

Grade 8IB Math

St. Thomas High School

## MIDTERM REVIEW PACKAGE

Name: \_\_\_\_\_

Teacher: \_\_\_\_\_

Exam Date & Time: FRIDAY, DECEMBER 20<sup>TH</sup>, 2019

8 AM TO 11AM

**Remember to bring (IN A CLEAR ZIPLOC):**

- pencils, eraser, sharpener, ruler, highlighters
- calculator
- Memory aid (8 1/2 by 11" page single-sided/hand-written, **name in the top right hand corner**)

## BREAKDOWN OF EXAM

### The exam will consist of

- 6 multiple choice (4 marks each), (24%)
- 4 short answer (4 marks each), and (16%)
- 6 long answer questions (IB grading rubric Criterion A,B,C,D) (60%)

### TOPICS

#### 1. Numeracy (Review)

- Order of Operations with Integers
- Order of Operations with Fractions

#### 2. Equations

- Translating Words into Equations with One Unknown
- Properties of Equations
- Solving Simple Equations (one or two step)
- Solving Simple Equations Using the Distributive Property
- Solving Equations with Variables on Both Sides
- Solving Equations with Fractions
- Solving Word Problems

#### 3. Proportions and Ratios

- Properties of proportions
- Solving proportions
- Recognizing proportional situations (table, graph, word problem)
- Writing the rule for a proportional situation (table, graph, word problem)
- Completing a table of values for a proportional situation
- Solving problems involving part-to-part and part-to-whole ratios

#### 4. Percentages

- Converting percents, fractions and decimals
- Calculating Markup, Discount and Taxes
- Word problems with percentages
- Calculating percent change (ie: % increase, decrease, profit)
- Business math terms (expenses, profit, manufacturing cost per item, etc...)
- Business math calculations (% profit per item, % profit for business, etc...)

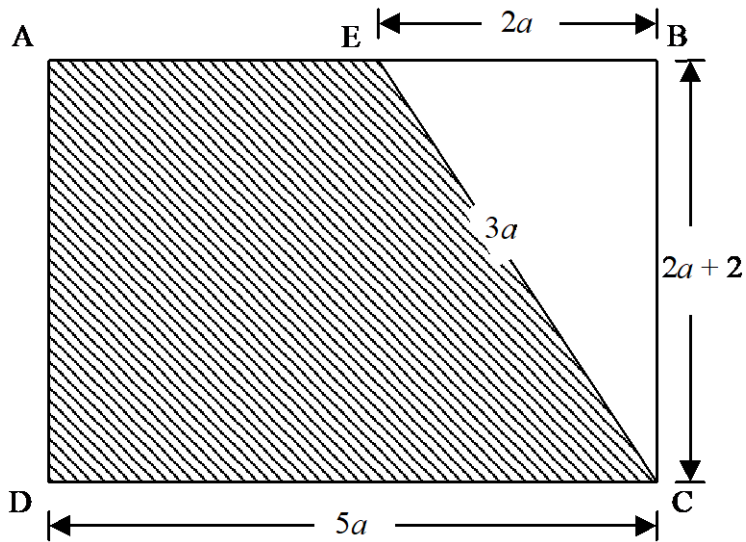
#### 5. Rates

- Comparing unit rates
- Converting rates

**Part I: Multiple Choice**

1

Triangle BCE is removed from rectangle ABCD shown below.



The perimeter of the shaded area measures 46 units.

Side EB of the triangle measures  $2a$  units.

Hypotenuse CE measures  $3a$  units.

Side BC measures  $(2a + 2)$  units and side CD,  $5a$  units.

Which of the following equations expresses the perimeter of the shaded figure AECD?

A)  $7a + 2 = 46$

B)  $10a + 2 = 46$

C)  $12a + 2 = 46$

D)  $13a + 2 = 46$

2

Pierre is in charge of renting sports equipment at an open air camp.

To serve his customers more efficiently, he made charts publicizing the cost of renting the equipment for various lengths of time.

Here is the chart for pedal-boat rentals :

PEDAL-BOAT RENTALS

TIME	1h00	1h30	2h00	2h30	3h00	3h30	4h00
COST	\$5.50	\$6.50	\$7.50	\$8.25	\$9.00	\$9.50	\$10.00

Which of these statements is true?

- A) For each added hour of rental, the cost increase is constant.
- B) Whatever the duration of the rental, the cost for each 30-minute period is the same.
- C) The longer the rental, the less expensive it costs per hour.
- D) The longer the rental, the more expensive it costs per hour.

3

Michael pays \$44 for a workbook, a geometry set and a dictionary. The workbook costs 3 times the price of the geometry set, while the dictionary costs 6 times the price of the workbook.

Let  $x$  be the price of the geometry set.

Which equation can be used to calculate the price of the geometry set?

- A)  $x + 3x + 18x = 44$
- B)  $x + 3x + 6x = 44$
- C)  $x + \frac{x}{3} + 6x = 44$
- D)  $x + \frac{x}{3} + \frac{x}{6} = 44$

4

The ages of Sylvia, Mario and Claudia add up to 70. Sylvia's age, diminished by 5, is equal to Mario's age, and Claudia's age is one-half of Mario's.

If  $x$  represents Sylvia's age, which of the following equations represents this situation?

A)  $x + x + 5 + \frac{x + 5}{2} = 70$

B)  $x + x - 5 + \frac{x - 5}{2} = 70$

C)  $x + x - 5 + \frac{x}{2} = 70$

D)  $x + x + 5 + \frac{x}{2} = 70$

5

Mylène, Kim and Judith collect erasers. Together they have 285 samples. Mylène has twice as many erasers as Kim and Judith has 30 fewer than Mylène.

Which equation can be used to calculate the number of erasers  $x$  that Kim has in her collection?

A)  $x + 2x + (x - 30) = 285$

B)  $x + 2x + (2x - 30) = 285$

C)  $x + (x + 2) + (x + 2 - 30) = 285$

D)  $x + (x - 30) + 2(x - 30) = 285$

6

What is the value of  $x$  in the following equation?

$$5x - \frac{1}{2} = \frac{11}{2}$$

A) 6

C)  $\frac{6}{5}$

B) 5

D)  $\frac{1}{2}$

7

Last season, Simon, Max and Justin scored a total of 366 points for their basketball team.

Max scored 25 points fewer than Justin. Simon scored 40 points more than Max.

Which of the following equations could be used to determine the number of points  $x$  scored by Justin?

A)  $x + (x - 40 + 25) + (x + 25) = 366$

B)  $x + (x + 40 - 25) + (x - 25) = 366$

C)  $x + (x - 40) + (x + 25) = 366$

D)  $x + (x + 40) + (x - 25) = 366$

8

During the annual chocolate bar drive, Laird sold 16 more bars than Felicia did whereas Kim sold three times as many as Felicia. Together the three of them sold 216 bars.

If  $c$  is the number of bars that Felicia sold, which of the following equations can be used to represent this situation?

A)  $c + (c + 16) + (c + 3) = 216$

B)  $c + (c - 16) + 3c = 216$

C)  $c + (c + 16) + 3c = 216$

D)  $c + (c + 16) + 3(c + 16) = 216$

9

What is the solution to the following equation?

$$2(x + 3) - 5 = 17 - 4x$$

A)  $\frac{17}{6}$

C)  $\frac{-8}{3}$

B)  $\frac{8}{3}$

D)  $\frac{-17}{6}$

10

An electronics store entices customers with a draw held during its annual Summer Sale.

Three winners will share a total of \$750 in prizes.

The first-place winner will receive three times the amount of the third-place winner. The second-place winner will receive \$75 more than the third-place winner.

If  $x$  represents the amount won by the third-place winner, which of the following equations represents the situation?

A)  $3x = 750$

C)  $3x + x + 75 = 750$

B)  $3x + 75 = 750$

D)  $3x + x + 75 + x = 750$

11

In the equation  $x + (x + 1) + (x + 2) - 12 = (x + 3)$ ,  $x$  represents the smallest number in a series of 4 consecutive integers.

Which of the following describes this equation?

A) Given 4 consecutive integers, the sum of the first three integers is 12 less than the fourth integer.

B) Given 4 consecutive integers, the product of the first three integers is 12 less than the fourth integer.

C) Given 4 consecutive integers, the sum of the first three integers is 12 more than the fourth integer.

D) Given 4 consecutive integers, the product of the first three integers is 12 more than the fourth integer.

12

Which of the following is the simplified version of this expression?

$$4(7x + 5) - 2(3x - 6) + 2^2 + 6^2 \div 8$$

A)  $22x + 25.5$

C)  $22x + 22.5$

B)  $22x + 40.5$

D)  $22x + 16.5$

13

Mike's favorite cereal is called *Lucky Stars*.

The company producing this cereal has just announced that its new larger box will contain 30% more cereal than its current smaller box does.

Each large box will contain 520 grams of cereal.

**How many grams of cereal does the current small box contain?**

A) 156 g

C) 400 g

B) 364 g

D) 676 g



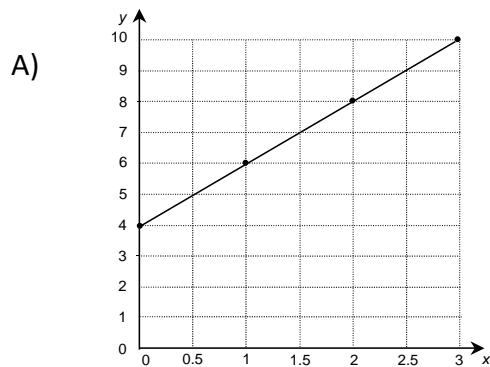


Which of the following shows a direct proportional situation for graph, table and rule?

**Graph**

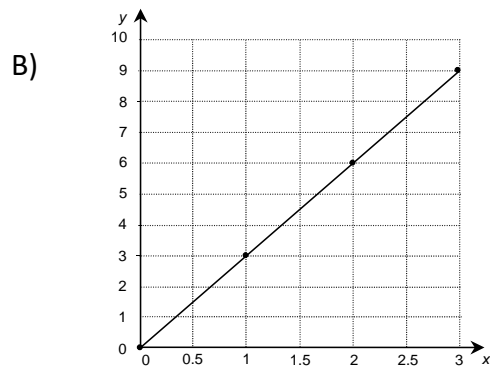
**Table**

**Rule**



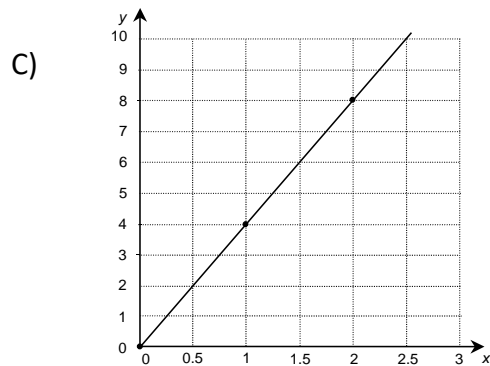
x	0	1	2	3
y	4	6	8	10

$$y = 2x + 4$$



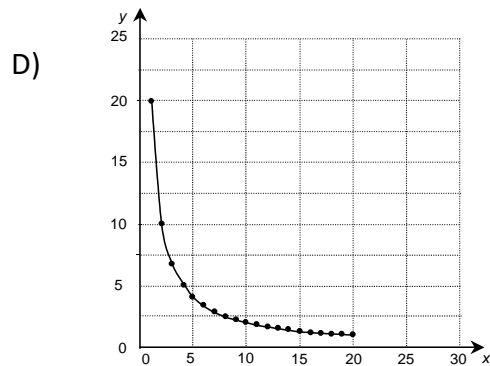
x	0	1	2	3
y	0	3	6	9

$$y = 3x + 2$$



x	0	1	2	3
y	0	4	8	12

$$y = 4x$$



x	2	4	5	10
y	10	5	4	2

$$y = \frac{20}{x}$$

15

Given the following speeds:

- 1) 15 m/s                      2) 700 m/min                      3) 9 km/15 min                      4) 48 km/hr

Which sequence lists the different speeds from slowest to fastest?

- A) 2, 3, 1, 4                                      C) 3, 1, 4, 2  
 B) 2, 4, 1, 3                                      D) 3, 2, 4, 1

### Part II – Short Answer

1

Camille earns \$14/hour working as a security guard.

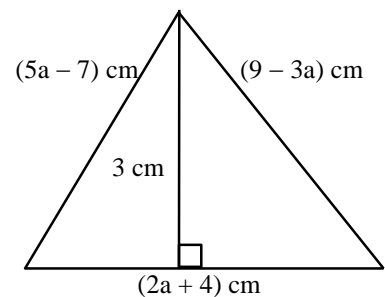
Given this situation, complete the following table of values.

Camille's hours	2	b	8	d
Camille's earnings	a	56	c	126

2

Given the triangle illustrated at the right.

The length of each side is represented by an algebraic expression.



Write the simplified expression for the perimeter of the triangle

3

Solve the following equation :

$$6x + x + 4 = 2x + 16$$

4

There are 3 members in the Swanson family – Father, Mother and daughter Lynn.

Father is 5 years older than Mother. Lynn is 23 years younger than her father. The sum of their ages is 110 years.

If  $x$  is Mother's age, write the equation that represents this situation.

5

Find the value of  $x$  in each of the following equations .

a)  $3(x - 15) = 6x + 3$

b)  $\frac{2x}{5} = 10$

6

Simplify the following expressions .

a)  $2x + 3 + 2(4x - 5)$

b)  $(9x - 8) - (6x - 4)$

c)  $-6(5 - 4x)$

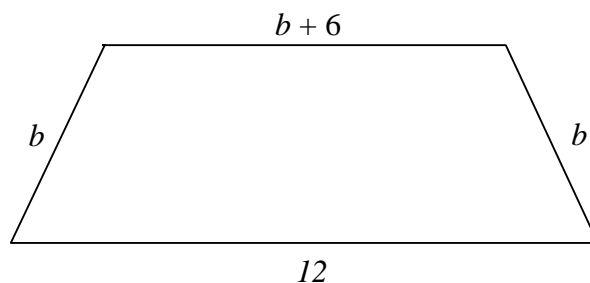
7

Write an equation you can use to represent the following situation.

"Three times the sum of a certain number and 5 is equal to twice the number minus 4".

8

Given the following figure :



What algebraic expression represents the perimeter of this quadrilateral?

9

Solve for x.  $\frac{x}{3} + 12 = 7$

10

If I add 5 years to twice my brother's age, I get triple his age less 10 years.

Using x to represent my brother's age, write an equation to represent this situation.

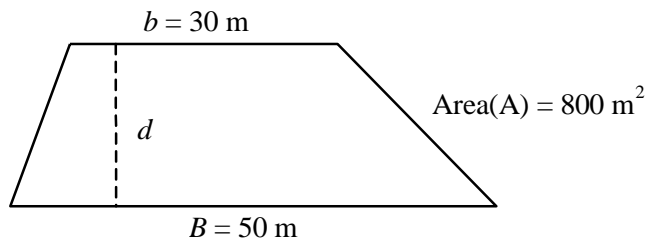
11

Solve the following equation :

$$0.5m - 9.2 = 8.6$$

12

The diagram below represents a piece of land that the owner wants to sell.



He uses the following formula to calculate the depth  $d$  of the land :

$$A = \frac{(B + b)d}{2}$$

What is the depth  $d$  of the land?

13

Solve the following :

$$4(2x + 3) - 1 = 7$$

14

Gina has  $x$  dollars. Her brother John has \$8 more than twice as much as she does. Together they have a total of \$47.

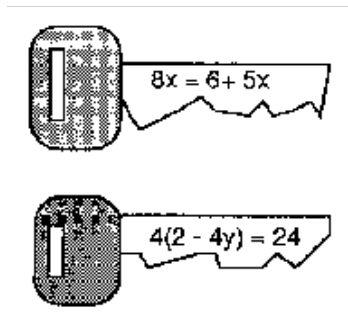
Write an equation to represent this situation.

15

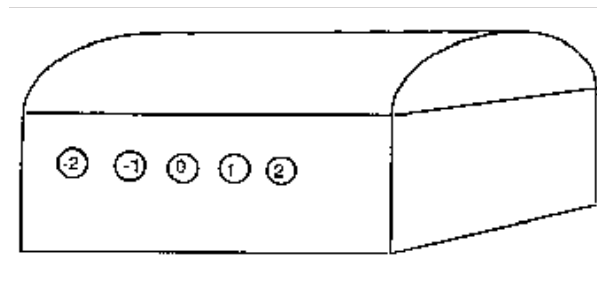
At a Scout Camp, the scout master has organized a treasure hunt. Two keys must be used simultaneously to open the treasure chest.

There is an equation written on each key. The solution to the equation indicates into which lock the key must be inserted.

The team "Sharp Eyes" has found these two keys :



Blacken the locks into which the keys must be inserted.



16

The sum of the ages of James and Samantha is 40 years. Samantha is 4 years older than twice James' age.

If " $x$ " represents James' age, write an equation to represent this situation.

17

Simplify the following algebraic expression:

$$-2(x + 2) - (x - 2)$$

18

Solve the following equation :

$$x - 10 = 3x - 20$$

19

Jennifer and Jerry went on a bike trip together. They rode the same distance every day.

Complete the table of values below.

Number of Days	2	b	c	11
Distance covered (km)	a	320	560	880

20

The gas a car uses on the highway is proportional to the distance it travels.

The following table of values shows the amount of gas used to travel different distances.

Distance (Kilometres)	Gas Consumption (Litres)
87.5	5.25
300	18
	30

**What number is missing from this table of values?**

21

Solve the following algebraic equation (leave your answer as an improper fraction):

$$\frac{5}{4x-9} = -\frac{10}{6x+2}$$

22

Place the following rates in order from slowest to fastest:

- a) 0.018 km/s      b) 1020 m/min      c) 15 m/s      d) 57.6 km/h

23

Some homes are heated by a furnace that burns oil.

The cost of the heating oil is proportional to the volume delivered to a customer's home.

The following table of values shows the costs for different quantities.

Volume of Heating Oil (Litres)	Cost (\$)
300	219
A) _____	365
650	474.50
870	B) _____

What amounts are missing from this table of values?

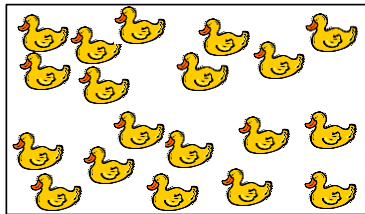
24

Sandra is planning the "Floating Ducks" game booth. She found instructions to create a  $3 \text{ m}^2$  rectangular pond which holds 75 rubber ducks. Unfortunately, she only has enough material to build a similar  $20\,000 \text{ cm}^2$  rectangular pond.

### Rectangular pond from instructions

Area =  $3 \text{ m}^2$

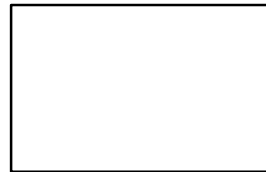
Holds 75 ducks



### Sandra's Rectangular pond

Area =  $2 \text{ m}^2$

Holds ? ducks



*Diagrams are not drawn to scale*

In keeping with proportionality requirements, how many ducks are needed to fill Sandra's rectangular pond?

## EXTENDED ANSWER

1

A waiter in a restaurant is paid solely in tips. Saturday, he made twice what he had made Friday. Sunday he got \$30 less than he had made Saturday. For these three days he made \$350.

How much did he make in tips on each of these three days?

2

In their hockey league, the trio of Mario, Eric and Paul has scored 25 goals in 8 games. Of this total, Mario has 6 goals. Eric has 3 goals fewer than Paul.

How many goals did Paul score?

3

At the end of the year, the school organized an Ecological Day in which 430 students participated. During this activity, the number of Secondary 2 students was 3 times the number of Secondary 1 students. The number of Secondary 3 students was twice the number of Secondary 2 students.

How many Secondary 2 students participated in this activity?

4

In a fund-raising drive it was found that one person in two gave \$2.00. Two hundred people gave \$5.00 each and the rest gave \$10.00. The total collected was \$6200.00.

Louis had to provide a receipt for each donor. How many receipts did he have to write?

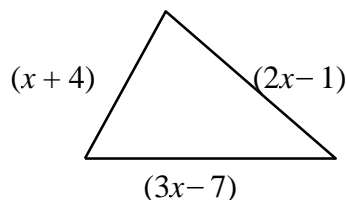
5

A student said to his teacher : "You are four times older than I am". His teacher replied : "Yes, but in 5 years, I will be only 3 times older than you!".

How old is the student?

6

The perimeter of a triangle is 44 cm. The sides are respectively  $(x + 4)$ ,  $(2x - 1)$  and  $(3x - 7)$  centimetres.



What is the length of each side?



7

The sum of the ages of 3 persons is 78 years. The second person is twice as old as the first, and the third person is 2 years younger than the second.

Find the age of each person.

8

Every Saturday, Kelly and Cathy deliver the local newspaper. The manager pays them \$0.10 for each newspaper delivered.

Last Saturday, Kelly delivered 50 more newspapers than Cathy. Together they earned \$25.

How much was Cathy paid?

9

A popular singer wants to sell 52 000 copies of his latest compact disk.

He has already sold 26 000 copies in Quebec as well as a certain number in France. He predicts that he will have to sell 8000 more in francophone countries other than France.

How many copies of his compact disk will he have to sell in the other francophone countries to reach his objective?

10

Jack must solve the following problem before he can claim the contest prize he won. "Four fifths of a number, increased by triple the number is 1140."

What is the number?

11

In order to construct a bird house, a total of 59 pieces are required, including screws, nails and pieces of wood. To determine the number of nails, add 12 to quadruple the number of screws. To determine the number of pieces of wood, add 5 to the number of screws.

How many screws, nails and pieces of wood will be required to construct this bird house?

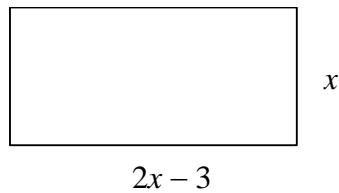
12

Julie plans to carpet a rectangular-shaped floor whose perimeter is 24 metres. The rectangle is  $(2x - 1)$  metres wide and  $(3x + 3)$  metres long.

Find the area of the floor to be carpeted.

13

The perimeter of a rectangular garden is 26.16 m.



What are the dimensions of the garden in metres?

14

Operating for the same length of time, a hair dryer consumes 5 times as many watts as a blender, whereas a curling iron consumes 100 watts less than a hair dryer. If all three appliances are left on for one full hour, they will use a total of 2100 watts of energy.

How many watts of energy does each appliance consume?

15

A library has a collection of 31 books, all by the same author. Austin has read three times as many books as Victor. Jena has read four fewer books than Austin.

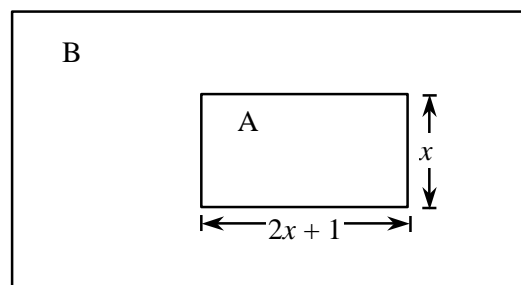
Together, the three of them have read all the books in the collection. However, not one of the three has read the same book.

How many books has each of them read?

16

The owners of a ranch need to put a new fence around the horses' enclosure (Rectangle A) and the field (Rectangle B).

Here is the model they will follow:



The ratio of the sides of the large rectangle to the sides of the small rectangle is 3:1

The total length of fencing needed for the horses' enclosure (Rectangle A) and the field (Rectangle B) is 248 metres.

What is the actual perimeter of the horses' enclosure?

17

Stephanie, her brother Ed, and sister Caroline each contributed money to buy their parents an anniversary gift.

Ed contributed twice as much as Stephanie and Caroline contributed \$10 more than three times the amount contributed by Stephanie.

Together they contributed \$310.

How much did each person contribute?

18

An artist is designing the front cover of a children's book.

The length of the front cover of the rectangular book is 4 cm less than twice its width.

The perimeter of the front cover is 166 cm.

What is the area of the front cover of this book in  $\text{cm}^2$ ?

19

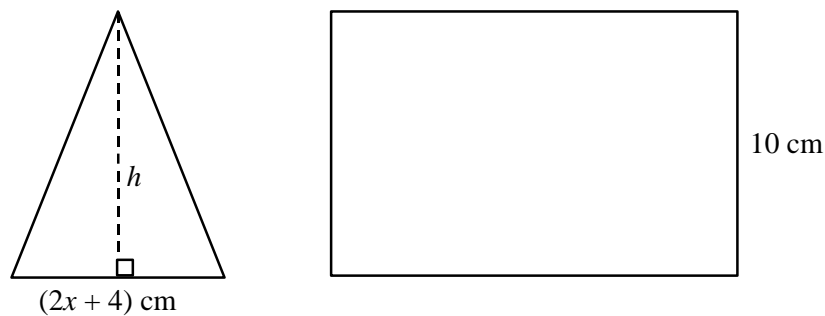
The height of the rectangle below is 10 cm.

The height of the triangle is equal to the height of the rectangle.

The measure of the base of the triangle is  $(2x + 4)$  cm.

The base of the rectangle is twice the length of the base of the triangle.

The combined area of the triangle and rectangle is  $300 \text{ cm}^2$ .



What is the perimeter of the rectangle?

20

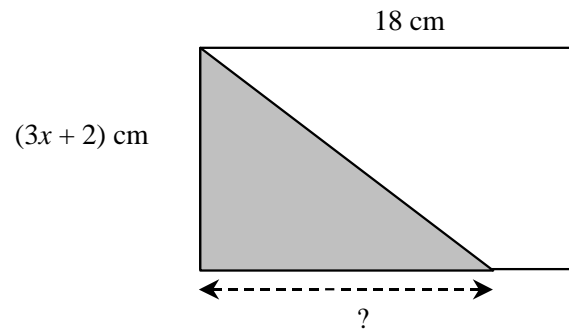
The shaded triangle in the diagram below has an area equal to  $\frac{1}{3}$  the area of the rectangle.

The length of the rectangle measures 18 cm.

The width of the rectangle measures  $(3x + 2)$  cm.

The area of the rectangle is  $144 \text{ cm}^2$ .

**What is the measure of the base of the shaded triangle?**

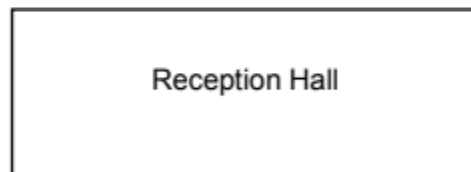


21

A local community centre is replacing the carpet in its reception hall.

The budget for this project is \$10 000.

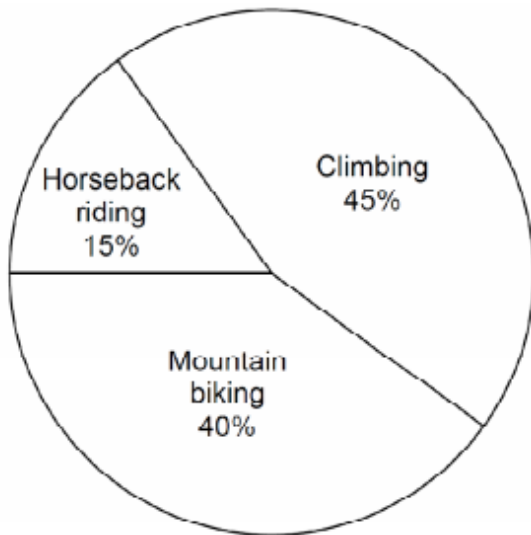
- The length of the reception hall is four metres less than three times its width.
- The perimeter of the hall is 72 metres.
- The cost of replacing the carpet is  $\$39.78/\text{m}^2$ .



**Will the budget be enough to cover the cost of replacing the carpet?**

A field trip to celebrate the end of the school year was organized for the 280 Secondary II students in a school. The circle graph and table below provide information about the activities chosen by the students and the entrance fees associated with each activity.

DISTRIBUTION OF STUDENTS  
BY ACTIVITY



ENTRANCE FEE FOR EACH ACTIVITY

Activity	Entrance Fee
Horseback riding	\$35 per student
Climbing	\$30 per student
Mountain biking	\$20 per student

Each student paid for his or her own entrance fee.

**The cost of the field trip includes:**

- Transportation fee of \$1 872.50 for the students, which was paid for by the school.
- The sum of the entrance fees for all 280 students.

**What percentage of the cost of the field trip did the school pay?**

A company registered total expenses of \$128 500 and total revenue of \$2 356 000.

Calculate the percent profit for the business.

24

Rosie makes a necklace by stringing different coloured beads on a wire.

The beads that are the same colour are also the same length. The following table gives the length of the beads by colour.

LENGTH OF THE BEADS BY COLOUR

Colour	Length (mm)
Blue	5
Yellow	2.5
Purple	3.5
Green	3

The necklace is made up of 150 beads.

The following information concerns the distribution of the 150 beads by colour.

- $\frac{2}{3}$  of the beads are yellow.
- The number of blue beads is three times the number of green beads.
- There are 10 more purple beads than green beads.

**What is the length of the part of the wire occupied by the 150 beads?**

25

A manufacturer of automobiles spends \$500 000 on steel, \$1 450 000 on electronic parts, \$3 235 000 on labour and \$755 000 on other materials in order to manufacture 1000 cars. They sell each of these cars to dealerships for \$15000. What is their percent profit per item?

26

The table below contains equations. The values of  $x$  in these equations form a sequence of numbers.

1st equation	$5(3x - 12) - 3x + 60$
2nd equation	$\frac{1}{2}x + 30 = 2x$
3rd equation	$0.5x + 2.5x = 90$
4th equation	$\frac{2x}{5} = \blacksquare$

What number should replace  $\blacksquare$  in the 4th equation?

27

A department store registered total expenses of \$568 500 and total revenue of \$1 356 000.  
Calculate the percent profit for the business.

28

Mariaville High School is organizing a fundraising concert.

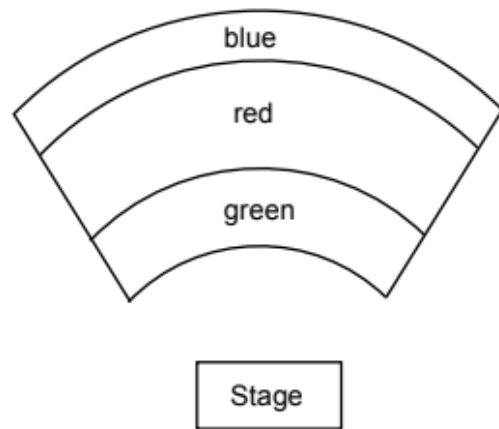
The concert organizers are using the school's auditorium, which has 810 seats.

The auditorium seating is divided into three sections: blue, red and green.

The ratio of the number of seats in the blue, red and green sections is 3 : 4 : 2.

The tickets for the blue section are priced at \$25 each. The tickets for the red section are \$30 each, while the tickets for the green section are \$65 each.

The concert organizers managed to sell 70% of the blue section, 90% of the red section and 85% of the green section.



**How much money was raised from the sale of tickets?**

29

A manufacturer of cell phones spends \$232 200 on materials and \$1 475 000 on labour in order to manufacture 20 000 cell phones. They sell each of these phones to retailers for \$350. What is their percent profit per item?



## ANSWERS

Multiple Choice

SHORT ANSWER

<p>1) D 2) C 3) A 4) B 5) B 6) C 7) B 8) C 9) B 10) D 11) C 12) B 13) C 14) C 15) D</p>	<p>1) <math>a = \\$28</math>, <math>b = 4</math> hours, <math>c = \\$112</math> 2) The simplified expression for the perimeter of the triangle is <math>(4a + 6)</math> cm . 3) In this equation, <math>x</math> is equal to 2.4 or <math>\frac{12}{5}</math> . 4) The equation representing this situation is : <math>x + (x + 5) + (x + 5 - 23) = 110</math> or <math>x + (x + 5) + (x - 18) = 110</math> 5 a) <math>x = -16</math> b) <math>x = 25</math> 6 a) <math>10x - 7</math> b) <math>3x - 4</math> c) <math>-30 + 24x</math> 7) <math>3(x + 5) = 2x - 4</math> 8) The algebraic expression for the perimeter of the quadrilateral is <math>3b + 18</math>. 9) <math>x = -15</math> 10) The equation is <math>2x + 5 = 3x - 10</math>. 11) The value of <math>m</math> is 35.6. 12) The depth <math>d</math> of the land is 20 m. 13) <math>x = \frac{-1}{2}</math> 14) The equation is <math>x + 2x + 8 = 47</math>. 15) The locks to be blackened are : -1 and 2. 16) The equation is <math>x + 2x + 4 = 40</math> or any other equivalent equation. 17) The simplified expression is: <math>-3x - 2</math> 18) <math>x = 5</math> 19) <math>a = 160</math> km, <math>b = 4</math> days, <math>c = 7</math> days 20) 500 km 21) <math>\frac{8}{7}</math> 22) c, d, b, a 23) A) 500 L B) \$635.10 24) 50 ducks</p>
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## ANSWERS TO EXTENDED ANSWER

1

Let  $x$ , Friday's tips

$2x$ , Saturday's tips

$2x - 30$ , Sunday's tips

$$x + 2x + 2x - 30 = 350$$

$$5x = 380$$

$$x = 76$$

Result The waiter made \$76 on Friday, \$152 on Saturday and \$122 on Sunday.

2

Let  $x$ , number of goals Paul scored

$$6 + x - 3 + x = 25$$

$$2x + 3 = 25$$

$$2x = 22$$

$$\frac{2x}{2} = \frac{22}{2}$$

$$x = 11$$

Result Paul scored 11 goals.

3

Let  $x$  represent the number of Secondary 1 students

$3x$  represent the number of Secondary 2 students

$6x$  represent the number of Secondary 3 students

$$x + 3x + 6x = 430$$

$$10x = 430$$

$$x = 43$$

Number of Secondary 2 students

$$3(43) = 129$$

Result 129 Secondary 2 students participated.

4

Let  $x$  : number of receipts

$$2\left(\frac{x}{2}\right) + 200 \times 5 + 10\left(x - 200 - \frac{x}{2}\right) = 6200$$

$$x + 1000 + 5x - 2000 = 6200$$

$$6x - 1000 = 6200$$

$$6x = 7200$$

$$x = \frac{7200}{6} = 1200$$

Result 1200 receipts.

5

Let Student's age :  $x$     Teacher's age :  $4x$

$$3(x + 5) = (4x + 5)$$

$$3x + 15 = 4x + 5$$

$$10 = x$$

Result    The student is 10 years old.

6

$$x + 4 + 2x - 1 + 3x - 7 = 44$$

$$6x - 4 = 44$$

$$6x = 48$$

$$x = 8$$

Result    The length of the sides of the triangle are 12 cm, 15 cm and 17 cm.

7

Let 1<sup>st</sup> person  $\rightarrow x$     2<sup>nd</sup> person  $\rightarrow 2x$     3<sup>rd</sup> person  $\rightarrow 2x - 2$

$$(x) + (2x) + (2x - 2) = 78$$

$$5x - 2 = 78$$

$$5x = 80$$

$$x = 16$$

Result    Their ages are 16 years, 32 years and 30 years

8

Let  $x$  : number of newspapers delivered by Cathy

$x + 50$  : number of newspapers delivered by Kelly

$$(x \times 0.10) + [(x + 50) \times 0.10] = 25$$

$$0.1x + 0.1x + 5 = 25$$

$$0.2x = 20$$

$$x = 100$$

As Cathy delivered 100 newspapers at \$0.10 each

$$100 (\$0.10) = \$10.$$

Result    Cathy received \$10.

9

Let  $x$  = number of compact disks sold in France

$$26\,000 + x + x + 8000 = 52\,000$$

$$2x = 18\,000$$

$$x = 9000$$

Number of compact disks he must sell in other francophone countries to meet his goal

$$x + 8000 = 9000 + 8000 = 17\,000$$

Result    17 000 compact disks

10

Let  $x$  be the winning number

Four fifths on the number :  $\frac{4}{5}x$

Triple the number :  $3x$

$$\frac{4}{5}x + 3x = 1140$$

$$4x + 15x = 5700$$

$$19x = 5700$$

$$x = 300$$

Result      The winning number is 300.

11

Let  $x$ , represent the number of screws

$4x + 12$ , the number of nails

$x + 5$ , the number of pieces of wood

$$x + 4x + 12 + x + 5 = 59$$

$$6x = 42$$

$$x = 7$$

Result      7 screws, 40 nails and 12 pieces of wood are needed to build the bird house.

12

Find the value of  $x$

$$2(2x - 1) + 2(3x + 3) = 24$$

$$4x - 2 + 6x + 6 = 24$$

$$10x = 20$$

$$x = 2$$

Find the floor dimensions

$$\text{width : } 2x - 1$$

$$2(2) - 1 = 3$$

$$\text{length : } 3x + 3$$

$$3(2) + 3 = 9$$

Find the area of the floor

$$\text{Area} = \text{width} \bullet \text{length}$$

$$\text{Area} = 3(9)$$

$$\text{Area} = 27$$

Result      The area of floor to be covered is 27 m<sup>2</sup>.

13

Let  $x$  = width of the rectangle

$$2x + 2(2x - 3) = 26.16$$

$$2x + 4x - 6 = 26.16$$

$$6x - 6 = 26.16$$

$$3x = 32.16$$

$$x = 5.36$$

Width : 5.36 m

Length :  $2(5.36) - 3 = 7.72$  m

Result      The dimensions are : 5.36 m and 7.72 m.

14

Let  $x$  : number of watts consumed by a blender  
 $5x$  : number of watts consumed by a hair dryer  
 $5x - 100$  : number of watts consumed by a curling iron

Mathematize the situation

$$x + 5x + 5x - 100 = 2100$$

Solve the equation

$$11x - 100 = 2100$$

$$11x = 2200$$

$$x = 200$$

$$5x = 1000$$

$$5x - 100 = 900$$

Answer The blender consumes 200 watts of energy, the hair dryer consumes 1000 watts of energy, and the curling iron consumes 900 watts of energy.

15

Let  $x$ , the number of books Victor read  
 $3x$ , the number of books Austin read  
 $3x - 4$ , the number of books Jena read

$$3x + x + 3x - 4 = 31$$

$$7x - 4 = 31$$

$$7x = 35$$

$$x = 5$$

Answer Victor has read 5 books, Austin has read 15 books, Jena has read 11 books.

16

Dimensions of field (Rectangle B)

$$3(2x + 1) = 6x + 3$$

$$3(x) = 3x$$

Perimeter of enclosure (Rectangle A)

$$2(2x + 1) + 2(x) = 4x + 2 + 2x \\ = 6x + 2$$

Perimeter of field (Rectangle B)

$$2(6x + 3) + 2(3x) = 12x + 6 + 6x \\ = 18x + 6$$

Length of the fence

$$6x + 2 + 18x + 6 = 248$$

$$24x + 8 = 248$$

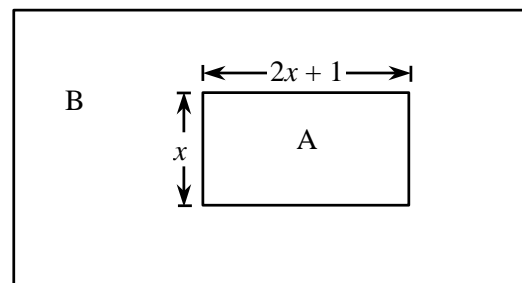
$$24x = 240$$

$$x = 10$$

Perimeter of the horses' enclosure (Rectangle A)

$$6(10) + 2 = 62$$

Answer The actual perimeter of the horses' enclosure is 62 m.



17

Let  $x$  be the amount (\$) Stephanie contributed  
 $2x$  be the amount (\$) Ed contributed  
 $3x + 10$  be the amount (\$) Caroline contributed

$$(3x + 10) + 2x + x = 310$$

$$6x + 10 = 310$$

$$6x = 300$$

$$x = 50$$

Answer: Stephanie contributed \$50, Ed contributed \$100, Caroline contributed \$160.

18

Let  $w$  be the width of the cover in cm  
 $2w - 4$  be the length of the cover in cm  
 $2[w + (2w - 4)] = 166$

$$6w - 8 = 166$$

$$6w = 174$$

$$w = 29$$

Width is 29 cm, length is 54 cm

Area is  $29(54) = 1566$

Answer: The area of the cover is  $1566 \text{ cm}^2$ .

19

Area of triangle

$$\frac{10(2x + 4)}{2} = (10x + 20)$$

Base of rectangle

$$2(2x + 4) = (4x + 8)$$

Area of rectangle

$$10(4x + 8) = (40x + 80)$$

Combined area

$$(10x + 20) + (40x + 80) = 300$$

$$50x + 100 = 300$$

$$50x = 200$$

$$x = 4$$

Perimeter of rectangle

$$2(10) + 2(4x + 8) = 8x + 36$$

Perimeter

$$8(4) + 36 = 68$$

Answer: The perimeter of the rectangle is **68 cm**.

20

Area of the rectangle

$$18(3x + 2) = 144$$

$$54x + 36 = 144$$

$$54x = 108$$

$$x = 2$$

Height of triangle

$$3x + 2 = 3(2) + 2$$

$$= 8$$

Area of triangle

$$\frac{144}{3} = 48$$

$$8 \times \frac{\text{base}}{2} = 48$$

$$8 \text{ base} = 96$$

$$\text{base} = 12$$

Answer: The base of the shaded triangle measures **12 cm**.

21

Let  $x$  = width of reception hall

$x = 10$  m, the length is  $3(10) - 4 = 26$  m

The area is  $260 \text{ m}^2$ , so the cost is \$10 342.80. \$10 000 will not be enough.

22

42 went horseback riding / 126 went climbing / 112 went mountain biking

Total cost was \$9362.50 / The transportation cost is 20% of the total cost

23

Profit = \$2 227 500      Percent profit = 1733.5%

24

Let  $g$  = # green beads,  $b$  = # blue beads and  $p$  = # purple beads

$b = 3g$  and  $p = g + 10$

Total of yellow +  $g + b + p = 180$  beads

$$100 + g + 3g + g + 10 = 180$$

$$g = 14$$

There are 100 yellow, 14 green, 42 blue and 24 purple

Length =  $100(2.5 \text{ mm}) + 14(3 \text{ mm}) + 42(5 \text{ mm}) + 24(3.5 \text{ mm})$

$$= 586 \text{ mm}$$

25

Manufacturing cost/item = \$5940      Percent profit/item = 152.5%

26

1<sup>st</sup> Solve to get  $x = 10$

2<sup>nd</sup> Solve to get  $x = 20$

3<sup>rd</sup> Solve to get  $x = 30$

Based on the patten the 4<sup>th</sup> must be  $x = 40$ , so...  $2(40)/5 = 16$

The missing value is 16

27

Profit = \$787 500      Percent profit = 138.5%

28

Based on the ratios there are 270 blue seats, 360 red seats and 180 green seats

Using percents, 189 blue tickets were sold for a total of \$4 725

324 red tickets were sold for a total of \$9 720

153 green tickets were sold for a total of \$9 945

Total raised was \$24 390

29

Manufacturing cost/item = \$85.35      Percent profit/item = 310.0%