Mental Math

H–1

Grade 12 Essential Mathematics (40S)

Unit A: Home Finance Review **Specific Learning Outcomes: 12.E5.A.1/E6.H.1**

General Questions or Review Relating to the SLOs	**Answers**
1. The interest earned on a savings account is 2% annually. How many dollars of interest will you receive in a year on a $500 investment?	$10
2. What percent is halfway between the percents? 3%, _____, 13%	8%
3. Evin buys a house for $100,000 more than Karl's house. Sharra's house costs $50,000 less than Karl's house. If Sharra's house costs $200,000, how much is Evin's house?	$350,000
4. The Ramone family wants to buy a $300,000 house in 6 years. They need a 20% down payment. How much should they save each year to reach their down payment goal?	$10,000 per year
5. The Yasui family have a monthly mortgage payment of $1270. Their electricity costs $150 per month and property taxes are $140 month. Their water bill is $120 every three months. What is the total of all of these expenses each month?	$1600
6. Orlando makes $72,000 per year. How much does he make each month?	$6000
7. Padraig bought a house on February 1. He will have to pay $2400 in property taxes on or before October 1 of the same year. How much should Padraig save each month to pay his property taxes on time?	$300
8. Raven bought a house for $140,000. She will pay a land transfer tax of $0 on the first $30,000, 0.5% on the amount between $30,000 and $90,000, and 1.0% on the amount between $90,000 and $150,000. How much does she pay for the land transfer tax in dollars?	$800
Other Questions	
9.	
10.	

Mental Math

Grade 12 Essential Mathematics (40S)

H–2

Unit A: Home Finance Review

Specific Learning Outcome: 12.E6.H.1

General Questions or Review Relating to the SLOs	Answers
1. Vasili has a $300,000 mortgage. He will make a monthly payment of $6 per $1000. Calculate Vasili's monthly mortgage payment.	$1800
2. Maeve has a mortgage for $250,000 over 25 years (or 300 months). She makes mortgage payments of $1000 per month. How much interest will Maeve pay on her mortgage?	$50,000
3. Sadie's house had sewage backup. Her homeowner's insurance covered $120,000 in replacement costs. Sadie spent $110,000 on repairs and $30,300 in furniture and other household contents. Sadie had to pay a $200 deductible to the insurance company. How much did Sadie have to pay?	$20,500
4. The Bailey family have a total portioned assessment of $70,000 on their home. The annual municipal rate is 10 mills. The annual education rate is 11 mills. Calculate the total annual municipal taxes and education taxes for the property.	$1470
5. Raini had a new furnace installed. One day, her furnace broke, costing $5200. The repair technician told her to replace her furnace filter three times a year. Each filter costs $10. She also needs to get an annual furnace inspection, costing $120. How much will Raini spend on maintenance costs in 5 years?	$750
6. Premjot decides to buy a new fridge. His old fridge cost him $700 a year in electricity. His new fridge only costs $25 a month in electricity. How much money does he save each year?	$400
7. Karen buys a new fridge and stove on sale for $3000. The electrical cost of her old appliances was $1200 a year but the new appliances cost only $50 a month for electricity. How many months will it take Karen to get her $3000 back? (Hint: Find the savings first.)	60 months or 5 years
8. Kevin currently rents a house for $1600 a month plus $200 in monthly utilities and tenant insurance for $100 per month. He is thinking about buying a house and will pay mortgage, property taxes, house insurance, utilities, and maintenance for a total of $2200 per month. Which option is cheaper and by how much?	Renting is cheaper by $300 per month
Other Questions	
9.	
10.	

Mental Math

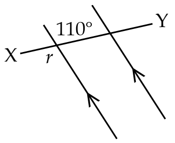
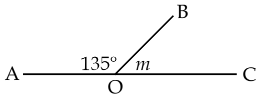
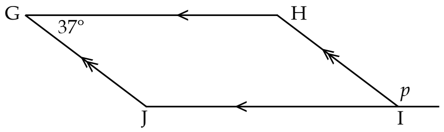
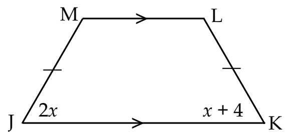
H–3

Grade 12 Essential Mathematics (40S)

Unit B: Geometry and Trigonometry Review **Specific Learning Outcomes: 12.E5.A.1/E6.G.2**

General Questions or Review Relating to the SLOs	Answers
1. Sudoku: Fill in the blanks with the five missing numbers. The numbers 1 to 5 can appear once in each row and in each column.	Row 1 = 3 Row 2 = 5 Row 4 = 3, 4 Row 5 = 3

5		2	4	1
1	4		3	2
3	1	4	2	5
2	5		1	
4	2	1	5	

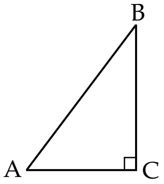
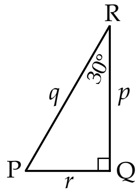
General Questions or Review Relating to the SLOs	Answers
2. Five people were at work. John finished work before Cassandra but after Amandeep. Riley finished work before Cadence but after Cassandra. Who finished work last?	Cadence
3. A regular pentagon has 5 equal angles. If the sum of the measurements of all the angles is 540°, what is the measurement of each angle?	108°
4. Find the measurement of $\angle r$. 	$\angle r = 110°$
5. Find the measurement of $\angle m$. 	$\angle m = 45°$
6. Find the measurement of $\angle p$ in parallelogram GHIJ. 	$\angle p = 143°$
Use the trapezoid shown here to answer questions 7 and 8. 	
7. Solve for x.	4
8. If $\overline{JM}$ is 12 cm, find $\overline{KL}$.	$\overline{KL} = 12$ cm
Other Questions	
9.	
10.	

Mental Math

Grade 12 Essential Mathematics (40S)

H–4

Unit B: Geometry and Trigonometry Review **Specific Learning Outcome: 12.E6.G.1**

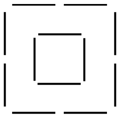
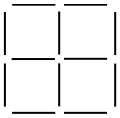
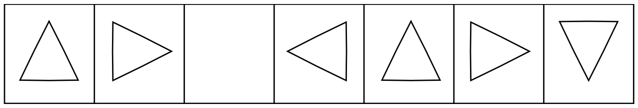
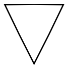
General Questions or Review Relating to the SLOs	Answers
1. Evaluate: $\left(\frac{1}{2}\right)(20\text{ in.})$	10 in.
2. Evaluate: $\dfrac{20\text{ cm}}{\left(\frac{1}{2}\right)}$	40 cm
3. Solve for x: $\frac{1}{2} = \frac{x}{30}$	$x = 15$
4. If ∠ABC is 37°, what is the measure of ∠BAC? 	∠BAC = 53°
Use the right triangle shown here to answer questions 5 and 6. Remember, $\sin\theta = \frac{\text{opposite}}{\text{hypotenuse}}$. $\sin 30° = \frac{1}{2}$ 	
5. If $q = 50$ cm, then $\sin 30° = \frac{r}{50}$. How long is r?	$r = 25$ cm
6. If $r = 20$ in., then $\sin 30° = \frac{20}{q}$. How long is q?	$q = 40$ in.
7. Solve for b: $b^2 = 3^2 + 4^2 - 21$	2
8. Solve for w: $w^2 = 5^2 + 6^2 - 36$	5
Other Questions	
9.	
10.	

Mental Math

Grade 12 Essential Mathematics (40S)

H–5

Unit C: Business Finance Review **Specific Learning Outcomes: 12.E5.A.1/E6.B.1**

General Questions or Review Relating to the SLOs	**Answers**
1. Move four sticks to make five squares. 	
2. What is the orientation of the missing shape in the pattern below? 	
3. 4 × 5 = 20: We can say that 4 and 5 have a **product** of 20. 4 + 5 = 9: We can say that 4 and 5 have a **sum** of 9. What are two integers with a product of 35 and a sum of 12?	5 and 7
4. Laurenza is looking for patterns of the 11 times table. She sees that 11 × 12 = 132; 11 × 32 = 352; 11 × 41 = 451; 11 × 53 = 583. How is the middle digit related to the first and last digits in each product?	Middle is sum of first and last
5. The Singh family has a mechanic's business. Mr. Singh pays employee salaries of \$5000 each month. He pays rent at \$1400 per month, and the utility bills are \$300 per month. If Mr. Singh wants to pay himself \$7000 per month, how much are his total monthly business expenses?	\$13,700
6. Wolf builds custom-made desks. For each desk, he charges \$40 per hour plus the cost of building materials. Wolf spends 30 hours building a desk. The materials cost \$300. How much will the desk cost?	\$1500
7. Liza charges \$70 for a manicure and pedicure in people's homes. If Liza has 20 clients one week and her expenses are \$300, how much profit does she make?	\$1100
8. Teo is an electrician and he does contract work. Teo charges the Ming family \$7000 to rewire their home. It costs Teo \$3300 in materials. How much profit does he make?	\$3700
Other Questions	
9.	
10.	

Mental Math

Grade 12 Essential Mathematics (40S)

H–6

Unit C: Business Finance Review **Specific Learning Outcomes: 12.E6.B.1/E6.B.2**

General Questions or Review Relating to the SLOs	Answers
1. Knowing $\frac{1100}{55} = 20$, what is $\frac{1100}{20}$?	55
Use the following information to answer questions 2, 3, and 4. Sidonie makes costume jewelry. She spends \$275 and \$325 from two suppliers of beads, metal, hemp, and glue. She buys a glue gun, a vise, and other tools for \$400.	
2. Sidonie will make 200 items with her supplies. How much does she need to charge per item to cover the cost of supplies and tools?	\$5 per item
3. If Sidonie charges \$10 per item, how many pieces of costume jewelry does she need to make to cover the cost of supplies and tools?	100 pieces
4. The next time Sidonie makes a batch of jewelry, she will buy more supplies but she will not buy more tools. If Sidonie makes another 200 items, how much will she need to charge per item to break even?	\$3 per item

Use the information provided to answer questions 5 and 6.

Chike has a small business. See the list on the right for this year's expenses.

Description	Cost
advertising	\$800
telephone	\$1500
fees/licences	\$200
mortgage interest	\$1500

Description	Cost
house heat	\$300
property taxes	\$300
supplies	\$800
house insurance	\$300

General Questions or Review Relating to the SLOs	Answers
5. If Chike runs her business from her home, what will be the total of the expenses from the list that she can submit for taxes?	\$5700
6. If Chike runs her business from an office, what will be the total of expenses from the list that she can submit for taxes?	\$3300
7. Imani has a small business. Her total income is \$55,000. Below is a list of deductions, only some of which are tax deductible. Calculate her taxable income.	\$46,000

Type of Deduction	Amount
personal vacation	\$4500
child care expenses	\$2000
unregistered pension payments	\$3000

Type of Deduction	Amount
business losses	\$400
union dues	\$600
registered pension payments	\$6000

General Questions or Review Relating to the SLOs	Answers
8. Solange submitted her tax return and she calculated that she owes \$3500. The government will allow her to pay this back in 12 monthly installments but she will have to pay \$100 in interest. How much will she pay each month?	\$300 per month

Other Questions

9.

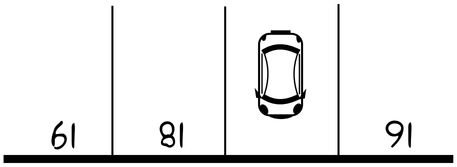
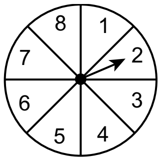
10.

Mental Math

Grade 12 Essential Mathematics (40S)

H–7

Unit D: Probability Review **Specific Learning Outcomes: 12.E5.A.1/E6.P.1**

General Questions or Review Relating to the SLOs	Answers
1. This is an overhead view of a parking lot with painted spot numbers. What is the number of the parking spot that the car is in? Hint: Think of the view of the driver. 	17 (the numbers are upside down)
2. Simplify the fraction: $\frac{64\ 246}{2}$	32 123
3. Express $\frac{3}{4}$ as a percent.	75%
4. Express $\frac{2}{25}$ as a percent.	8%
Use the spinner shown here to answer questions 5, 6, and 7. 	
5. What is the probability that the spinner will land on an even number? Express as a ratio in lowest terms.	1 : 2
6. What is the likelihood that you will spin a number less than 7? Express as a percent.	75%
7. What are the odds that the spinner will land on an even number? Express in lowest terms.	1 : 1
8. There is a 25% chance of rain. What are the odds that it will rain?	1 : 3
Other Questions	
9.	
10.	

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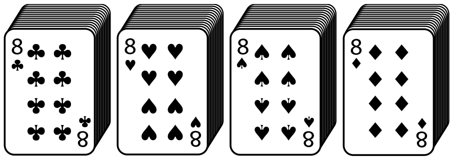
Grade 12 Essential Mathematics (40S)

Unit D: Probability Review **Specific Learning Outcome: 12.E6.P.1**

General Questions or Review Relating to the SLOs	Answers
There are four suits in a deck of cards (clubs, spades, diamonds, and hearts). There are 13 cards in each suit. There are 4 of each type of card. Use this information to answer questions 1 to 3. 	
1. What is the probability that you will not pick a heart in a deck of 52 cards? Express as a fraction in lowest terms.	$\frac{3}{4}$
2. What are the odds of drawing an 8?	4 : 48 or 1 : 12
3. What are the odds of drawing a 2, 3, 4, 5, or 6?	20 : 32 or 5 : 8
4. What is 30% of $200?	$60

Use the following table to answer questions 5 to 7. This table represents the odds of winning and losing at a dice game.

Event	Probability	Amount Won	Cost to Play	Payoff
Winning	$\frac{3}{5} = 0.6$	$220	$20	$200
Losing	$\frac{2}{5} = 0.4$	$0	$20	−$20

	Answers
5. What is the probability × payoff for winning the game?	$120
6. What is the probability × payoff for losing the game?	−$8
7. What is the expected value of the game?	$112
8. A volcano, Mount Artemis, erupts approximately every 300 years. If Mount Artemis last erupted in 1761, what are the chances it will erupt this year? Express your answer as a fraction.	$\frac{1}{300}$

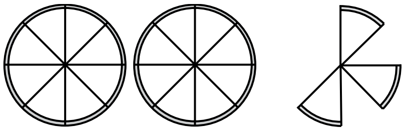
Other Questions	
9.	
10.	

Mental Math

Grade 12 Essential Mathematics (40S)

Unit E: Vehicle Finance Review **Specific Learning Outcomes: 12.E6.A.1/E5.V.1**

A	E	B	C	D
D	▨	A	B	E
	▨	E	D	B
B	▨	C	E	A
	▨			

General Questions or Review Relating to the SLOs	Answers
1. Alphabet Sudoku: The letters A, B, C, D, and E can appear once in each row and in each column. Determine the four shaded spaces in column 2.	Row 2 = C Row 3 = A Row 4 = D Row 5 = B
2. Represent the pizzas shown here as an improper fraction. 	$\frac{19}{8}$
3. There are 30 students in a class. Five students do not play the piano or the saxophone. Of the remaining students, 16 students play only the saxophone and another 6 students play the saxophone and the piano. How many students play the piano but not the saxophone?	3 students
4. Evaluate: $24 + 25 \times 3$	99
Use the following information to answer questions 5 and 6. Alaine has a $30,000 down payment to buy a house. The mortgage payments will be $1200 per month with property taxes at $120 per month and $80 monthly for heating. She currently has a car payment of $500 per month and credit card debt of $100 monthly. Her gross income is $5000 per month.	
5. Calculate 40% of Alaine's income.	$2000
6. If she buys the house, calculate the ratio of Alaine's monthly debt to her monthly gross income.	40%
7. A Lexus car has a base price of $52,000. Optional equipment includes a 5-stack CD player for $700, remote start for $600, and leather seats for $3000. There is an excise tax of $100 and a destination charge of $400. Calculate the manufacturer's suggested retail price for the car.	$56,800
8. Aaqib takes out a car loan for a Toyota truck. He makes payments of $800 a month for 60 months and he made a down payment of $5000. How much does he pay for the truck altogether?	$53,000
Other Questions	
9.	
10.	

Mental Math

Grade 12 Essential Mathematics (40S)

Unit E: Vehicle Finance Review

Specific Learning Outcome: 12.E5.V.1

General Questions or Review Relating to the SLOs	**Answers**
1. Noureddin leases a Honda car for 60 months with payments at $500 a month. After his lease is up, Noureddin can pay another $10,000 to buy the car. How much does he pay for the car in total?	$40,000
2. Luna leases a Chevy van with monthly payments of $610 a month for 5 years. How much did she pay for the lease?	$36,600
3. Morningstar buys a 3-year-old car for $18,000. She pays PST of $1440, a lien search for $30, and a safety inspection costing $60, including taxes. How much does she pay for the car?	$19,530
4. Hateyah wants to buy a used car that needs repairs. He takes it to a shop and they charge him $120 for the safety inspection and diagnostic test. The shop will charge $2100 for repairs. The price for the car is $6000 and the PST is $480. How much will he pay for the car?	$8700
5. A $50,000 SUV depreciates 20% the first year and 10% more in the second year. What is the depreciation in the second year?	$4000
6. Cindy drove 200 km and used 24.6 litres of gasoline. What is the fuel consumption rate of her vehicle in L/100 km?	12.3 L/100 km
7. Bear has a merit discount of 12%. Pleasure insurance for his vehicle has a rate of $750 before the discount. Calculate the amount of Bear's discount.	$90
8. Navjot has a merit discount of 10%. All-purpose vehicle insurance for Navjot's car is $1800 before the discount. How much will the insurance be after the discount?	$1620
Other Questions	
9.	
10.	

Mental Math

Grade 12 Essential Mathematics (40S)

H–11

Unit F: Statistics Review **Specific Learning Outcomes: 12.E6.A.1/E5.S.1**

General Questions or Review Relating to the SLOs	Answers
1. Kaymin and Shaquiel are making pancakes. One full recipe requires $\frac{3}{4}$ cups of flour. They wish to double the recipe. How many cups of flour do they need?	$1\frac{1}{2}$ or $\frac{3}{2}$
2. Alizon is making pancakes with the same recipe requiring $\frac{3}{4}$ cups of flour. She wants to make half a recipe. She estimates that a $\frac{1}{2}$ cup of flour is needed. Is that an underestimate or an overestimate?	Overestimate
3. Five people went into a hairdressing shop for haircuts. Omar went in before Chetan but after Simarpal. Rob went before Klaus but after Chetan. Who went into the shop last?	Klaus
Use the following data to answer questions 4 to 8. 2, 4, 4, 5, 6, 7, 14, 38	
4. What is the median?	5.5
5. What is the mode?	4
6. What is the mean?	10
7. Eliminate the outlier and calculate the median.	5
8. Eliminate the outlier and calculate the mean.	6
Other Questions	
9.	
10.	

Mental Math

Grade 12 Essential Mathematics (40S)

H–12

Unit F: Statistics Review **Specific Learning Outcomes: 12.E5.S.1/E5.S.2**

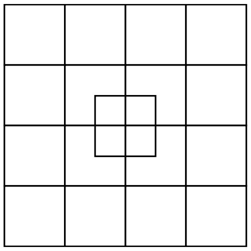
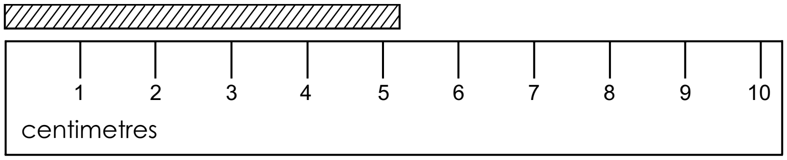
General Questions or Review Relating to the SLOs	Answers
Use the following information to answer questions 1 and 2. Amanda just received her marks for her second year at university. ■ English Literature: 4.0 ■ Greek Mythology: 4.0 ■ Anatomy and Physiology: 2.6 ■ Observational Astronomy: 3.8	
1. What is Amanda's grade-point average (GPA)?	3.6
2. If English Literature and Observational Astronomy are half-credit courses, what is Amanda's weighted GPA?	3.5
Use the following data to answer questions 3 to 5. 5, 4, 11, 6, 4	
3. What is 27 more than the median?	32
4. What is the mode times 7?	28
5. What is the mean divided by 2?	3
Use the information below to answer questions 6 to 8. N = the total number of scores b = the number of scores below a given score $\text{Percentile Rank} = \frac{b}{N} \times 100$	
6. Your test mark is 80% and three other people in your class of 50 students have the same mark as you. There are 28 people with a lower test mark than you. What is your percentile rank?	56th
7. Your test mark is 77% and one other person has the same mark as you in your class of 25 students. There are 21 people with a lower test mark than you. What is your percentile rank?	84th
8. Your test mark is 72% and, in your class of 20 students, nobody else has the same mark as you. There are two people with a higher mark. What is your percentile rank?	85th
Other Questions	
9.	
10.	

Mental Math

Grade 12 Essential Mathematics (40S)

H–13

Unit G: Precision Measurement Review **Specific Learning Outcomes: 12.E6.A.1/E5.P.1**

General Questions or Review Relating to the SLOs	**Answers**
1. □ + □ + ○ = 21 ○ = △ + □ = 10 △ = ○ + ○ = 18 □ =	○ = 9 △ = 4 □ = 6
2. Complete the sequence: 3, 7, 11, ____ , ____	15, 19
3. How many squares are there? 	35
4. State the precision of 452.36 cm.	hundredth of a centimetre
5. State the precision of 24.1 m.	tenth of a metre
Use the following diagram to answer questions 6 to 8.  1 2 3 4 5 6 7 8 9 10 centimetres	
6. Measure the string using the given ruler.	5 cm
7. What is the precision?	nearest centimetre
8. What is the uncertainty?	±0.5 cm
Other Questions	
9.	
10.	

Mental Math

H–14

Grade 12 Essential Mathematics (40S)

Unit G: Precision Measurement Review **Specific Learning Outcome: 12.E5.P.1**

General Questions or Review Relating to the SLOs	Answers
1. There are 12 inches in a foot. How many inches is 4′6″?	54″
2. What is 51″ in feet and inches?	4′3″
3. There are 100 centimetres in a metre. How many cm is 3.4 m?	340 cm
Use the following information to answer questions 4 to 8. You are redecorating your bedroom. ■ The bedroom has four walls all measuring 12′ by 10′ high. ■ You have a window that is 5′ × 5′ on one wall. ■ You have a door that measures 3′ wide by 7′ high.	
4. How many feet of baseboards do you need to go around all four walls? (Your door does not need baseboards.)	45′
5. What is the total area of the window and door openings?	46 ft.^{2}
6. You want to paint. What is the total surface area of the bedroom walls? (You don’t need paint for the window or door.)	434 ft.^{2}
7. You buy primer and paint for your room. You need one can of primer at $22 and two cans of paint at $39 each. How much will this cost with taxes (PST 8% and GST 5%)?	$113
8. You want to buy new carpeting at $2 per square foot. How much will it cost before taxes to carpet your room?	$288
Other Questions	
9.	
10.	