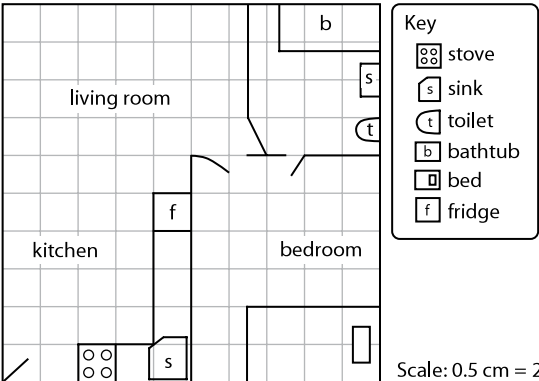| General Questions	Answers
1. If you travel 1800 m in 5 min., how fast are you going (in m/s)?	6
2. Which side is the hypotenuse of a right triangle if the side lengths are 5, 12, 13?	13
3. What is the measure of the third angle of a triangle if the other two angles are 80° and 60°?	40
4. 8'5" = _____ in.	101
5. What is the total cost of lunch if a sandwich costs $2.25, a salad costs $4.05, and an orange juice costs $1.55?	$7.85
Unit Questions	
You are planning to paint a room blue with a grey ceiling. The dimensions of the room are 10' long × 20' wide × 7' high.	
6. What is the surface area of the ceiling?	200 sq. ft.
7. What is the surface area of the walls?	420 sq. ft.
8. One can of paint covers 300 sq. ft. How many cans of grey and blue paint will you need to paint the room?	1 can grey / 2 cans blue
Other Questions	
9.	
10.	

Mental Math

Grade 11 Essential Mathematics (30S)

G–5

Unit G: Design Modelling   **Specific Learning Outcome: 11.E4.D.2**

General Questions	Answers
1. Gazielle was born in 1998. How old will she be in 2040?	42
2. What is a third of $\frac{1}{9}$?	$\frac{1}{27}$
3. How many eggs do you have if you have 11 dozen?	132
4. Evaluate: $75 - 50 - 25 + 25$	25
5. Gabi paid $72 for a pair of jeans. Chelsea paid $34 less than Gabi. How much did Chelsea pay?	$38

Unit Questions

Use the floor plan of an apartment shown below to answer questions 6 to 8. The scale is 0.5 cm = 2 ft.

6. What is the actual area of this apartment? ($A = l \times w$)	400 sq. ft.
7. What are the actual dimensions of the bed?	$7' \times 4'$
8. What are the actual dimensions of the stove?	$2' \times 2'$

Key
- stove
- s sink
- t toilet
- b bathtub
- bed
- f fridge

living room, kitchen, bedroom

Scale: 0.5 cm = 2 ft.

Other Questions

9.	
10.	

Mental Math

Grade 11 Essential Mathematics (30S)

G–6

Unit G: Design Modelling **Specific Learning Outcome: 11.E4.D.2**

General Questions	Answers
1. Evaluate: $\dfrac{7}{8} - \dfrac{3}{16}$	$\dfrac{11}{16}$
2. Estimate the product: 41×49	≈ 2000
3. There are 15 students missing from a class of 45. In lowest form, write the fraction representing the missing students in the class.	$\dfrac{1}{3}$
4. How many mm^3 are there in 1 cm^3?	10^3 or 1000
5. The scale of the map is 1 cm : 22 km. If it is 7 cm on the map from your house to the next town, how far do you have to drive?	154 km

Unit Questions

Use the exploded view of a shelving unit to answer questions 6 to 8.
The scale is 1 cm : 3 ft.

6. A wooden shelving unit has three shelves with diagram dimensions of 1 cm × 5 cm. What are the actual dimensions?	$3' \times 15'$
7. The two sidewalls of the shelving unit have diagram dimensions of 1 cm × 6 cm. What are the actual dimensions?	$3' \times 18'$
8. You decide to build a back wall for the shelving unit. What are the actual dimensions of this piece of wood?	$15' \times 18'$

Other Questions

9.	
10.	

Mental Math

Grade 11 Essential Mathematics (30S)

H–1

Unit A: Interest and Credit Review   **Specific Learning Outcomes: 11.E3.I.1/I.3**

General Questions or Review Relating to the SLOs	Answers
1. Find the simple interest if the principal is $500, the rate is 10%, and the time is 4 years. ($I = Prt$)	$200
2. Find the time in months if the interest is $15, the principal is $200, and the rate is 5%. $\left(t = \dfrac{I}{Pr} \right)$	1.5 years or 18 months
3. If a compound interest investment and a simple interest investment both have a rate of 6%, which will make more money? Why?	Compound interest, as it pays interest on interest.
4. Gurkiran wants to buy a new car. She has $15,000 but the new car costs $30,000. If Gurkiran invests her money at an interest rate of 6%, how long will it take her to double her money?	12 years
5. Oleh invests $1000 at an annual rate of 20%, compounded semi-annually. How much money will he have after 6 months?	$1100
6. Without making any calculations, determine which investment will make more money. Why? Option A 4.25% Investment for 3 years. Compounded daily. or Option B 4.25% Investment for 3 years. Compounded monthly.	Option A. The interest is compounded more often.
7. Which is an example of a low-risk investment: a savings account or real estate?	Savings account
8. Which is an example of a high-risk investment: a Canada Savings Bond or the stock market?	Stock market
Other Questions	
9.	
10.	

Mental Math

Grade 11 Essential Mathematics (30S)

H–2

Unit A: Interest and Credit Review   **Specific Learning Outcomes: 11.E3.I.1/I.2/I.3**

General Questions or Review Relating to the SLOs	Answers
1. Giuseppe wants to buy a new TV for $3000. The electronics store offers him a loan at a rate of 20%. Should Giuseppe take the loan or shop around for a better price? Why?	Shop around (20% is high).
2. Jasmine borrowed $800 to invest. How much money did she lose/gain altogether?	She gained $200.

Investment	Money Borrowed
$P = \$800, r = 10\%, t = 5$ years $I = Prt$ $\quad = 800 \times 0.1 \times 5$ $\quad = \$400$	$P = \$800, r = 5\%, t = 5$ years $I = Prt$ $\quad = 800 \times 0.05 \times 5$ $\quad = \$200$

	Answers
3. How many payments are made on a loan paid monthly, amortized over 5 years?	60

Use the table below to solve questions 4 to 6.

Amortization Table				
Monthly Payment per $1000 Loan Proceeds				
Annual Rate	1 Year Monthly	2 Years Monthly	3 Years Monthly	4 Years Monthly
5.00%	$80.50	$45.50	$30.40	$25.50
5.25%	$80.60	$45.60	$30.50	$25.60
5.50%	$80.70	$45.70	$30.60	$25.70
5.75%	$80.80	$45.80	$30.70	$25.80

	Answers
4. Chan needs $20,000 to repair his flooded basement. He takes out a bank loan at a rate of 5% for 4 years. How much does Chan pay monthly?	$510
5. Adrianne is going on vacation and takes out a loan for $3000 to pay for her expenses. She will pay her credit union $91.80 a month for 3 years. What is her annual interest rate?	5.50%
6. Claudette borrows $10,000 to pay for tuition. Her loan is at a rate of 5.5% and she pays $257 a month. How many years will she be paying this loan?	4 years

Answer questions 7 and 8 using the following information. Oman buys a washer for $500 and a dryer for $500 on the buy-now, pay-later plan. On the date of purchase, he must pay the taxes (12%), a delivery charge of $50, and an administration charge of $25. If Oman pays for the balance of his purchase in a year, he will not be charged interest.

	Answers
7. How much will Oman pay upfront (at the time of purchase)?	$195
8. If Oman pays the balance within a year, how much will his pay-later price be?	$1000

Other Questions

Mental Math

Grade 11 Essential Mathematics (30S)

H–3

Unit A: Interest and Credit Review   **Specific Learning Outcomes: 11.E3.I.1/I.2/I.3**

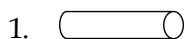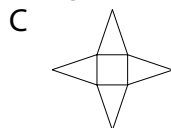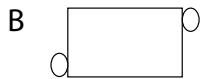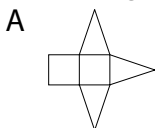| General Questions or Review Relating to the SLOs	Answers
Answer questions 1 to 4 using the following information. Barpinder is buying a bedroom suite at Future Store. He has three options.	
1. Option 1: Pay $3000 cash plus tax. How much does the suite cost after 12% taxes?	$3360
2. Option 2: Barpinder can pay $100 a month for 3 years. How much would he pay?	$3600
3. Option 3: Barpinder can put $1000 down and pay $100 a month for 2 years. How much would he pay?	$3400
4. Which option is the cheapest (Option 1, 2, or 3)?	Option 1
5. Vlad's cellphone is broken. A new phone will cost him $800. The carrying charge for the phone is $40. What is the percent rate of the carrying charge?	5%
6. Cadence charges $300 to her credit card on August 12. She knows the purchase is interest-free as long as she pays the balance owing on her next statement, which is due September 15. However, she cannot pay the entire balance. From what day does she pay interest on the $300?	August 12
7. Samir is excited about his new credit card. He knows he can make purchases on his card and has a 30-day grace period before he pays interest. Because of this grace period, Samir takes out a $200 cash advance on his card and plans to pay it back in two weeks. What is his mistake?	Interest is charged on cash advances from the day they are withdrawn.
8. Mashercard is offering a credit card with a rate of 18% and 1 Sky Mile for every $20 you spend. Liam loves Sky Miles! Vassa is offering a credit card with a rate of 16% and coffee points at Squarebucks. Liam does not drink coffee. Which card is better for Liam financially?	Vassa is better because it has a lower interest rate.
Other Questions	
9.	
10.	

Mental Math

Grade 11 Essential Mathematics (30S)

H–4

Unit B: 3-D Geometry Review   **Specific Learning Outcomes: 11.E3.G.1/G.3**

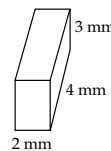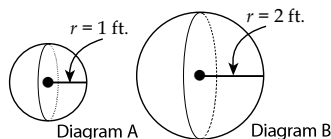| General Questions or Review Relating to the SLOs	Answers
Match the 3-D images in question 1 and 2 with the net diagrams below. A B C	
1. 2.	1. B 2. C
3. What is the surface area of the square pyramid with a base of 4 yd. and a slant height of 5 yd.? (Area of a square = s^2; area of a triangle = $\frac{1}{2}bh$) 5 yd. 4 yd.	56 yd.^{2}
4. What is the surface area of a rectangular prism if the width is 2 mm, the depth is 4 mm, and the height is 3 mm? 3 mm 4 mm 2 mm	52 mm^2
5. The work below has a mistake. Find the correct answer. Square pyramid A has a surface area of 27 m^2. Square pyramid B has each dimension one-third the length of pyramid A, so its surface area is $27 \div 3 = 9$ m^2. 3 m 1 m 3 m Pyramid A Pyramid B	$27 \div 9 =$ 3 mi.^{2}
6. If the surface area of sphere A is 4π ft.^{2}, what is the surface area of sphere B? $r = 1$ ft. $r = 2$ ft. Diagram A Diagram B	$4\pi \times 4 =$ 16π ft.^{2}
7. Omar wants to paint a square room in his house. Each wall is 20′ × 10′. There are two windows each 4′ × 5′ and one door that is 3′ × 7′. What is the surface area to be painted? Do not count the ceiling.	$800 - 61 =$ 739 sq. ft.
8. Omar needs to do two coats of paint (meaning he needs to paint twice). If a can of paint covers 300 sq. ft., how many cans of paint does Omar need?	5 cans
Other Questions	
9.	
10.	
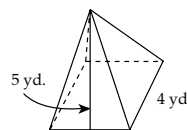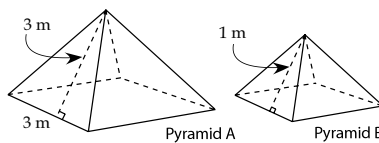
Unit B: 3-D Geometry Review   **Specific Learning Outcomes: 11.E3.G.2/G.3**

General Questions or Review Relating to the SLOs	Answers
1. Estimate the volume of this sphere. $\left(V = \frac{4}{3}\pi r^3\right)$ $r = 2\,m$	$\approx 32\ m^3$
2. Find the volume of this rectangular pyramid. $\left(V = \frac{1}{3}(lw) \times h\right)$ $h = 40\ mm$, $30\ mm$, $60\ mm$	$24\,000\ mm^3$
3. Find the mistake. If the volume of Rectangular Pyramid A is 12 yd.^{3}, find the volume of Rectangular Prism B. *Answer:* The rectangular prism has a volume of $12 \times 3 = 36$ yd. Pyramid A: $h = 3$ yd., 4 yd., 3 yd. Prism B: 3 yd., 4 yd., 3 yd.	36 yd.^{3} (Answer needs cubic units.)
4. Calculate the capacity of a pyramid if the inside of the top opening is 30 cm by 20 cm and the height is 30 cm. $\left(\text{Capacity} = \text{Volume} = \frac{1}{3}lwh\right)$ $h = 30\ cm$	$6000\ cm^3$ or 6 L
5. Estimate the capacity of this cylinder if the sides and base are 1 inch thick. **Hint:** 12 in. = 1 ft. (convert to feet before you use the formula). (Capacity = Volume = $\pi r^2 \times h$) $r = 25$ in., $h = 13$ in.	≈ 12 ft.^{3}
6. Would you use calipers or a metre stick to measure the inside of a coffee mug?	Calipers
7. Identify the mistake in the work shown. Do not solve. The Tomato Garden restaurant fills each semi-sphere bowl of soup to the brim (top). Remember 1 in.^{3} = 0.554 fluid ounces. If the radius of the bowl is 3 inches, then: $C = V = \left(\frac{1}{2}\right)\frac{4}{3}\pi r^3 = \left(\frac{1}{2}\right)\frac{4}{3}\pi(3)^3$ $= \left(\frac{1}{2}\right)\left(\frac{4}{3}\right)9\pi = \left(\frac{2}{3}\right)9\pi$ $= 6\pi$ in.$^2 \times 0.554$ $= 10.437$ fl. oz.	$(3)^3$ is NOT 9 $(3)^3$ is 27
8. The capacity of one bowl of soup at the Tomato Garden restaurant is about 30 fluid ounces. If 44 customers order soup, how many fl. oz. of soup did the restaurant serve?	1320 fl. oz.
Other Questions	
9.	
10.	

Mental Math

Grade 11 Essential Mathematics (30S)

H–6

Unit C: Statistics Review   **Specific Learning Outcome: 11.E3.S.1**

General Questions or Review Relating to the SLOs	Answers
Answer questions 1 to 3 using the pie chart. **Heritage Found in a School of 25 Students** (Asian, First Nations, European)	
1. About how many students are First Nations?	≈ 21
2. Estimate the ratio of European to Asian students.	$3:1$
3. Estimate the percentage of students who are First Nations.	$\approx 84\%$
Use the bar graph to answer questions 4 to 8. **Genres Liked at Garden Hills School** (Country, Hip Hop/R & B, Pop Culture, Rock and Roll; 0 50 100 150 200; ☐ Teachers/Staff ■ Female Students ▨ Male Students)	

4. Estimate the values for A and B.

Genre	Male Students	Female Students	Teachers/ Staff
Hip Hop/R & B	124	126	**B:**
Country	**A:**	71	19

	Answers
	A = $\approx$ 80 or 82 B = $\approx$ 10 or 12
5. What is the favourite genre among the male students?	Rock and Roll
6. Estimate the ratio of male to female students at Garden Hills School.	$\approx 1:1$
7. If there are about 1000 people in Garden Hills School, estimate what percentage of them like rock and roll.	29% or 30%
8. Estimate the ratio of female students to teachers who like pop culture.	$\approx 17:1$ or $20:1$

Other Questions
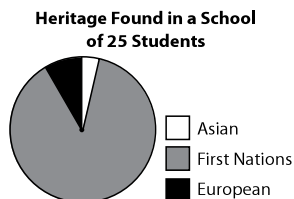
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Grade 11 Essential Mathematics (30S)

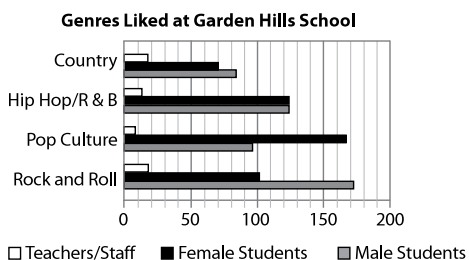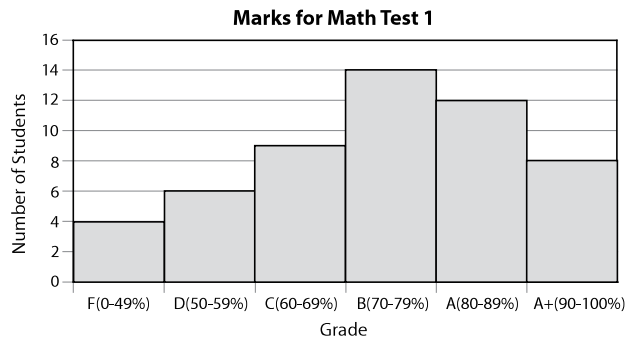**Unit C: Statistics Review**

Specific Learning Outcome: 11.E3.S.1

General Questions or Review Relating to the SLOs	Answers
Answer questions 1 to 4 using the bar graph. **Valentine's Day Gifts** (bar graph: Number of People vs Gift Items — Roses ≈37, Chocolates ≈49, Teddy Bears ≈27, Clothing ≈10, Candy ≈31, Other ≈3)	
1. Estimate the number of people who voted for Valentine's Day gifts.	≈ 160
2. Estimate the number of votes for teddy bears and candy.	≈ 60
3. Estimate how many more chose chocolates than teddy bears.	≈ 20
4. Which gift is chosen by about 20% of people?	Candy
Answer questions 5 to 8 using the information provided. This data is based on polling 100 men and 100 women for a total of 200 participants.	

Cellphone Use (min./month)	Men	Women
Under 50 min./month	47	49
50–100 min./month	17	17
100–200 min./month	12	16
Over 200 min./month	24	18

	Answers
5. How many people used under 50 min./month?	96
6. If the poll used a total of 50 participants instead of 200, predict how many people would have used 100 to 200 min./month.	3 + 4 = 7
7. Which range of cellphone use accounts for 14% of the total number of participants?	100–200 min./month
8. Which range of cellphone use has the largest difference between men and women?	over 200 min./month

Other Questions

9.

10.

Mental Math

Grade 11 Essential Mathematics (30S)

H–8

Unit C: Statistics Review **Specific Learning Outcome: 11.E3.S.1**

General Questions or Review Relating to the SLOs	Answers
Answer questions 1 to 4 using the bar graph. **Marks for Math Test 1** 	
1. How many students wrote the test?	53
2. Approximately what percentage of students got between 70% and 89%?	≈ 50%
3. How many more students received a grade of B compared to a grade of D?	8
4. Which grade ranges are in a 3:1 ratio?	A : F
Answer questions 5 to 8 using the circle graph. **Hair Colour of Kids at Sunshine Day Care** 	
5. How many kids do not have dark hair?	5
6. If there were 33 kids instead of 11 kids, predict how many of them would have blonde hair.	12
7. What is the percent difference between dark-haired and red-haired kids?	46%
8. If the red-haired kid left the day care, what would be the percent of blonde-haired kids?	40%
Other Questions	
9.	
10.	
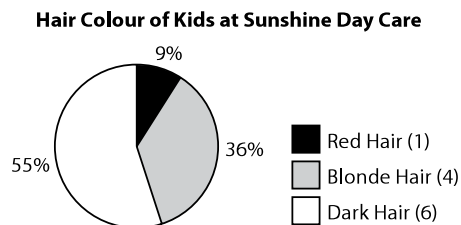
Mental Math

Grade 11 Essential Mathematics (30S)

Unit D: Managing Money Review   **Specific Learning Outcome: 11.E4.M.1**

General Questions or Review Relating to the SLOs	Answers
1. OJ and Elizabeth prepared a budget. OJ earns $650 and Elizabeth earns $500 monthly. How much more does OJ earn each month?	$150
2. Elizabeth would like to take a course next year. The course costs $350 and is due in 10 months. How much does she need to save monthly to do this?	$35 per month
3. OJ receives a car from his parents for his 21st birthday. He has to pay $180 per month for car insurance, $100 per month on gas, and $50 per month on maintenance. What are the total monthly expenses?	$330
4. Typically, which monthly expense is largest: hydro, groceries, car payment, or rent?	Rent
5. If OJ cuts entertainment by $55 and personal care by $47, how much extra could he save monthly?	$102
6. Elizabeth's net pay is $500 per month. She plans to save 10% each month for a vacation. How much will she have saved in one year?	$600
7. OJ's net pay is $650 per month. How much does he earn in one year?	$7800
8. Elizabeth pays $600 per year for car insurance. How much should she save each month to pay for the car insurance?	$50
Other Questions	
9.	
10.	

Mental Math

Grade 11 Essential Mathematics (30S)

H–10

Unit D: Managing Money Review   **Specific Learning Outcomes: 11.E4.M.1/M.2**

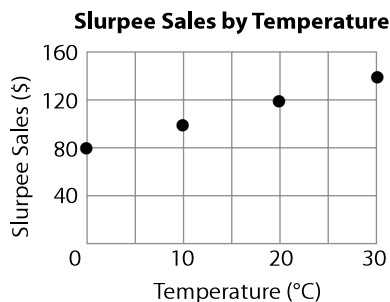| General Questions or Review Relating to the SLOs	Answers

1. Which unexpected expense costs more in a year?
   a) Your car breaks down, costing you $1100.
   b) You get demoted at work, losing $100 a month.
	Demoted at work

2. You need to save 10% of your annual income. How much do you need to save in a year if your income is $48,000?	$4800
3. If you save $400 per month, how much will you have after one year?	$4800
4. Rochelle has a combination account that earns her interest on any money over $600. If she has $1800 in her account, how much of it earns interest?	$1200
5. Javaan is a member of Royalty Bank. She goes to a privately owned ATM and takes out money. This costs her $1.50 each time. If Javaan does this 12 times, how much does this cost her?	$18
6. If Javaan takes out money from a private ATM 10 times every month, at $1.50 each time, how much will this cost her in a year?	$180
7. You have $108.12 in your chequing account. You write a cheque for $44.00. How much is left in your account?	$64.12
8. You have $203.20 in your chequing account. You deposit $29.90. How much will you have in your account?	$233.10
Other Questions	
9.	
10.	

Mental Math

Grade 11 Essential Mathematics (30S)

H–11

Unit E: Relations and Patterns Review   **Specific Learning Outcome: 11.E4.R.5**

General Questions or Review Relating to the SLOs	Answers
Use the scatterplot to answer questions 1 to 4. **Slurpee Sales by Temperature** Slurpee Sales ($) vs Temperature (°C)	
1. Does this graph show a linear or non-linear relationship?	Linear
2. Interpolate to determine how much money will be made on Slurpee sales when the temperature is 15° C.	$110
3. Extrapolate to determine how much money will be made on Slurpee sales when the temperature is 40° C.	$160
4. Extrapolate to determine how much money will be made on Slurpee sales when the temperature is −10° C.	$60
5. What are the next three numbers in the linear pattern 9, 18, 27, 36 . . .?	45, 54, 63
6. Gas costs $1.25 per litre. If a car's tank has 20 L of gas in an 80 L tank, how much will it cost to fill it with gas?	$75
Use the following information to answer questions 7 and 8. A dog (*d*) will usually have 5 or 6 puppies in a litter. Use the following formula to determine how many puppies (*P*) will be born. ($P = 5.5d$)	
7. How many puppies do you expect will be born if four dogs give birth?	22 puppies
8. How many puppies do you expect will be born if seven dogs give birth?	38 or 39 puppies
Other Questions	
9.	
10.	

Mental Math

Grade 11 Essential Mathematics (30S)

H–12

Unit E: Relations and Patterns Review   **Specific Learning Outcomes: 11.E4.R.1/R.2/R.3/R.4**

General Questions or Review Relating to the SLOs	Answers

An RV has a water tank with 8 gallons of water. It is leaking. Use the graph to answer questions 1 to 6.

Rate of Water Loss
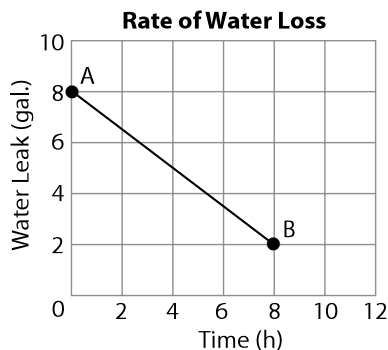
1. What is the slope of the line as a fraction? $\left(\text{slope} = \dfrac{\text{vertical change}}{\text{horizontal change}}\right)$

$-\dfrac{6}{8} = -\dfrac{3}{4}$ gal./h

2. What is the slope of the line as a decimal?

-0.75 gal./h

3. Extrapolate to determine when the tank will be empty.

About 10.5 h (10 h, 30 min.)

4. Estimate when the tank was half empty.

About 5.25 h (5 hr, 15 min.)

5. One gallon is approximately 3.75 litres. How many litres is the 8 gallon tank?

30 L

6. How many 4 litre jugs would you need to transfer all the water from an 8 gallon tank?

8 jugs (1 jug is half full)

7. A building blueprint has a scale of 1 cm: 2 ft. If a door is 3′ × 8′, how small should it be drawn on the blueprint?

1.5 cm × 4 cm

8. A map has a scale of 1 cm : 100 km. The distance measured between Winnipeg and Calgary is 13.3 cm. How many km apart are the two cities?

1330 km

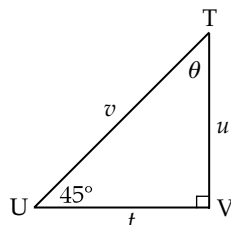**Other Questions**

9.

10.

Mental Math

Grade 11 Essential Mathematics (30S)

Unit F: Trigonometry Review　　　　　**Specific Learning Outcome: 11.E4.TG.1**

General Questions or Review Relating to the SLOs	Answers
1. What do D and A stand for in BEDMAS?	Division/ Addition
2. Evaluate: $45 + 12 \times (4 - 3)$	57
Simplify questions 3 and 4. An example is provided. $$\sqrt{500}$$ $$= \sqrt{(10^2)(5)}$$ $$= 10\sqrt{5}$$	
3. $\sqrt{30000}$	$100\sqrt{3}$
4. $\sqrt{4000}$	$20\sqrt{10}$
5. Evaluate: $100 \div \dfrac{1}{2}$	200
Use right triangle DEF to solve questions 6 to 8.	
6. Find the measure of angle θ in the above right triangle.	30°
7. If side $d = 20$ ft., what is the measure of side e? **Hint:** $\cos 60° = 0.5 = \dfrac{1}{2}$	40 ft.
8. If side e is 8 cm, what is the measure of side d?	4 cm
Other Questions	
9.	
10.	

Mental Math

H–14

Grade 11 Essential Mathematics (30S)

Unit F: Trigonometry Review   **Specific Learning Outcome: 11.E4.TG.1**

General Questions or Review Relating to the SLOs	Answers
Use right triangle TUV to solve questions 1 to 3.	
1. Find the measure of angle θ in the above right triangle.	45°
2. If side t = 40 ft., what is the value of side u? **Hint:** tan 45° = 1	40 ft.
3. Find the measure of side v if side u = 1 cm and t = 1 cm.	$\sqrt{2}$ cm
4. If the two shorter sides of a right triangle are 3 yd. and 4 yd., what is the length of the longest side?	5 yd.
5. If the two shorter sides of a right triangle are 30 mm and 40 mm, what is the length of the longest side?	50 mm
A fire ranger is in her tower. She spots a bear east of the tower at a 12° angle of depression. Her friend is 17 m west of the tower. Use the diagram to answer questions 6 to 8.	
6. Where would you label 12° and 17 m on the diagram? (Choose from A, B, C, D, E, F, G, and H.)	12° = D and H 17 m = F
7. Find the measure of angle C.	78°
8. If the bear is 4.7 m from the tower (G), how far is the bear from her friend?	21.7 m
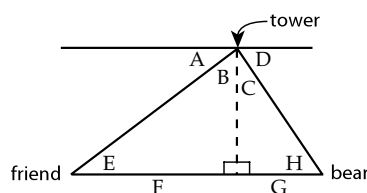
Other Questions

9.	
10.	

Mental Math

Grade 11 Essential Mathematics (30S)

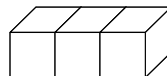**Unit G: Design Modelling Review**   **Specific Learning Outcome: 11.E4.D.1**

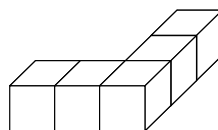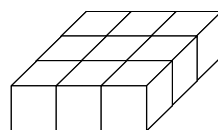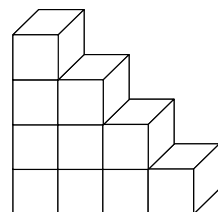| General Questions or Review Relating to the SLOs	Answers
For questions 1 to 4, the square side of each cube has a surface area of 10 cm². **Hint:** You are not given a side length this time.	
1. What is the surface area of the stack of 3 cubes as shown?	140 cm²
2. What is the surface area of the stack of 5 cubes as shown?	220 cm²
3. What is the surface area of the stack of 9 cubes as shown?	300 cm²
4. What is the surface area of the stack of 10 cubes as shown?	360 cm²
5. Evaluate: one-third of twelve.	4
6. Solve: $3x + 5 = 26$	$x = 7$
7. What is 12% of 50?	6
8. You earn $11 per hour. How much do you earn in 40 hours?	$440
Other Questions	
9.	
10.	

Mental Math

Grade 11 Essential Mathematics (30S)

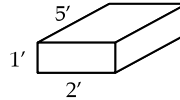**Unit G: Design Modelling Review**   **Specific Learning Outcome: 11.E4.D.1**

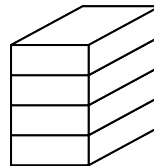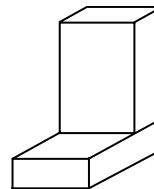| General Questions or Review Relating to the SLOs	Answers
For questions 1 to 4, each rectangle has dimensions as shown.	
1. What is the surface area of one rectangle?	34 sq. ft.
2. What is the surface area of the stack of four rectangles?	76 sq. ft.
3. What is the surface area of the stack of three rectangles?	82 sq. ft.
4. What is the surface area of the stack of two rectangles? **Hint:** Find the surface area of two full rectangles first, then subtract the covered area.	64 sq. ft.
5. Evaluate: one-fifth of fifteen	3
6. Solve: $16 = 4x - 8$	$x = 6$
7. What is 11% of 150?	16.5
8. You earn \$12 per hour. How much do you earn in 8 hours?	\$96
Other Questions	
9.	
10.	