

Mental Math

Grade 9 Mathematics (10F)

C-1

Substrand: Variables and Equations

Specific Learning Outcome: 9.PR.3

General Questions

1. What number satisfies the equation $\frac{4}{9} = \frac{x}{27}$?
2. If 35 out of 54 students in Grade 9 participate in after-school sports, how many students do not participate in after-school sports?
3. If you buy French fries that cost \$2.63 with a \$5 bill, how much money will you get back?
4. Divide a bill of \$93 equally among 3 people. How much does each person pay?
5. Simplify: $\frac{1}{2} \div \frac{2}{5}$
6. How many centimetres are equivalent to 8 km?

Answers

$x = 12$

19 students

\$2.37

\$31

$\frac{5}{4}$ or $1\frac{1}{4}$

800 000 cm

Unit Questions

7. Solve: $3x = 12$
8. Solve: $4x - 2 = 18$
9. Solve: $5x - 6 = 4$
10. Solve: $2(x - 3) = 8$

$x = 4$

$x = 5$

$x = 2$

$x = 7$

Other Questions

11.

12.

Mental Math

Grade 9 Mathematics (10F)

C-2

Substrand: Variables and Equations

Specific Learning Outcome: 9.PR.3

General Questions

1. Evaluate: $2 + 6 \times 5$
2. Paul says his annual salary is equal to three-fourths of \$60,000. What is his annual salary?
3. What is the area of a gymnasium that measures 30 m by 50 m?
4. Damien is 12 years old. His cousin Roland is 18 years old and his uncle Patrick is 30 years old. What is the average age of Damien, Roland, and Patrick?
5. Francisco got a mark of $\frac{46}{50}$ on his social studies exam. Express his results as a percentage.
6. Express $\frac{3}{5}$ as a number in decimal form.

Answers

32

\$45,000

1500 m²

20 years

92%

0.6

Unit Questions

7. Is $x = -3$ the solution to the equation $2x + 6 = 12$? Justify your answer.
8. Solve: $\frac{x}{8} = 12$
9. Solve: $\frac{24}{x} = 6$
10. Solve: $\frac{3}{x} = 6$

No, since $2(-3) + 6 \neq 12$.

$x = 96$

$x = 4$

$x = \frac{1}{2}$

Other Questions

11.

12.

Mental Math

C-3

Grade 9 Mathematics (10F)

Substrand: Variables and Equations

Specific Learning Outcome: 9.PR.3

General Questions

1. There are 9 boys and 13 girls in the classroom. What is the probability of randomly choosing a girl?
2. If the balance of your savings account is \$80 and you withdraw \$43 with your debit card, how much money is left in your savings account?
3. Jonathan can type 40 words per minute on the computer. After one hour, how many words will he type?
4. Tristan has 256 hockey cards. Eric has two times that number of hockey cards. How many hockey cards does Eric have?
5. What is the next number in the following pattern: 56, 50, 44, 38, ___?
6. Express $\frac{3}{20}$ as a number in decimal form.

Answers

$$\frac{13}{22}$$

\$37

2400 words

512 cards

32

0.15

Unit Questions

7. Solve: $3x = 10 + x$
8. Solve: $-2x = -8 - 3 + 5$
9. What is the opposite of adding $\frac{1}{4}$?
10. Solve: $2(x + 2) = 18$

$$x = 5$$

$$x = 3$$

subtracting $\frac{1}{4}$

$$x = 7$$

Other Questions

11.

12.

Mental Math

Grade 9 Mathematics (10F)

C-4

Substrand: Variables and Equations

Specific Learning Outcome: 9.PR.3

General Questions

1. Reduce the fraction $\frac{50}{450}$.
2. If the price of an \$800 canoe is reduced by 25%, what is the final price of the canoe?
3. How many minutes elapse between 12:15 p.m. and 4:00 p.m.?
4. What is the median of the following set of numbers: 1, 6, 8, and 10?
5. How much will each person receive if \$640 is divided equally among eight people?
6. How many weeks will it take to repay a debt of \$500 if you make payments of \$25/week?

Answers

$$\frac{1}{9}$$

\$600

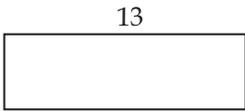
225 minutes

7

\$80

20 weeks

Unit Questions

7. Solve: $0.7x + 1.8x = 10$
8. Solve: $\frac{x}{3} + 5 = 20$
9. Find the value of x if the perimeter of the rectangle shown measures 46 units.

10. Is $x = 2$ the solution for the equation $2(x + 3) + 5x = 3x + 14$? Justify your answer.

$$x = 4$$

$$x = 45$$

$$x = 5$$

Yes, both sides equal 20.

Other Questions

11.

12.

Mental Math

Grade 9 Mathematics (10F)

C-5

Substrand: Variables and Equations

Specific Learning Outcome: 9.PR.4

General Questions

1. Add: $\$4.99 + \$0.99 + \$5.99$
2. How much money will you earn per month if you earn \$24,000 per year?
3. Express $\frac{9}{20}$ in decimal form.
4. Which of the following fractions is smaller: $\frac{4}{9}$ or $\frac{1}{5}$?
5. If your savings account balance is \$430 and you deposit a cheque for \$210, what is your new account balance?
6. If you are charged a 2% delivery charge on a new \$250 bike, what is the cost of the delivery charge?

Answers

\$11.97

\$2000

0.45

$\frac{1}{5}$

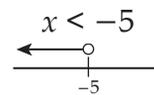
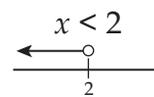
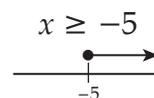
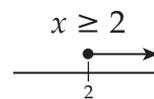
\$640

\$5.00

Unit Questions

Solve and show your answer on a number line.

7. $2x \geq 4$
8. $-3x \leq 15$
9. $3 + 2x < x + 5$
10. $5 - 5x > 10 - 4x$



Other Questions

11.

12.

Mental Math

Grade 9 Mathematics (10F)

C-6

Substrand: Variables and Equations

Specific Learning Outcome: 9.PR.4

General Questions

1. Water bottles cost \$1.30 each. How many water bottles could you buy with \$5.20?
2. Evaluate: 1^{49}
3. Write $\frac{2}{8}$ in decimal form.
4. Estimate a tip of 10% on a bill of \$48.75.
5. Reduce the ratio 24:18 to its simplest form.
6. What number is found halfway between 8 and 20?

Answers

4 bottles

1

0.25

\approx \$5

4:3

14

Unit Questions

7. When dividing by a negative number on both sides of a linear inequality, what happens to the inequality symbol?
8. You have \$5 and want to spend some of it to buy x bars of chocolate, which cost 0.67¢ each. Write an inequality that represents this.
9. If $x = 2$, then $3x > 2x + 3$. True or false?
10. If $x = -2$, then $-2x + 5 > 5$. True or false?

It changes direction.

$67x \leq 500$ or
 $0.67x \leq 5$

False

True

Other Questions

11.

12.

Mental Math

Grade 9 Mathematics (10F)

C-7

Substrand: Variables and Equations

Specific Learning Outcome: 9.PR.4

General Questions	Answers
1. You are charged a delivery fee of 6% on the value of a sofa costing \$500. How much are your delivery charges?	\$30
2. Solve: $18 + w = 30$	$w = 12$
3. If the balance in your chequing account is \$410 and you deposit \$34.70, what is your new account balance?	\$444.70
4. How many centimetres are equivalent to 49.4 m?	4940 cm
5. Alex spends one hour reading 22 pages of a novel. At this rate, how many pages will he read in 5 hours?	110 pages
6. Write the number equivalent to $\frac{9}{15}$ in decimal form.	0.6
Unit Questions	
7. In the solution to an inequality, explain the difference between $x > 5$ and $x \geq 5$.	$x > 5$ does not include 5. $x \geq 5$ includes 5.
8. You have at most \$110 to spend on a number of pizzas that cost \$12 each. The delivery charge is \$7. Write an inequality that models this situation.	$12x + 7 \leq 110$
9. Determine the maximum number of pizzas you could buy and have delivered as described in question 8.	8 pizzas
10. Is $x = 1$ the solution to the equation $3(x + 4) + 2x < 4x + 9$? Justify your answer.	No, $17 \not< 13$.
Other Questions	
11.	
12.	

Mental Math

Grade 9 Mathematics (10F)

C-8

Substrand: Variables and Equations

Specific Learning Outcome: 9.PR.5

General Questions

1. At a restaurant, you want to leave a tip of 15% on a bill of \$12.05. Estimate the value of your tip.
2. Add: $\frac{2}{3} + \frac{1}{6}$
3. Multiply: $5 \times 82 \times 2$
4. What is the perimeter of a schoolyard that measures 900 m by 300 m?
5. You take 2 minutes to complete 3 math problems. At this rate, how many minutes will it take you to complete your homework if you have 18 problems?
6. In 280 days, Kamal is travelling to Asia. How many weeks until she leaves?

Answers

$\approx \$1.80$

$\frac{5}{6}$

820

2400 m

12 minutes

40 weeks

Unit Questions

What name do you give to each of the parts of the expression $4x^2 + 8$?

7. 4
8. x
9. 2
10. 8

coefficient

variable

exponent

constant
(or term)

Other Questions

- 11.
- 12.

Mental Math

Grade 9 Mathematics (10F)

C-9

Substrand: Variables and Equations

Specific Learning Outcome: 9.PR.5

General Questions

1. If your savings account balance is \$240 and you make a withdrawal of \$42, what is your new account balance?
2. Evaluate: 31.54×10
3. Express $4\frac{5}{7}$ as an improper fraction.
4. In your French class of 20 students, 18 have already read the play *Les Misérables*. What fraction of students does that represent?
5. Which is the better buy: 6 doughnuts for \$2.75 or 12 doughnuts for \$5?
6. Multiply: $\frac{3}{5} \times \frac{2}{3}$

Answers

\$198

315.4

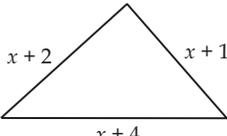
$\frac{33}{7}$

$\frac{9}{10}$ or $\frac{18}{20}$

12 doughnuts
for \$5

$\frac{2}{5}$

Unit Questions

7. If x is your current age, write an expression for your age in 10 years.
8. One-quarter of a number equals 3. Express this in an equation.
9. Write an expression to describe the perimeter of the triangle shown on the right.

10. How many terms are in the expression $4x^3 - 8x + 6y$?

$x + 10$

$\frac{x}{4} = 3$

$3x + 7$

3 terms

Other Questions

11.

12.

Mental Math

Grade 9 Mathematics (10F)

C-10

Substrand: Variables and Equations

Specific Learning Outcome: 9.PR.5

General Questions

1. Evaluate: $6 \times 0 \times 5 \times 245$
2. Nadia is 17 years younger than Riley. If Riley is 35 years old, what age is Nadia?
3. The price of a \$420 stereo is reduced by 20%. What is the amount of the reduction?
4. If you work 12 hours at an hourly rate of \$6 per hour, what is your total pay?
5. Convert 1 cm^2 to an equivalent amount in mm^2 .
6. Which of the following fractions is smallest: $\frac{1}{3}$, $\frac{4}{5}$, $\frac{6}{13}$?

Answers

0

18 years old

\$84

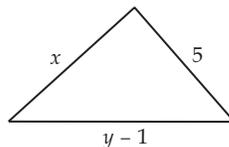
\$72

100 mm^2

$\frac{1}{3}$

Unit Questions

7. Identify the constant in the expression $8x - 16 + 3y$.
8. Write an equivalent expression to $\frac{2x + 1}{2}$.
9. Identify the like-term(s) to $3x$ amongst the following terms:
 $-2x$ $6x^2$ $3y$
10. Write an expression to describe the perimeter of the triangle shown on the right.



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Examples:

$x + \frac{1}{2}$ or $\frac{4x + 2}{4}$

-2x

$x + y + 4$

Other Questions

11.

12.

Mental Math

Grade 9 Mathematics (10F)

C-11

Substrand: Variables and Equations

Specific Learning Outcome: 9.PR.5

General Questions	Answers
1. Cecil swims 25 lengths of the pool 3 times a week. How many lengths of the pool will he swim in 10 weeks?	750 lengths
2. How much GST (5%) do you pay on a purchase of \$5?	\$0.25
3. What two consecutive numbers have a product of 12 and a sum of 7?	3 and 4
4. Estimate the sale price on an \$89.95 baseball glove if it is on sale for 10% off.	\approx \$81.00
5. Estimate the value of the product of 42 and 38.	\approx 1600
6. Estimate the square root of 80.	\approx 9
Unit Questions	
7. Simplify: $3x - 7x$	$-4x$
8. Simplify: $x + 3x + 6x$	$10x$
9. Simplify: $4x + 5x - 2x - x$	$6x$
10. Which term in the polynomial, $3x - 5x^2 + 6$, has the exponent with the highest degree?	$-5x^2$
Other Questions	
11.	
12.	

Mental Math

Grade 9 Mathematics (10F)

C-12

Substrand: Variables and Equations

Specific Learning Outcome: 9.PR.6

General Questions

1. If you buy 4 boxes of cereal at \$2.99 per box, what is the total cost of your purchase?
2. Write an expression to represent the sum of x and its square.
3. What is the maximum number of people that could eat at the same time in a restaurant with 32 tables large enough to sit 4 people?
4. In a Grade 9 class with 65 students, 20% wear glasses. How many students does that represent?
5. Simplify the fraction $\frac{12}{16}$.
6. A sweater that costs \$48 is on sale for 10% off. Find the sale price.

Answers

\$11.96

$x + x^2$

128 people

13 students

$\frac{3}{4}$

\$43.20

Unit Questions

7. Simplify: $(2x + 6) - (5x - 4)$
8. Simplify: $4x + 5 + 8x^2 + 3x - 4 - 10x^2$
9. Simplify: $3x^2 + 3x + 3 - (2x^2 + 4x + 2)$
10. Find the binomial that is missing: $(3x + 1) + (\text{_____}) = 2x + 3$

$-3x + 10$

$-2x^2 + 7x + 1$

$x^2 - x + 1$

$-x + 2$

Other Questions

11.

12.

Mental Math

Grade 9 Mathematics (10F)

C-13

Substrand: Variables and Equations

Specific Learning Outcome: 9.PR.6

General Questions	Answers
1. If a herd of 32 sheep join a herd of 62 cows, how many animals are there in total?	94 animals
2. If you pay for a meal of \$11.35 with a \$20 bill, how much money will you get back?	\$8.65
3. In a lake that contains 560 fish, 290 were caught. How many fish are still in the lake?	270 fish
4. What is the amount of GST (5%) on a \$9000 boat?	\$450
5. What is the next number in the sequence: 3, 8, 13, 18, ____?	23
6. Express $\frac{2}{5}$ as a percent.	40%
Unit Questions	
7. Simplify: $(3x^2 + 2x + 6) - (5x^2 - 3x + 12)$	$-2x^2 + 5x - 6$
8. $5x^2 - 4$ is equivalent to $(3x^2 + 4x - 7) - (-2x^2 + 4x - 3)$. True or false?	True
9. Which expression is equivalent to $\frac{-6x^2 - 4x - 12}{-2}$?	b) $3x^2 + 2x + 6$
a) $3x^2 - 4x - 12$ b) $3x^2 + 2x + 6$ c) $3x^2 - 2x - 6$	
10. Simplify: $3x^2 + 3x + 3 + 2x^2 + 4x + 2$	$5x^2 + 7x + 5$
Other Questions	
11.	
12.	

Mental Math

Grade 9 Mathematics (10F)

C-14

Substrand: Variables and Equations

Specific Learning Outcome: 9.PR.7

General Questions

1. Convert 8.5 cm into mm.
2. What percentage represents three months out of one year?
3. Evaluate: $4 + 6 \times 2$
4. What is the area of a rectangular cake that measures 20 cm by 60 cm?
5. If 30 m^3 of soil costs \$900, what is the price per m^3 ?
6. How many minutes pass between 3:55 p.m. and 6:00 p.m.?

Answers

85 mm

25%

16

1200 cm^2

$\$30/\text{m}^3$

125 minutes

Unit Questions

7. Find the product of $8x$ and $3x$.
8. Simplify: $(4ab)(3ab)$
9. Simplify: $\frac{24x^2y}{8x}$
10. Simplify: $(-5y)(-8x^2y)$

$24x^2$

$12a^2b^2$

$3xy$

$40x^2y^2$

Other Questions

11.

12.

Mental Math

Grade 9 Mathematics (10F)

C-15

Substrand: Variables and Equations

Specific Learning Outcome: 9.PR.7

General Questions	Answers
1. What number corresponds to two times the reciprocal of 4?	$\frac{1}{2}$
2. If 12 out of 30 students from your English class are going to the theatre, what fraction of students does this represent?	$\frac{2}{5}$
3. What is your total sum of money when you have 10 quarters, 12 dimes, and 6 pennies?	\$3.76 or 376¢
4. Calculate the product of 46 and 0.5.	23
5. How many grams are equal to 64 kg?	64 000 g
6. The price of an \$80 cushion was reduced by 40%. What is the sale price of the cushion?	\$48
Unit Questions	
7. Simplify: $2(x + 2y)$	$2x + 4y$
8. Simplify: $3x(2x - 4y + 1)$	$6x^2 - 12xy + 3x$
9. Simplify: $-5(8 + 2)$	-50
10. Simplify: $-5x(z^2 - 4x + 3)$	$-5xz^2 + 20x^2 - 15x$
Other Questions	
11.	
12.	

Mental Math

Grade 9 Mathematics (10F)

C-16

Substrand: Variables and Equations

Specific Learning Outcome: 9.PR.7

General Questions

1. Add: $\frac{3}{5} + \frac{7}{10}$

2. How much PST (8%) do you have to pay on a purchase of \$30?

3. If you earn \$35 after each shift, how much money will you earn after 4 shifts?

4. There are 20 students in your mathematics class and $\frac{1}{4}$ of them are absent one day. How many students are absent?

5. An enclosure contains 23 horses. How many legs can you count?

6. Evaluate: $\frac{4}{0}$

Answers

$\frac{13}{10}$

\$2.40

\$140

5 students

92 legs

There is no such number.

Unit Questions

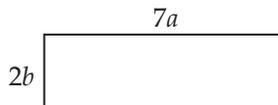
For questions 7 and 8, find the value of the polynomials knowing that $x = 3$ and $y = 2$.

7. $x^2 + y^2$

8. $-x - 3y$

9. Write an expression equivalent to $-(x - 3)$.

10. Express the area of the following rectangle in terms of a and b .



13

-9

$3 - x$ or
 $-x + 3$

$14ab$

Other Questions

11.

12.