



# Foundations of Mathematics and Pre-Calculus 10 Examination Booklet 2010 – 2011 Sample A Teacher Version

**DO NOT OPEN ANY EXAMINATION MATERIALS UNTIL INSTRUCTED TO DO SO.**

## Examination Instructions

1. On your Answer Sheet, fill in the bubble (Form A, B, C, D, E, F, G or H) that corresponds to the letter on this Examination Booklet.
2. You may require a protractor and a ruler (metric and imperial).
3. You may use math tiles.
4. When using your calculator (scientific or approved graphing calculator):
  - use the programmed value of  $\pi$  rather than the approximation of 3.14.
  - round only in the final step of the solution.
5. Diagrams are not necessarily drawn to scale.
6. When the examination begins, remove the data pages located in the centre of this booklet.
7. Read the Examination Rules on the back of this booklet.

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**Contents: 34 pages**

54 multiple-choice questions (maximum of 54 marks)

6 numeric-response questions (maximum of 6 marks)

**Examination: 2 hours**

**Additional Time Permitted: 60 minutes**

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## SAMPLE EXAMINATION — TEACHER VERSION

The purpose of the Sample Examinations is to give teachers and students a wide range, but not an exhaustive list, of questions that could appear in the provincial examinations. Examinations are developed to be as congruent as possible with the curriculum within the parameters of large-scale testing. However, this type of examination does not allow for the assessment of all the mathematical processes described in *The Common Curriculum Framework for Grades 10–12 Mathematics, 2008* (CCF).

The Teacher Versions include a number of comments that clarify the terminology or intent of a question. They also provide some alternative solutions or state expectations, whenever appropriate. The comments are given in the context of a specific question and are likely to apply to other questions. However, the comments will only appear once, therefore, teachers are encouraged to review both samples.

Teachers are encouraged to have their students use the Data Pages throughout the year so that they become familiar with their content before taking the provincial examination.



**PART A: MULTIPLE-CHOICE QUESTIONS**  
(calculator not permitted)

Value: 12 marks

**Suggested Time: 30 minutes**  
**Allowable Time: 40 minutes**

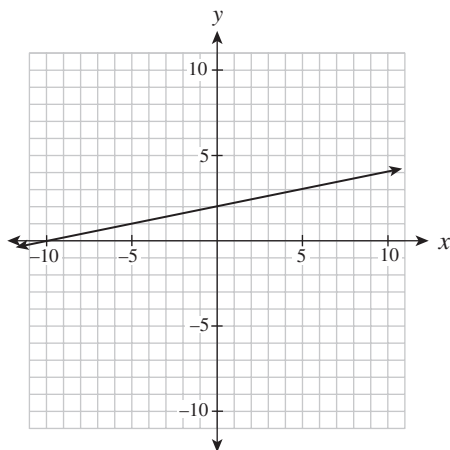
**INSTRUCTIONS:** No calculator may be used for this part of the examination. For each question, select the **best** answer and record your choice on the **blue Answer Sheet** provided. Using an HB pencil, completely fill in the bubble that has the letter corresponding to your answer. You have a **maximum of 40 minutes** to work on this section.

You have **Examination Booklet Form A**. In the box above #1 on your **Answer Sheet**, fill in the bubble as follows.

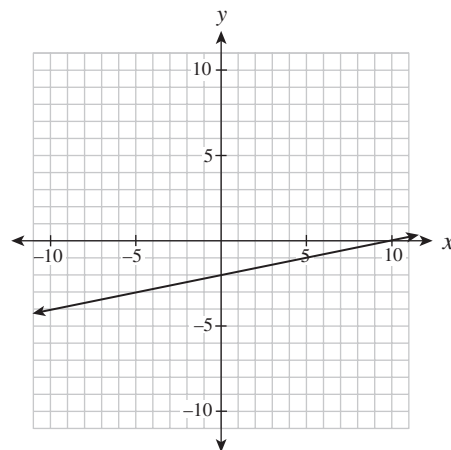
Exam Booklet Form/ Cahier d'examen	<b>A</b> <input checked="" type="radio"/> <b>B</b> <input type="radio"/> <b>C</b> <input type="radio"/> <b>D</b> <input type="radio"/> <b>E</b> <input type="radio"/> <b>F</b> <input type="radio"/> <b>G</b> <input type="radio"/> <b>H</b> <input type="radio"/>
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1. Which graph represents the relation  $x - 5y + 10 = 0$  ?

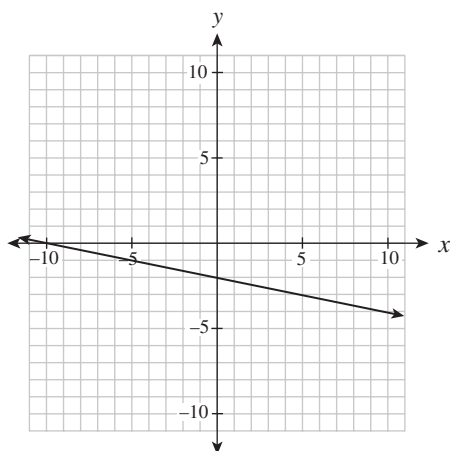
A.



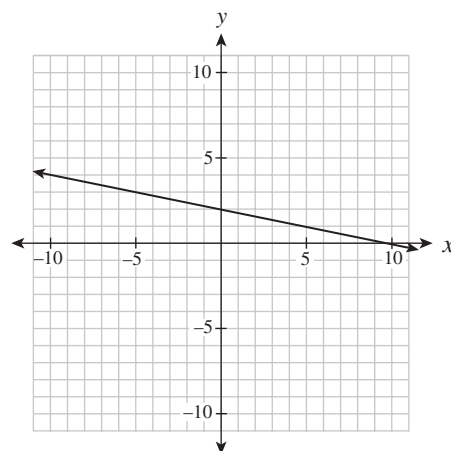
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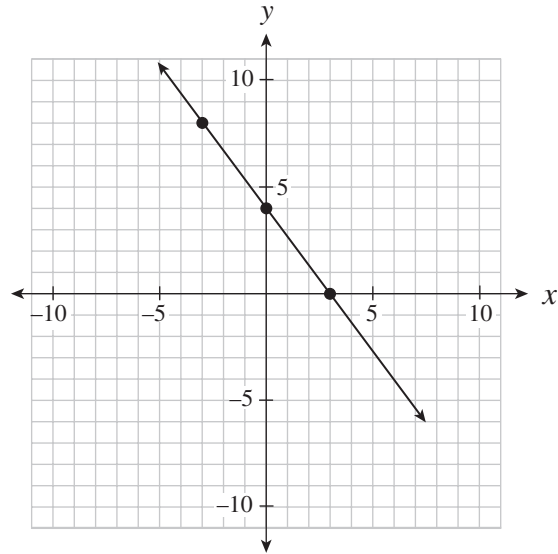
C.



D.



Use the following graph to answer question 2.



2. Which of the following equations describes the linear relation graphed above?

I.	$y = \frac{4}{3}x + 4$
II.	$y - 8 = -\frac{4}{3}(x + 3)$
III.	$4x + 3y - 12 = 0$

- A. II only
- B. I and II only
- C. I and III only
- D. II and III only

3. Determine the equation of a line, in slope-intercept form, that passes through the points  $(6, 1)$  and  $(-10, 9)$ .

A.  $y = -\frac{1}{2}x + 4$

B.  $y = -\frac{1}{2}x - 2$

C.  $y = -2x + 8$

D.  $y = -2x + 13$

4. Solve for  $y$  in the following system of equations:

$$x - y = -1$$

$$3x + 5y = 21$$

- A. 2  
B. 3  
C. 9  
D. 12

5. The cost  $C$ , in dollars, of renting a hall for the prom is given by the formula  $C(n) = 500 + 4n$ , where  $n$  is the number of students attending the prom. Calculate the cost of renting the hall if 70 students attend.

- A. \$108  
B. \$500  
C. \$780  
D. \$970

6. Which of the following statements are true?

I.	$\sqrt{4} = 2$ since $2 \times 2 = 4$
II.	$\sqrt{8} = 4$ since $4 + 4 = 8$
III.	$\sqrt[3]{27} = 3$ since $3 \times 3 \times 3 = 27$
IV.	$\sqrt[3]{81} = 9$ since $9 \times 9 = 81$

- A. I and III only
- B. I and IV only
- C. II and III only
- D. II and IV only

7. Which of the following statements are true?

I.	The factors of 24 are 2, 3, 4, 6, 8 and 12.
II.	The prime factorization of 24 is $2^3 \times 3^1$ .
III.	The prime factors of 24 are 2 and 3.
IV.	$\sqrt{24}$ is an irrational number.

- A. I and IV only
- B. II and III only
- C. II, III and IV only
- D. I, II, III and IV



Factors (and prime factors) of a number refer to the positive factors.



8. Simplify:  $\sqrt{72}$

- A.  $2\sqrt{6}$
- B.  $6\sqrt{2}$
- C.  $18\sqrt{2}$
- D.  $36\sqrt{2}$



Only appropriate radicands, such as  $\sqrt{2400}$ ,  $\sqrt[3]{54}$ , will be chosen for the non-calculator section.

9. Which pattern could be used to predict  $3^{-4}$ ?

A.

$3^3$	27
$3^2$	9
$3^1$	3
$3^0$	1
$3^{-1}$	$\frac{1}{3}$
$3^{-2}$	$\frac{1}{9}$
$3^{-3}$	$\frac{1}{27}$

B.

$3^3$	9
$3^2$	6
$3^1$	3
$3^0$	0
$3^{-1}$	$-\frac{1}{3}$
$3^{-2}$	$-\frac{1}{6}$
$3^{-3}$	$-\frac{1}{9}$

C.

$3^3$	27
$3^2$	9
$3^1$	3
$3^0$	1
$3^{-1}$	-3
$3^{-2}$	-9
$3^{-3}$	-27

D.

$3^3$	9
$3^2$	6
$3^1$	3
$3^0$	0
$3^{-1}$	-3
$3^{-2}$	-6
$3^{-3}$	-9



The outcome covered by this question (B3) could also be assessed with an application/context question involving negative (or positive) exponents.

10. Evaluate:  $16^{-\frac{3}{4}}$

A. -8

B.  $\frac{1}{8}$

C.  $\frac{1}{2}$

D. 2

11. A baker gets his muffin boxes from the United States. The tallest muffins he bakes are 11 cm. Estimate the height of the smallest box in which the muffins will fit.

A. 30 inches tall

B. 10 inches tall

C. 5 inches tall

D. 4 inches tall

12. Jasdeep and Kelsey converted 177 ounces into kilograms, as shown below.

Jasdeep's Solution	Kelsey's Solution
$177 \text{ oz} \times \frac{28.35 \text{ g}}{1 \text{ oz}} \times \frac{1 \text{ kg}}{1000 \text{ g}} = 5 \text{ 017 950 kg}$	$177 \text{ oz} \times \frac{1 \text{ oz}}{28.35 \text{ g}} \times \frac{1 \text{ kg}}{1000 \text{ g}} = 0.0062 \text{ kg}$

Which statement below is true?

- A. Only Kelsey is correct because the units cancel.
- B. Only Jasdeep is correct because the units cancel.
- C. Only Kelsey is incorrect because the conversion factors are incorrect.
- D. They are both incorrect for different reasons.



- The intent of this non-calculator question is that students will recognize the unreasonableness of Jasdeep's answer and not perform the actual calculation.
- It is best practice to include the units when converting units of measure.

**This is the end of Part A (calculator not permitted).**

If there is some time left, you have two options:

- i) Make sure you have answered all the questions. You will not be able to go back to this section at the end of 40 minutes.
- ii) You may proceed to the rest of the examination without the use of a calculator; there are many questions that do not require a calculator. Make sure you flag any questions you skip to remember to go back to them later.

Do not access your calculator until directed by the supervisor. At the end of the 40 minutes, the supervisor will give you permission to access your calculator.



- When going over the sample examinations in class, teachers may want to discuss with their students which questions can be answered without a calculator.

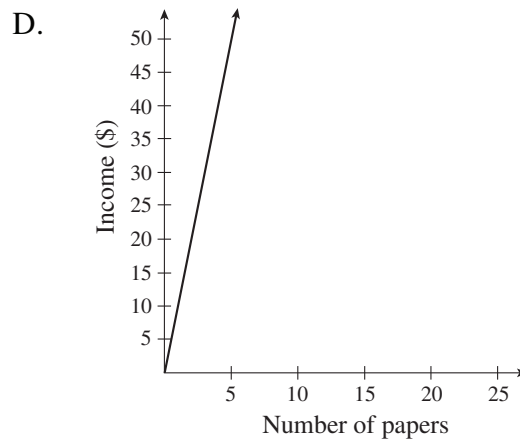
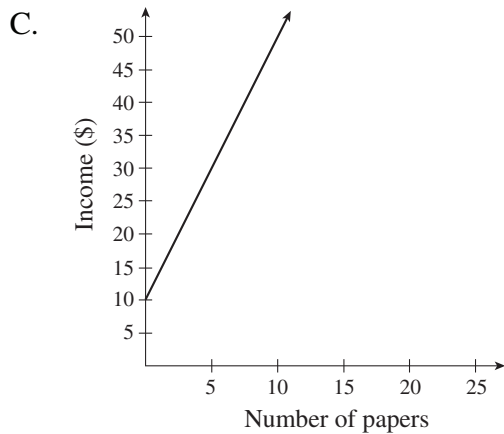
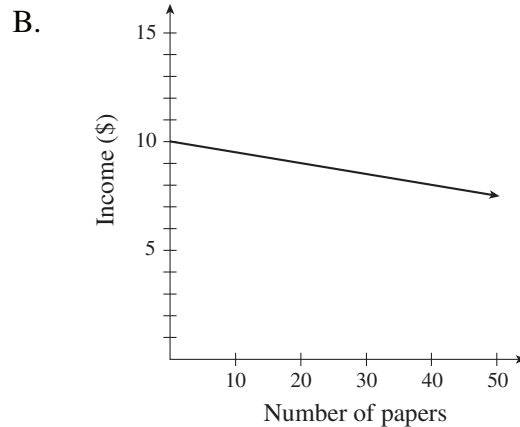
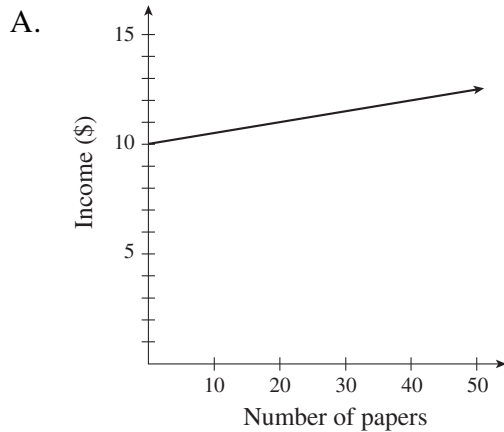
**PART B: MULTIPLE-CHOICE QUESTIONS**  
(calculator permitted)

Value: 42 marks

Suggested Time: 75 minutes

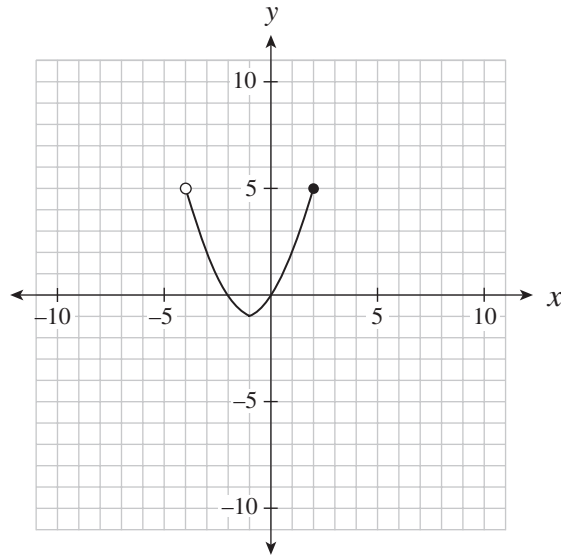
**INSTRUCTIONS:** For each question, select the **best** answer and record your choice on the **white Answer Sheet** provided. Using an HB pencil, completely fill in the bubble that has the letter corresponding to your answer.

13. Jim delivers newspapers. He gets paid 10 dollars for every day of work, plus 5 cents for every paper he delivers. Which of the following graphs best represents Jim's possible income for one day?



- In this question, the situation calls for a discrete graph but it has been drawn as a continuous graph due to the close proximity of the points.
- It is best practice for all graphs that involve content to have a title, properly labelled axes and scales. The provincial examinations will model this in many situations but some of these characteristics may be omitted for simplicity.

14. Determine the domain of the relation graphed below.



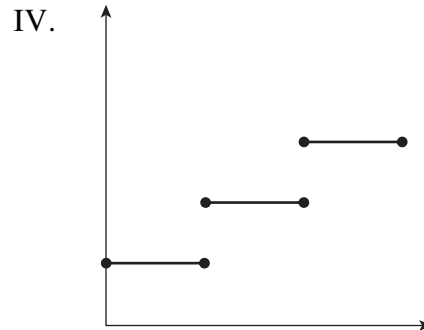
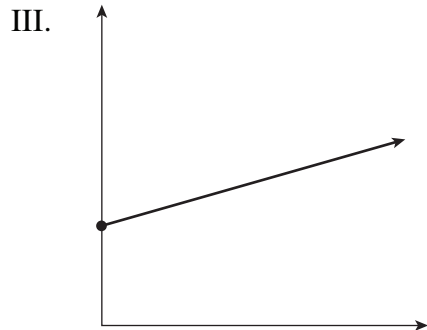
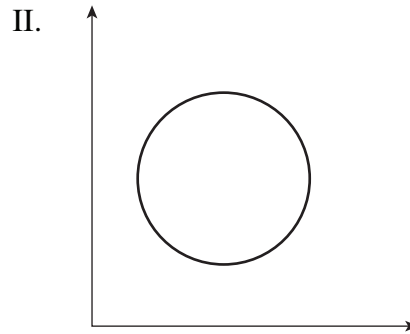
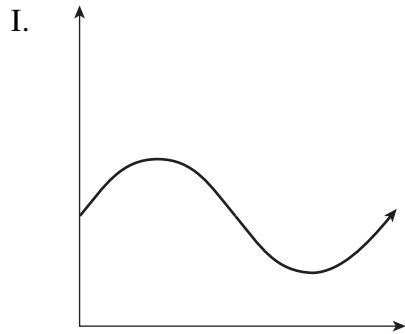
- A.  $(-4, 2]$
- B.  $[-4, 2)$
- C.  $[-1, 5)$
- D.  $[-1, 5]$



In interval notation:

- parentheses,  $( )$ , means not including the endpoints
- brackets,  $[ ]$ , means including the endpoints

15. Which of the following relations are also functions?



- A. III only
- B. I and III only
- C. II and IV only
- D. I, III and IV only

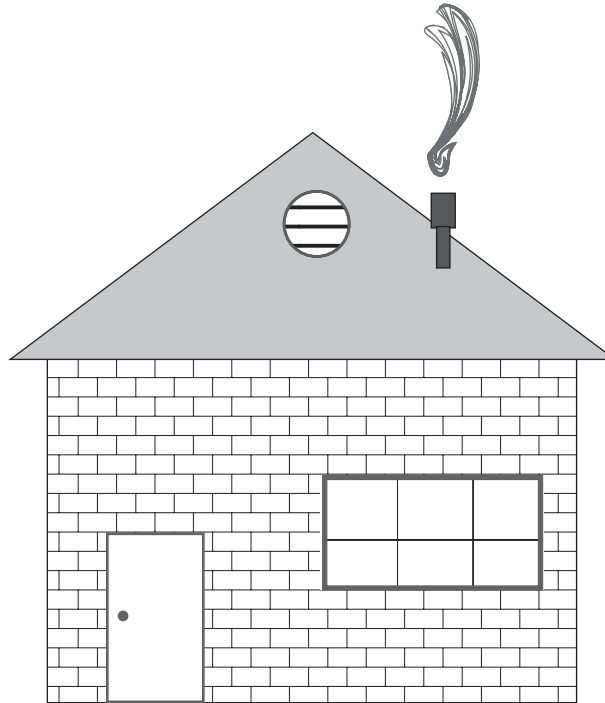


Besides understanding the definition of a function, students should have other strategies to determine whether a relation is a function, such as mapping or using the vertical line test.

16. Calculate the slope between the points  $(7, -3)$  and  $(4, 3)$ .

- A.  $-2$
- B.  $-\frac{1}{2}$
- C.  $2$
- D.  $10$

17. Use a ruler to determine the slope of the roof shown below.



**Note: This diagram is drawn to scale.**

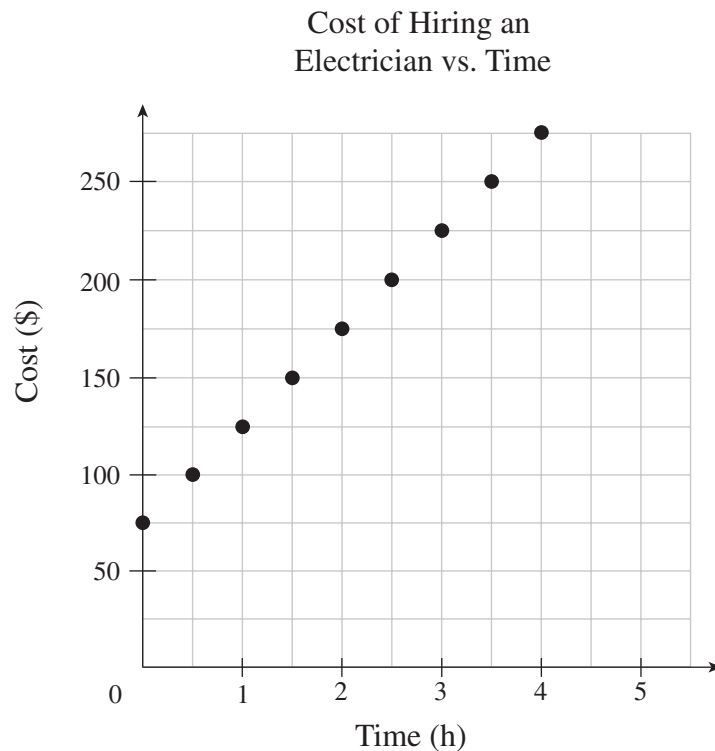
- A.  $\frac{3}{8}$
- B.  $\frac{3}{4}$
- C.  $\frac{4}{5}$
- D.  $\frac{4}{3}$



- A reminder that diagrams are not necessarily drawn to scale in provincial examinations. However, when students need to take a measurement, there will be a note indicating that the diagram is drawn to scale.
- Alternate solution: the angle of elevation could be measured using a protractor. Then the slope could be calculated using the tangent ratio.
- Students should have their own ruler with cm/mm and inches (1/16ths) even though rulers are provided in the Data Pages. However, students will need to have their own protractor for the exam, as none is provided in the Data Pages.

18. A line with an undefined slope passes through the points  $(-2, 1)$  and  $(p, q)$ . Which of the following points could be  $(p, q)$ ?
- A.  $(1, 0)$
  - B.  $(0, 1)$
  - C.  $(0, -2)$
  - D.  $(-2, 0)$

Use the graph below to answer question 19.



19. What is the cost of hiring an electrician for 8 hours?
- A. \$550
  - B. \$475
  - C. \$400
  - D. \$275



In this question, the graph should be a step function, but it has been drawn as a discrete graph for simplicity.

When a discrete graph goes to the edge of the grid, students can assume the pattern continues.



20. Two isosceles triangles have the same height. The slopes of the sides of triangle A are double the slopes of the corresponding sides of triangle B. How do the lengths of their bases compare?
- A. The base of A is quadruple that of B.
  - B. The base of A is double that of B.
  - C. The base of A is half that of B.
  - D. The base of A is one quarter that of B.

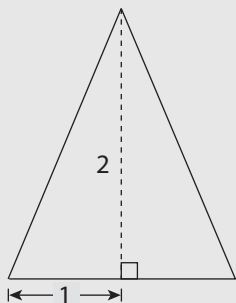


One possible solution to this problem is to use a diagram.

Triangle A

$$\text{slope} = 2 = \frac{2}{1}$$

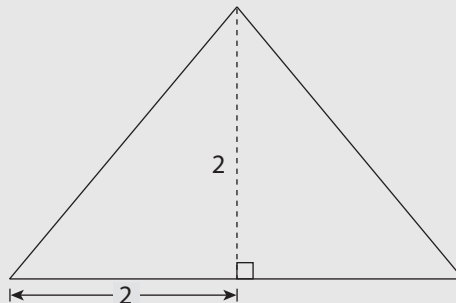
$$\text{so base} = 2$$



Triangle B

$$\text{slope} = 1 = \frac{2}{2}$$

$$\text{so base} = 4$$



21. Which of the following relations could be produced by  $y = \frac{2}{5}x - 6$ ?

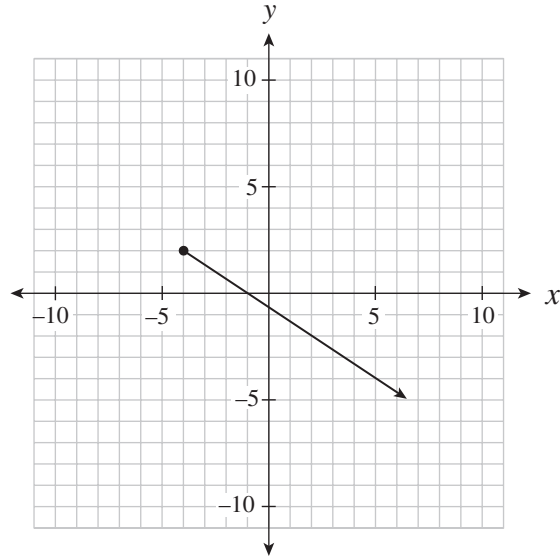
I.	$2x - 5y - 30 = 0$
II.	$\{(15, 0), (10, -2), (-5, -8), (-10, -10)\}$
III.	

- A. I only
- B. II only
- C. I and II only
- D. I, II and III

22. Determine the slope of the linear relation  $3x + 5y + 15 = 0$ .

- A.  $\frac{5}{3}$
- B.  $\frac{3}{5}$
- C.  $-\frac{3}{5}$
- D.  $-\frac{5}{3}$

23. Determine the range of the linear relation graphed below.



- A.  $y \leq -4$
- B.  $y \leq 2$
- C.  $y \geq -4$
- D.  $y \geq 2$

24. Which of the following coordinates are intercepts of the linear relation  $2x - 3y + 30 = 0$ ?

I.	$(0, 10)$
II.	$(0, \frac{2}{3})$
III.	$(-10, 0)$
IV.	$(-15, 0)$

- A. I only
- B. I and IV only
- C. II and III only
- D. II and IV only

25. Kelly explained her method for graphing the linear relation  $y = -\frac{2}{3}x + 7$  as follows:

Steps	
I.	Place a dot on the y-axis at positive 7.
II.	Move up two on the y-axis to positive 9.
III.	From the positive 9, move to the left three spots and place a dot there.
IV.	Draw a line through the two dots.

Where did Kelly make the first mistake in her explanation?

- A. Step I
  - B. Step II
  - C. Step III
  - D. There is no mistake.
26. Alex bought 144 bagels for \$80. His profit was \$75 once he had sold 100 bagels. Which equation below represents Alex's profit  $P$ , as a function of the number sold,  $n$ ?
- A.  $P = -0.05n + 80$
  - B.  $P = 0.05n - 80$
  - C.  $P = 0.75n$
  - D.  $P = 1.55n - 80$



Students are expected to know the vocabulary *profit*, *revenue* and *loss*.

27. Determine the slope-intercept equation of the line that is parallel to  $y = \frac{2}{5}x - 3$  and passes through the point  $(0, 5)$ .
- A.  $y = -\frac{5}{2}x - 3$
  - B.  $y = -\frac{5}{2}x + 5$
  - C.  $y = \frac{2}{5}x + 3$
  - D.  $y = \frac{2}{5}x + 5$

28. The cost to insure jewellery is a fixed amount plus a percentage of the value of the jewellery. It costs \$32 to insure \$1000 worth of jewellery or \$44.50 to insure \$3500 worth of jewellery. What is the fixed amount to insure jewellery?
- A. \$27.00  
 B. \$31.25  
 C. \$44.65  
 D. \$58.82
29. Lines A and B are perpendicular and have the same  $x$ -intercept. The equation of line A is  $x + 2y - 4 = 0$ . Determine the  $y$ -intercept of line B.
- A.  $-8$   
 B.  $-2$   
 C.  $4$   
 D.  $8$



Algebraic and graphical methods are both appropriate to answer this question.

30. Which of the following systems of linear equations has a solution of  $(-3, 4)$ ?

A. 
$$\begin{cases} 2x - 3y = 6 \\ y = 3x - 13 \end{cases}$$

B. 
$$\begin{cases} 2x - 3y = 6 \\ y = 3x + 13 \end{cases}$$

C. 
$$\begin{cases} 2x + 3y = 6 \\ y = 3x - 13 \end{cases}$$

D. 
$$\begin{cases} 2x + 3y = 6 \\ y = 3x + 13 \end{cases}$$



The intent of this question is for students to test the point in each system, not to solve all four systems.

31. Two planes have a cruising speed of 570 km/h without wind. The first plane flies for 12 hours against a constant headwind. The second plane flies for 10 hours in the opposite direction with the same wind (a tailwind). The second plane flies 370 km less than the first plane.

Determine two equations that could be used to solve for the wind speed,  $w$ , and the distance travelled by the first plane,  $d$ .

- A.  $(570 - w)(12) = d$   
 $(570 + w)(10) = d - 370$
- B.  $(570 - w)(12) = d$   
 $(570 + w)(10) = d + 370$
- C.  $(570 + w)(12) = d$   
 $(570 - w)(10) = d - 370$
- D.  $(570 + w)(12) = d$   
 $(570 - w)(10) = d + 370$

32. Which two numbers have the following properties?

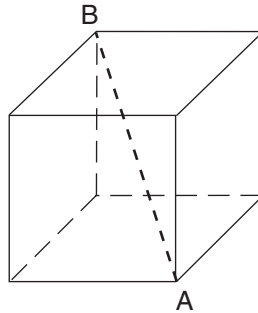
- Their GCF is 12.
- Their LCM is 72.

- A. 2 and 3  
B. 24 and 36  
C. 48 and 72  
D. 72 and 864



The acronyms GCF and LCM will be used on provincial examinations for simplicity.

33. Polar Company has designed an ice block in the shape of a cube. The volume of the cube is  $15\,625\text{ cm}^3$ . Which of the following dimensions is the smallest opening of an ice dispenser that will accommodate length AB?

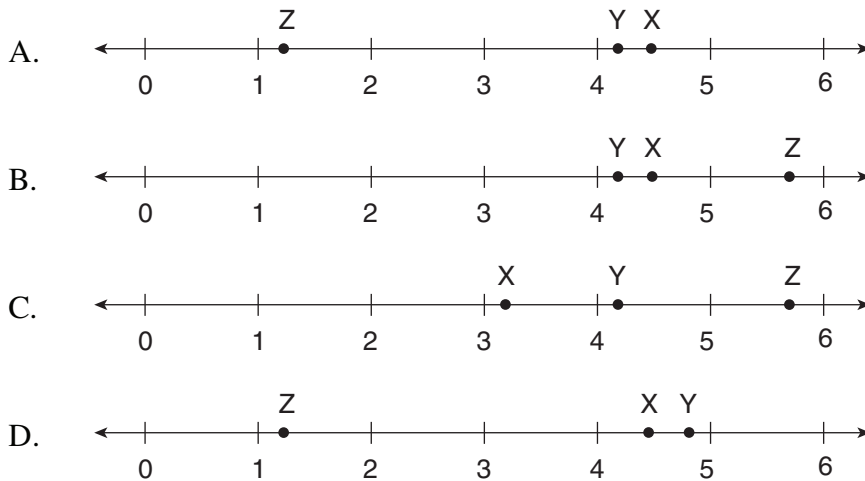


- A. 25 cm wide  
 B. 40 cm wide  
 C. 45 cm wide  
 D. over 50 cm wide
34. Which of the following number lines best represents the placement of X, Y, Z, given:

$$X = 2\sqrt{5}$$

$$Y = \text{cube root of } 68$$

$$Z = \sqrt[4]{2}$$



35. Chantal made a mistake in her simplification of  $\frac{(3a^5)^{-2}}{a^4}$ .

Steps	
I.	$\frac{1}{(3a^5)^2(a^4)}$
II.	$\frac{1}{(3)^2(a^5)^2(a^4)}$
III.	$\frac{1}{(9)(a^7)(a^4)}$
IV.	$\frac{1}{9a^{28}}$

Which step contains her first mistake?

- A. Step I
- B. Step II
- C. Step III
- D. Step IV



*Mistake* (or sometimes *error*) refers to actual incorrect work, not additional or omitted steps.

36. Simplify:  $\left(\frac{25x^a}{125x^3}\right)^3$

- A.  $\frac{x^{3a-9}}{125}$
- B.  $\frac{x^{a-3}}{5}$
- C.  $125x^{3a-9}$
- D.  $\frac{x^{27a}}{5}$



37. A research assistant calculated the brain mass,  $b$ , of an 8 kg cat. She used the formula

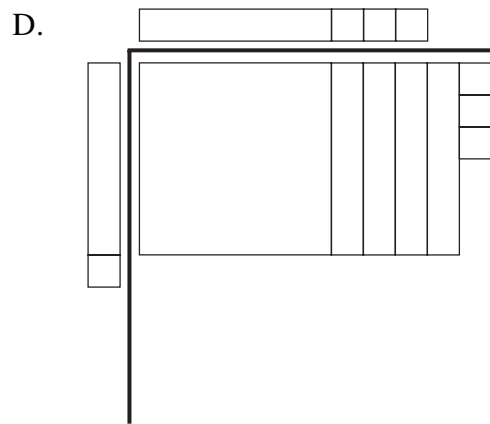
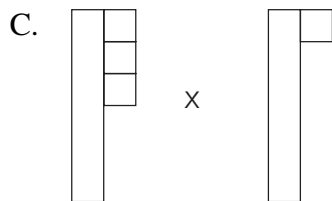
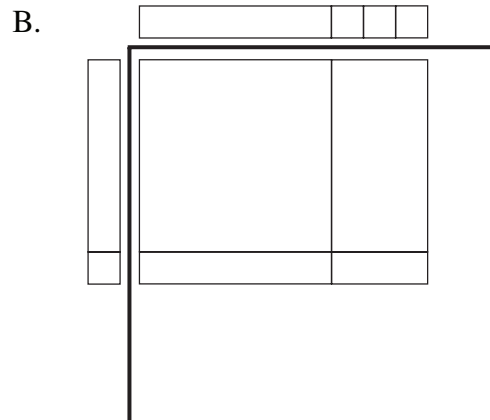
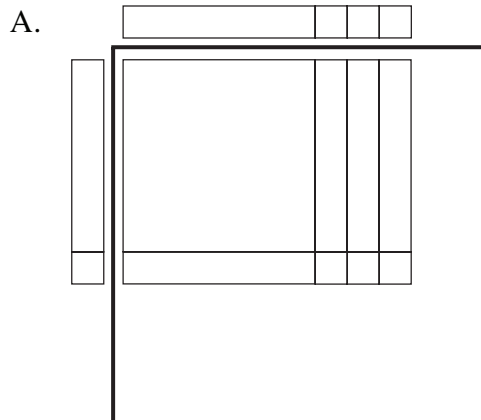
$$b = 0.01m^{\frac{2}{3}}, \text{ where } m \text{ is the total mass of the cat.}$$


Steps	
I.	$b = 0.01\sqrt[3]{8^2}$
II.	$b = 0.01\sqrt[3]{16}$
III.	$b \approx 0.01(2.52)$
IV.	$b \approx 0.025$

In which step did the research assistant first make a mistake?

- A. Step I
- B. Step II
- C. Step III
- D. Step IV

38. Which of the following diagrams best represents the expansion of  $(x + 3)(x + 1)$  pictorially?



 The provincial examinations will follow the Math Tile Legend in the Data Pages.

39. Expand and simplify:  $(x - 4)^3$

- A.  $x^3 - 12x^2 + 48x - 64$
- B.  $x^3 + 12x^2 + 48x + 64$
- C.  $x^3 - 4x^2 + 16x + 64$
- D.  $x^3 - 64$

40. Katie simplified the expression  $(x + b)(x + c)$ , where  $b < 0$  and  $c < 0$ , to the form  $x^2 + gx + k$ . What must be true about  $g$  and  $k$ ?
- A.  $g < 0$  and  $k > 0$
  - B.  $g < 0$  and  $k < 0$
  - C.  $g > 0$  and  $k > 0$
  - D.  $g > 0$  and  $k < 0$



The notation  $m < n < 0$  is equivalent to  $m < 0$ ,  $n < 0$ , and  $m < n$ . It could be used in domain/range questions.

41. Factor:  $y^2 - 81$

- A.  $(y - 9)^2$
- B.  $(y + 9)^2$
- C.  $(y + 9)(y - 9)$
- D.  $(y + 3)(y - 3)(y + 9)$



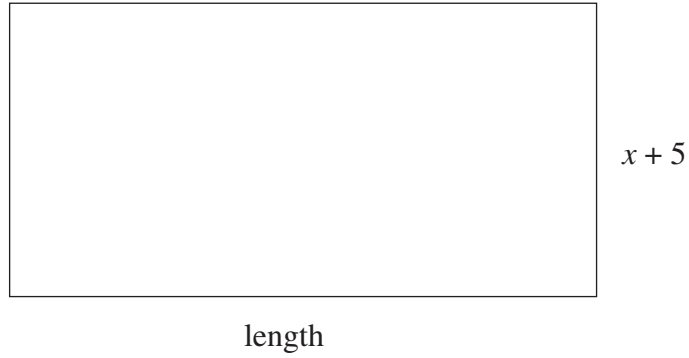
*Factor* means factor completely.

42. Which of the following expressions have a factor of  $x + 2$ ?

I.	$x^2 - 4$
II.	$2x^2 - x - 10$
III.	$5x + 10$

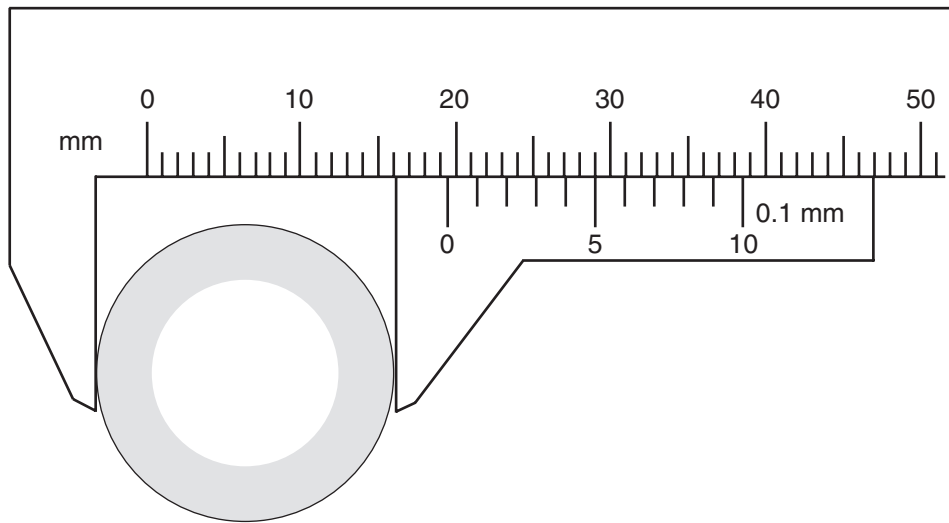
- A. I only
- B. III only
- C. I and III only
- D. I, II and III

43. Given that the area of the rectangle below is  $2x^2 + 9x - 5$ , determine the length of the rectangle.



- A.  $2x - 1$
  - B.  $2x + 1$
  - C.  $2x + 9$
  - D.  $2x^2 + 8x - 10$
44. As an estimation strategy, what could be used to best approximate one centimetre?
- A. the length of your foot
  - B. the width of your hand
  - C. the width of your finger
  - D. the width of a pencil lead

45. Sarah needs to replace the exhaust pipe on her dirt bike. She uses a Vernier calliper to find the diameter of the pipe.



What is the diameter of the pipe?

- A. 16.1 mm
  - B. 19.2 mm
  - C. 19.5 mm
  - D. 29.0 mm
46. On a quiz, students were asked to convert 5 lbs 4 oz to a metric weight.

	Stan's Solution	Erin's Solution
<b>Step 1</b>	$4 \text{ oz} \times \frac{1 \text{ lb}}{16 \text{ oz}} = 0.25 \text{ lb}$	$5 \text{ lb} \times \frac{16 \text{ oz}}{1 \text{ lb}} = 80 \text{ oz}$
<b>Step 2</b>	$5.25 \text{ lb} \times \frac{0.454 \text{ kg}}{1 \text{ lb}} \approx 2.3835 \text{ kg}$	$84 \text{ oz} \times \frac{28.35 \text{ g}}{1 \text{ oz}} \approx 2381.4 \text{ g}$

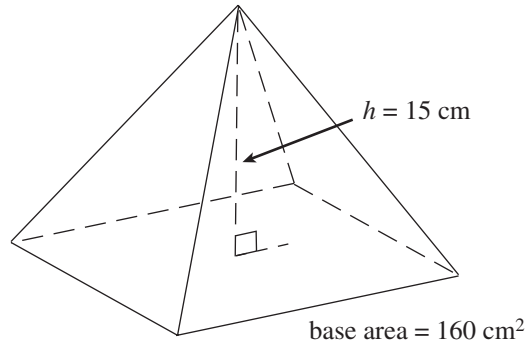
How should the teacher mark these two solutions?

- A. Only Erin's solution is correct.
- B. Only Stan's solution is correct.
- C. Both Stan and Erin gave a correct solution.
- D. Neither Stan nor Erin gave a correct solution.

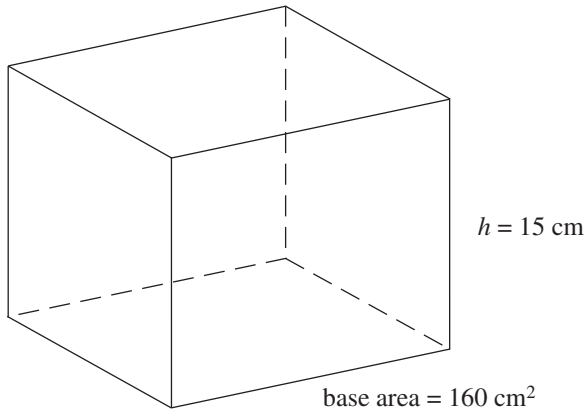


Although the two solutions have slightly different final answers, they are both correct based on the unit conversions found in the Data Pages.

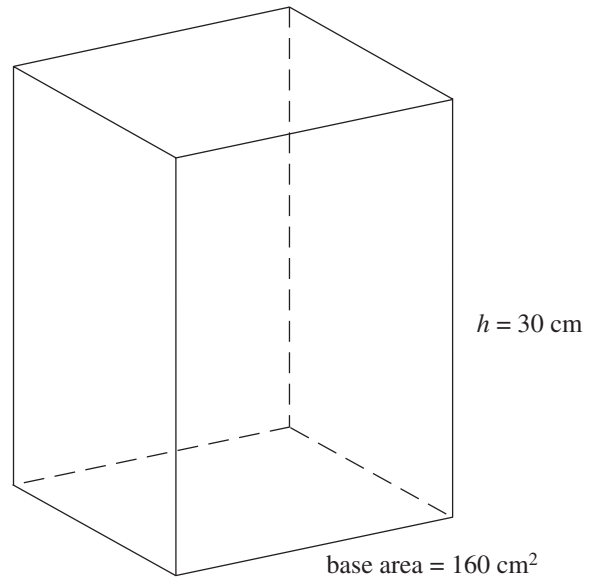
47. Which of the following shapes has a volume three times larger than the pyramid below?



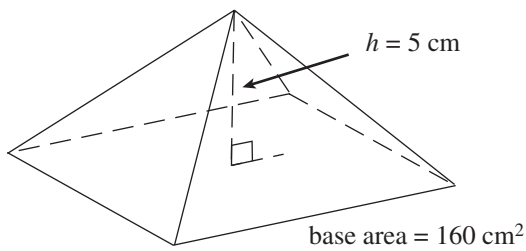
A.



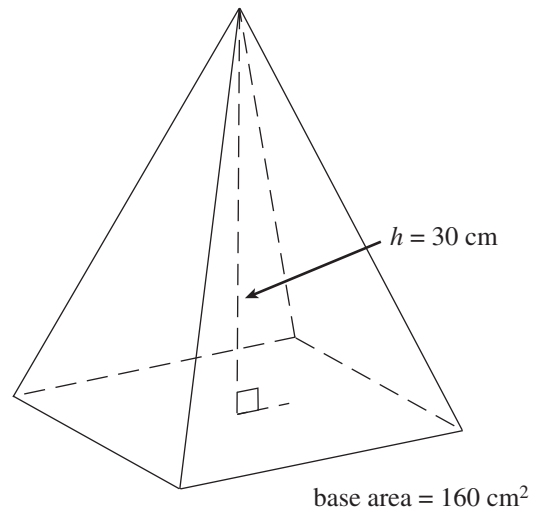
B.



C.



D.



The intent of this question is for students to recognize the relationship between the volume of a pyramid and the volume of a prism with the same base area.

48. A cylinder has a surface area of  $402 \text{ cm}^2$ . The height is three times greater than the radius. What is the height of the cylinder?
- A. 8.00 cm  
B. 10.48 cm  
C. 12.00 cm  
D. 16.97 cm



One possible solution:

$h = 3r$ , where  $h$  = height of the cylinder and  $r$  = radius of the cylinder

$$SA = 2\pi r^2 + 2\pi r h$$

$$402 = 2\pi r^2 + 2\pi r(3r)$$

$$402 = 2\pi r^2 + 6\pi r^2$$

$$402 = 8\pi r^2$$

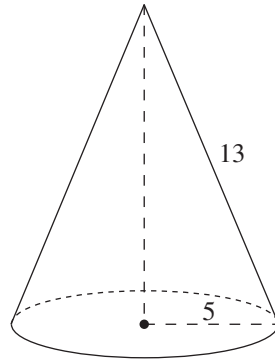
$$\sqrt{\frac{402}{8\pi}} = r$$

$$3.998 \approx r$$

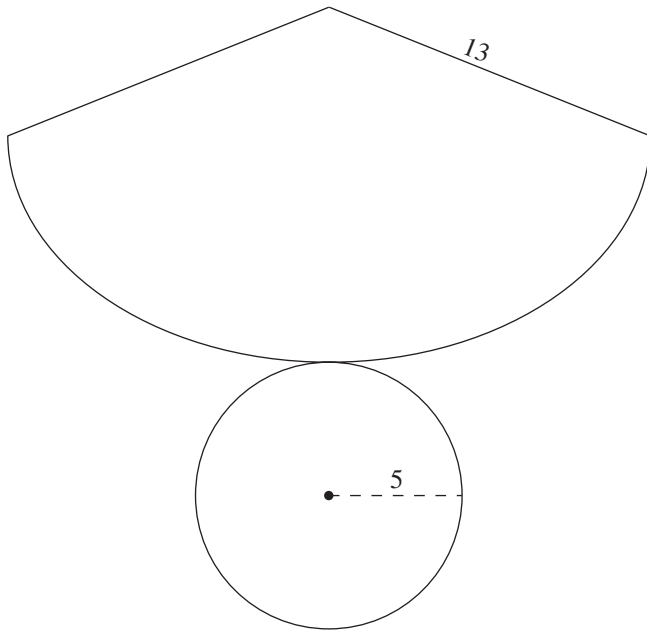
$$\therefore h \approx 3(3.998) \approx 11.994 \text{ cm}$$

49. A bowling ball measures 264 cm in circumference. What is the volume of the smallest cube that will hold this ball?
- A. approximately  $75\,000 \text{ cm}^3$   
B. approximately  $311\,000 \text{ cm}^3$   
C. approximately  $594\,000 \text{ cm}^3$   
D. approximately  $2\,300\,000 \text{ cm}^3$

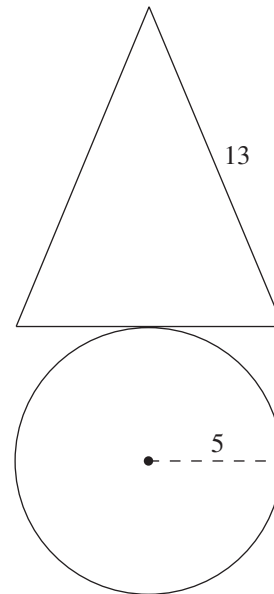
50. Which of the following net diagrams best constructs the cone below?



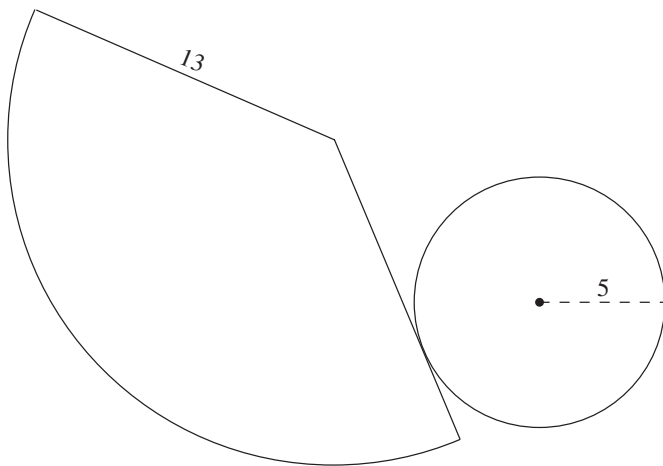
A.



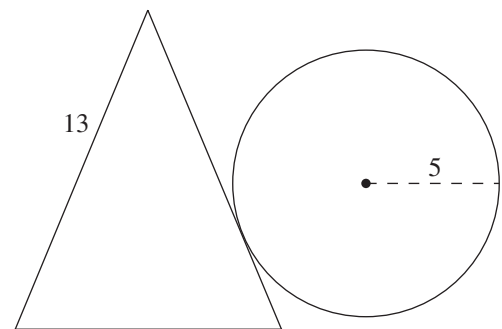
B.



C.

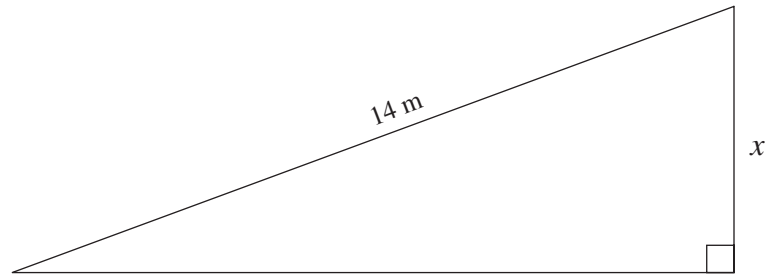


D.





51. Using a protractor, measure one of the unknown angles and determine the length of side  $x$ .



**Note: This diagram is drawn to scale.**

- A. 3.5 m
- B. 4.8 m
- C. 5.1 m
- D. 13.2 m



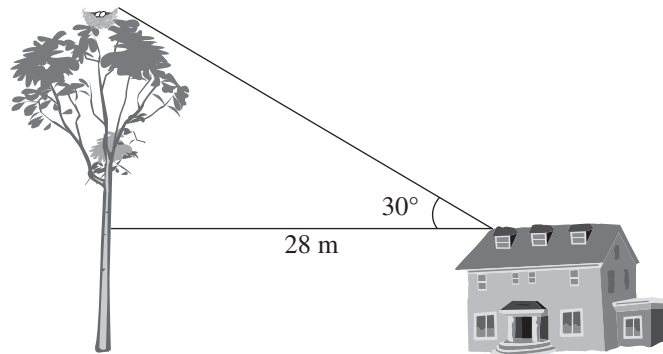
One possible method:

Measure the angle at the bottom left using a protractor, then use sine to solve for side  $x$ .

52. In  $\triangle ABC$ ,  $\angle C = 90^\circ$ ,  $AB = 17$  cm and  $AC = 15$  cm. Calculate the measure of  $\angle ABC$ .

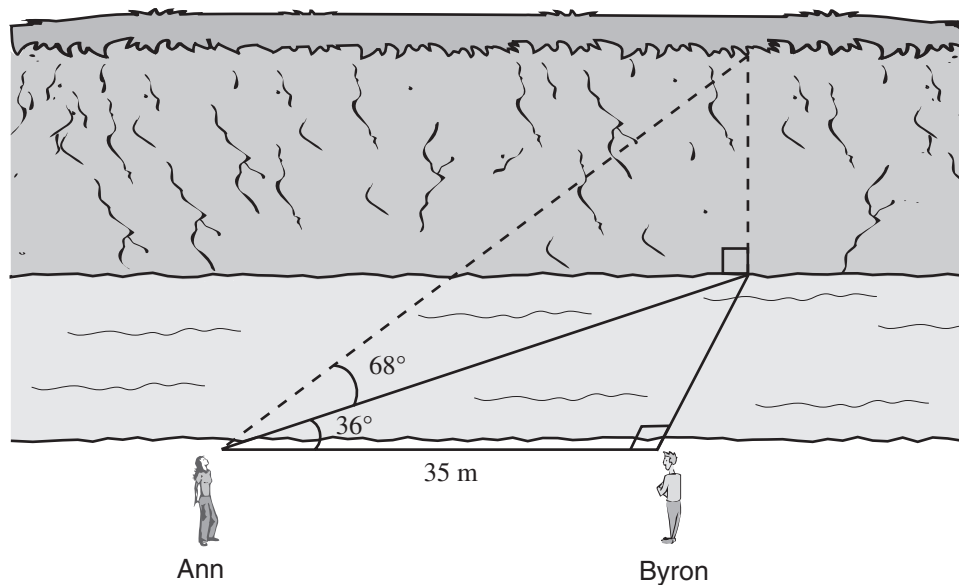
- A.  $28^\circ$
- B.  $41^\circ$
- C.  $49^\circ$
- D.  $62^\circ$

53. A 10 metre tall farmhouse is located 28.0 m away from a tree with an eagle's nest. The angle of elevation from the roof of the farmhouse to the eagle's nest is  $30^\circ$ .



What is the height of the eagle's nest?

- A. 16 m  
B. 24 m  
C. 26 m  
D. 48 m
54. Ann and Byron positioned themselves 35 m apart on one side of a stream. Ann measured the angles, as shown below.



Calculate the height of the cliff on the other side of the stream.

- A. 17.5 m  
B. 62.9 m  
C. 70.1 m  
D. 107.1 m

**PART C: NUMERICAL-RESPONSE QUESTIONS**  
(calculator permitted)

Value: 6 marks

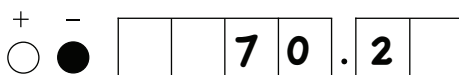
Suggested Time: 15 minutes

**INSTRUCTIONS:** When answering **numerical-response questions** on your Answer Sheet:

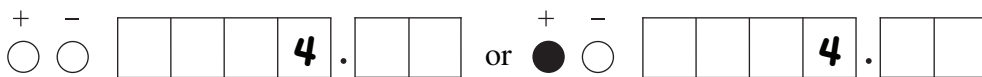
- print digits as illustrated:



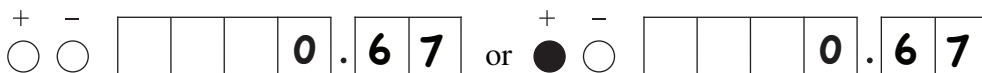
- shade the bubble with the negative symbol if the answer is negative; shade or leave blank the bubble with the positive symbol if the answer is positive.
- write your answer in the spaces provided using one digit per box, noting proper place value.
- leave unused boxes blank.
- For example,  $-70.2$  will be written as:



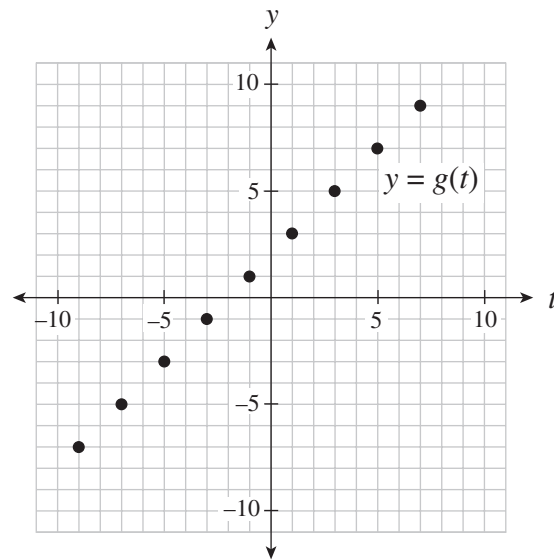
- For example, 4 will be written as:



- For example,  $\frac{2}{3}$ , answered to two decimal places, will be written as:



55. Given the graph of  $y = g(t)$  below, determine the value of  $t$  for which  $g(t) = -3$ .  
Answer as an integer.



**Record your answer neatly on the Answer Sheet.**

56. Solve for  $x$ :

$$3x + 4y = -16$$

$$x = 4y$$

**Record your answer neatly on the Answer Sheet.**

57. A package of 12 hex bolts and 10 anchor bolts weighs 7 pounds. A second package of 5 hex bolts and 15 anchor bolts weighs 4 pounds. How much does a single hex bolt weigh? Answer in pounds to one decimal place.

**Record your answer neatly on the Answer Sheet.**

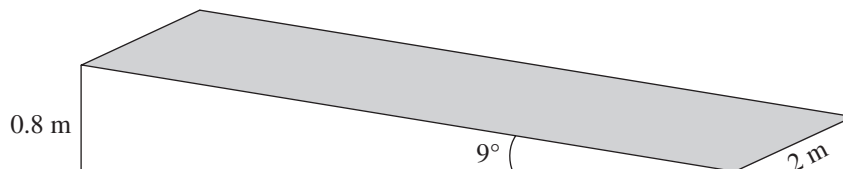
58. How many integer values are there for  $k$  for which  $4x^2 + kxy - 9y^2$  is factorable?

**Record your answer neatly on the Answer Sheet.**

59. Convert 150 pounds into kilograms. Answer to the nearest kilogram.

**Record your answer neatly on the Answer Sheet.**

60. A ramp is set up using a rectangular piece of plywood (shaded region) as shown below.



Calculate the area of the plywood. Answer in square metres to one decimal place.

**Record your answer neatly on the Answer Sheet.**

You have **Examination Booklet Form A**. In the box above #1 on your **Answer Sheet**, ensure you filled in the bubble as follows.

Exam Booklet Form/ Cahier d'examen	A	B	C	D	E	F	G	H
	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

## Examination Rules

1. The time allotted for this examination is two hours.  
You may, however, take up to 60 minutes of additional time to finish.
2. Answers entered in the Examination Booklet will not be marked.
3. Cheating on an examination will result in a mark of zero. The Ministry of Education considers cheating to have occurred if students break any of the following rules:
  - Students must not be in possession of or have used any secure examination materials prior to the examination session.
  - Students must not communicate with other students during the examination.
  - Students must not give or receive assistance of any kind in answering an examination question during an examination, including allowing their papers to be viewed by others or copying answers from another student's paper.
  - Students must not possess any book, paper or item that might assist in writing an examination, including a dictionary or piece of electronic equipment, that is not specifically authorized for the examination by ministry policy.
  - Students must not copy, plagiarize or present as their own, work done by any other person.
  - Students must immediately follow the invigilator's order to stop writing at the end of the examination time and must not alter an Examination Booklet, Response Booklet or Answer Sheet after the invigilator has asked students to hand in examination papers.
  - Students must not remove any piece of the examination materials from the examination room, including work pages.
4. The use of inappropriate language or content may result in a mark of zero being awarded.
5. Upon completion of the examination, return all examination materials to the supervising invigilator.





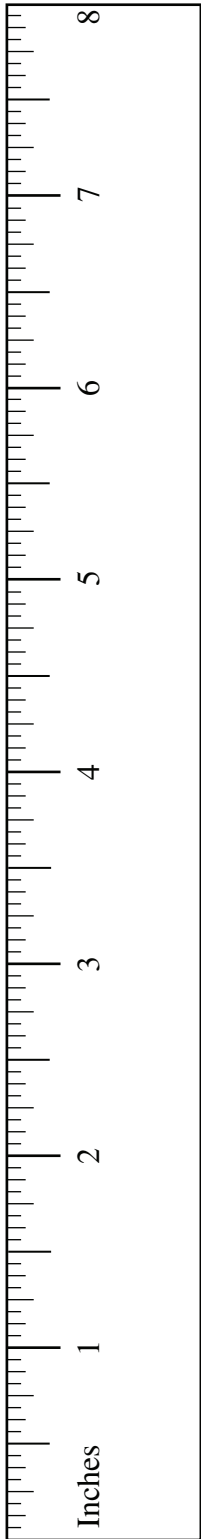
## UNIT CONVERSION

	Common Imperial	Imperial and SI	SI
<b>Length</b>	1 mile = 1760 yards 1 mile = 5280 feet 1 yard = 3 feet 1 yard = 36 inches 1 foot = 12 inches	1 mile $\approx$ 1.609 km 1 yard = 0.9144 m 1 foot = 30.48 cm 1 inch = 2.54 cm	1 km = 1000 m 1 m = 100 cm 1 cm = 10 mm
<b>Mass (Weight)</b>	1 ton = 2000 pounds 1 pound = 16 ounces	2.2 pounds $\approx$ 1 kg 1 pound $\approx$ 454 g 1 ounce $\approx$ 28.35 g	1 t = 1000 kg 1 kg = 1000 g
<b>Common Abbrevia- tions</b>	mile = mi yard = yd feet = ' or ft inch = " or in ton = tn pound = lb ounce = oz		kilometre = km metre = m centimetre = cm millimetre = mm tonne (metric ton) = t gram = g

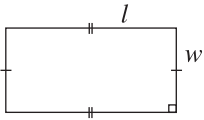
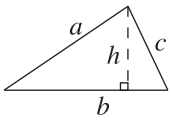
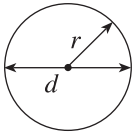
## FORMULAE

<p>(Put your calculator in Degree Mode)</p> <ul style="list-style-type: none"> <li>Right triangles</li> </ul> $\sin A = \frac{\text{opposite}}{\text{hypotenuse}}$ $\cos A = \frac{\text{adjacent}}{\text{hypotenuse}}$ $\tan A = \frac{\text{opposite}}{\text{adjacent}}$ <p><b><i>Pythagorean Theorem</i></b></p> $a^2 + b^2 = c^2$ <p>distance = speed <math>\times</math> time</p>		<ul style="list-style-type: none"> <li>The equation of a line:  <math>y = mx + b</math>  <math>Ax + By + C = 0</math>  <math>y - y_1 = m(x - x_1)</math> </li> <li>The slope of a line:  <math>m = \frac{\text{rise}}{\text{run}} = \frac{\Delta y}{\Delta x} = \frac{y_2 - y_1}{x_2 - x_1}</math> </li> </ul>												
<b>Math Tiles Legend</b>														
<table style="width: 100%; border: none;"> <tbody> <tr> <td style="text-align: center; border: 1px solid black; width: 50px; height: 50px;"></td> <td style="text-align: center;"><math>+x^2</math></td> <td style="text-align: center; border: 1px solid black; width: 50px; height: 50px; background-color: #cccccc;"></td> <td style="text-align: center;"><math>-x^2</math></td> </tr> <tr> <td style="text-align: center; border: 1px solid black; width: 50px; height: 15px;"></td> <td style="text-align: center;"><math>+x</math></td> <td style="text-align: center; border: 1px solid black; width: 50px; height: 15px; background-color: #cccccc;"></td> <td style="text-align: center;"><math>-x</math></td> </tr> <tr> <td style="text-align: center; border: 1px solid black; width: 10px; height: 15px;"></td> <td style="text-align: center;"><math>+1</math></td> <td style="text-align: center; border: 1px solid black; width: 10px; height: 15px; background-color: #cccccc;"></td> <td style="text-align: center;"><math>-1</math></td> </tr> </tbody> </table>				$+x^2$		$-x^2$		$+x$		$-x$		$+1$		$-1$
	$+x^2$		$-x^2$											
	$+x$		$-x$											
	$+1$		$-1$											

## GEOMETRIC FORMULAE



Key Legend	
$l$ = length	$P$ = perimeter
$w$ = width	$C$ = circumference
$b$ = base	$A$ = area
$h$ = height	$SA$ = surface area
$s$ = slant height	$V$ = volume
$r$ = radius	
$d$ = diameter	

Geometric Figure	Perimeter	Area
Rectangle 	$P = 2l + 2w$ or $P = 2(l + w)$	$A = lw$
Triangle 	$P = a + b + c$	$A = \frac{bh}{2}$
Circle 	$C = \pi d$ or $C = 2\pi r$	$A = \pi r^2$

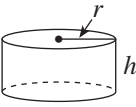
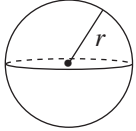
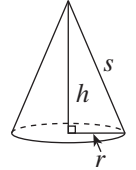
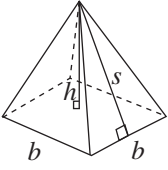
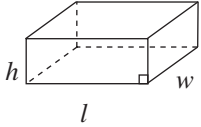
**NOTE:** Use the value of  $\pi$  programmed in your calculator rather than the approximation of 3.14.

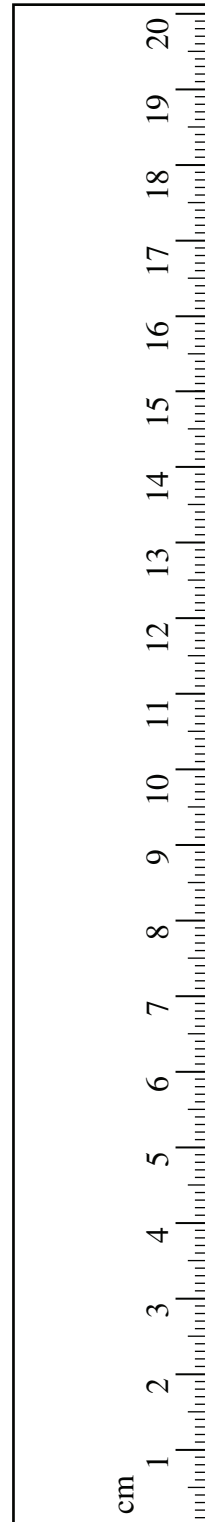


Students will be better prepared for the provincial examination if they understand the basic ideas behind the development of the formulae rather than just memorizing them.

For instance:

- perimeter is the distance around an object
- area is the space occupied by a 2-D object
- surface area is the sum of the areas of all the faces of a 3-D object
- volume of a prism is (area of base)  $\times$  (height)

Geometric Solid	Surface Area	Volume
Cylinder 	$A_{top} = \pi r^2$ $A_{base} = \pi r^2$ $A_{side} = 2\pi rh$ $SA = 2\pi r^2 + 2\pi rh$	$V = (\text{area of base}) \times h$
Sphere 	$SA = 4\pi r^2$ <b>or</b> $SA = \pi d^2$	$V = \frac{4}{3}\pi r^3$
Cone 	$A_{side} = \pi rs$ $A_{base} = \pi r^2$ $SA = \pi r^2 + \pi rs$	$V = \frac{1}{3} \times (\text{area of base}) \times h$
Square-Based Pyramid 	$A_{triangle} = \frac{1}{2}bs$ (for each triangle) $A_{base} = b^2$ $SA = 2bs + b^2$	$V = \frac{1}{3} \times (\text{area of base}) \times h$
Rectangular Prism 	$SA = wh + wh + lw + lw + lh + lh$ <b>or</b> $SA = 2(wh + lw + lh)$	$V = (\text{area of base}) \times h$
General Right Prism	$SA = \text{the sum of the areas of all the faces}$	$V = (\text{area of base}) \times h$
General Right Pyramid	$SA = \text{the sum of the areas of all the faces}$	$V = \frac{1}{3} \times (\text{area of base}) \times h$



**NOTE:** Use the value of  $\pi$  programmed in your calculator rather than the approximation of 3.14.

**ROUGH WORK SPACE**  
(No marks will be given for work done on this page.)

