



# Applied

## Grade 9 Assessment of Mathematics

Winter 2006



Education  
Quality and  
Accountability  
Office

Please note: The format of these booklets is slightly different from that used for the assessment. The items themselves remain the same.

1. Emily burns **2500 kJ/h** when she runs. To regain the energy she spends, Emily eats apples. An apple gives her **420 kJ** of energy.



How many apples must Emily eat to regain all of her energy when she runs for **1 h**?

- a approximately 6 apples \*
- b approximately 4.5 apples
- c approximately 3.5 apples
- d approximately 2 apples

2. In 2003, 50% of the 64 members of an environmental group voted to protest a new development.

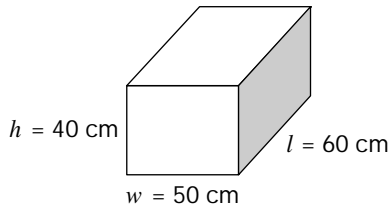
In 2004, with a membership of 85, 40% voted to protest the same development.



How many **more** members voted to protest the expressway in 2004 than in 2003?

- a 0 members
- b 2 members \*
- c 32 members
- d 34 members

3. Examine the diagram below.



Which statement is **true**?

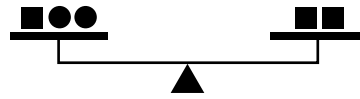
- a The height is 40% of the width.
- b The height is 50% of the length.
- c The height is 80% of the width. \*
- d The height is 125% of the width.

4. Expand and simplify the following expression:

$$3(2y + 4) - 12$$

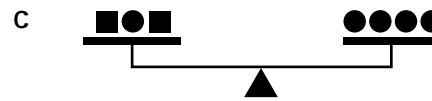
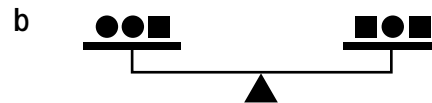
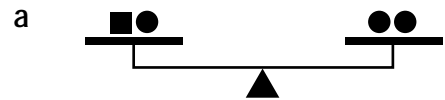
- a 6
- b  $6y$  \*
- c  $6y - 8$
- d  $18y - 12$

5. The following scale is balanced.

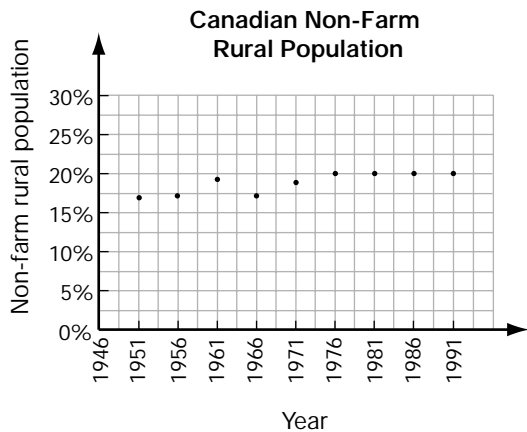


All figures with the same shape have the same mass.

Which scale below is balanced?



6. Study the graph below, which shows how the percent of the Canadian population that is non-farm rural has varied over time.

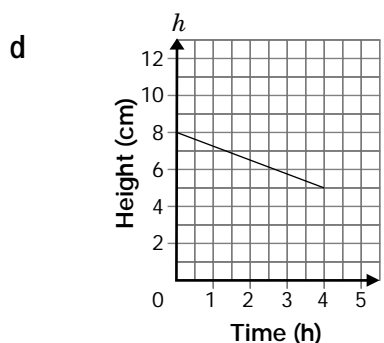
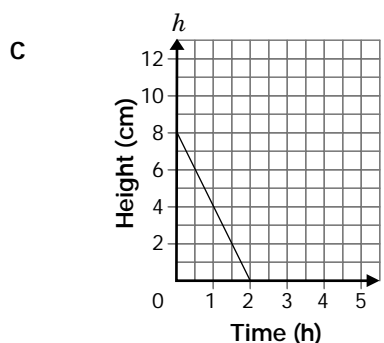
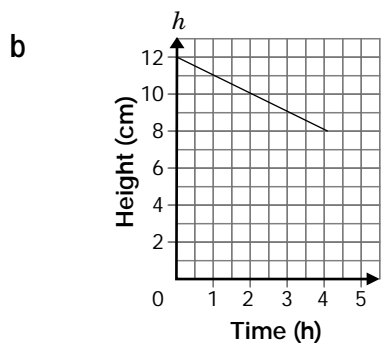
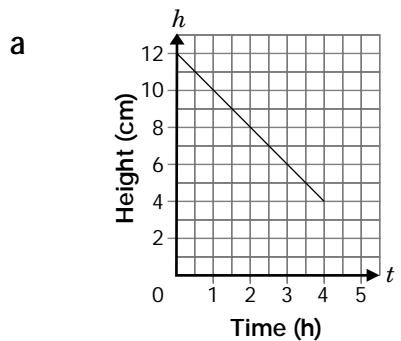


Which statement about the percent is true?

- a It stayed constant from 1951 to 1991.
- b It increased from 1966 to 1976. \*
- c It decreased at a constant rate from 1961 to 1981.
- d It increased at a constant rate from 1951 to 1971.

7. On a warm March day, Julie notices that the height of a snow bank is **decreasing** at an average rate of 2 cm/h.

Which graph illustrates the relationship between the height of the snow bank, in centimetres, and time, in hours?

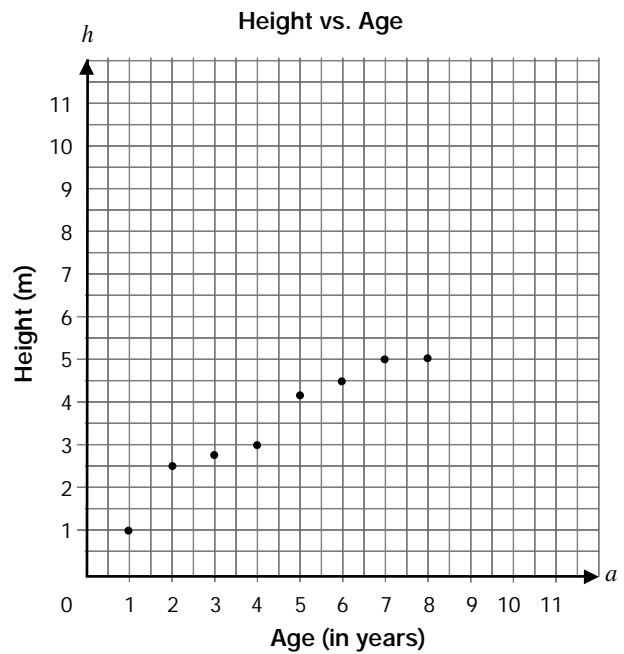


8. Ruth works as a translator. She charges her customers a fixed consulting fee of \$20, plus 23¢ per word.

Which expression shows Ruth's charge, in dollars, for translating a document with  $n$  words?

- a  $(20 + 0.23)n$
- b  $(20 - 0.23)n$
- c  $20n - 0.23$
- d  $20 + 0.23n$  \*

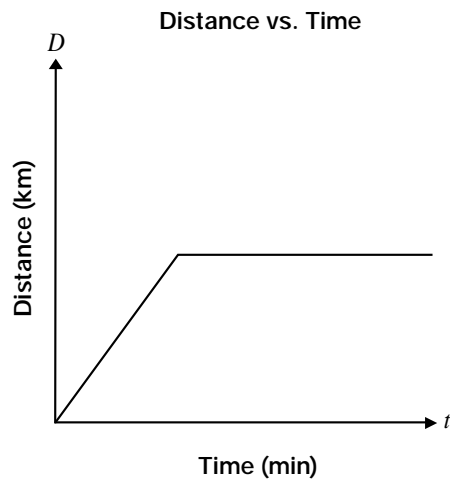
9. The graph below represents the relationship between the height,  $h$ , in metres, and the age,  $a$ , in years, of a tree.



What is the approximate **height** of the tree if it is **10 years old**?

- a 10.5 m
- b 8.5 m
- c 6.5 m \*
- d 4.5 m

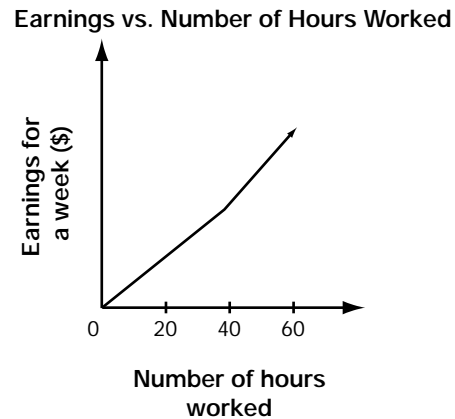
10. Every day, MaryLou takes a walk.



Which statement describes **her walk** as **modelled** by the graph?

- a She starts slowly, increases her speed and then walks at a constant rate.
- b She walks at a constant rate and then stops. \*
- c She walks at an increasing rate and then walks at a constant rate.
- d She walks at a fast constant rate and then walks at a slower constant rate.

11. Daniel works full-time at a restaurant. The graph shows the relationship between Daniel's earnings for a week and the number of hours worked.

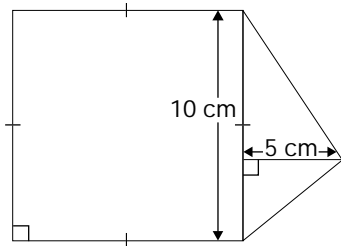


Which statement best describes how Daniel's work conditions change when he works more than 40 h in the week?

- a He is paid a one-time bonus.
- b He works at a faster rate.
- c He is paid at a higher rate. \*
- d He gets promoted to a higher rank.

12. A rectangle has a perimeter of 60 cm.  
Which dimensions will ensure the rectangle has the largest possible area?
- a 29 cm by 1 cm
  - b 25 cm by 5 cm
  - c 20 cm by 10 cm
  - d 15 cm by 15 cm \*

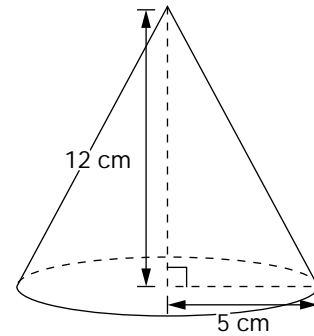
13. Examine the figure below.



What is the **total area** of the figure?

- a  $150 \text{ cm}^2$
- b  $145 \text{ cm}^2$
- c  $140 \text{ cm}^2$
- d  $125 \text{ cm}^2$  \*

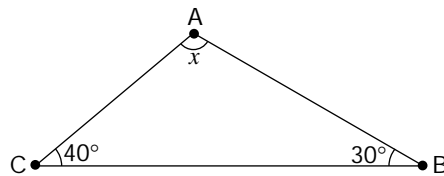
14. A cone has a height of 12 cm and a radius of 5 cm.



What is the **volume** of this cone?

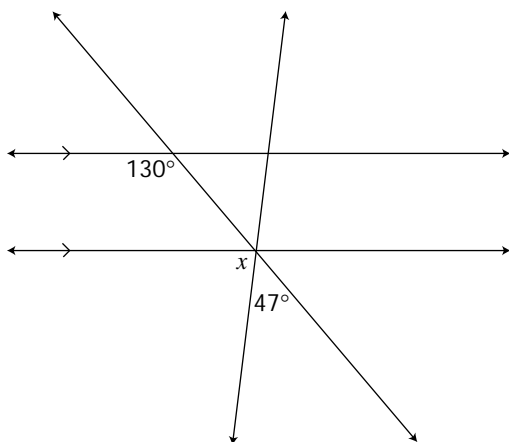
- a  $754.0 \text{ cm}^3$
- b  $340.3 \text{ cm}^3$
- c  $314.2 \text{ cm}^3$  \*
- d  $62.8 \text{ cm}^3$

15. Determine the value of  $x$  in triangle ABC.



- a  $70^\circ$
- b  $110^\circ$  \*
- c  $250^\circ$
- d  $290^\circ$

16. Determine the measure of  $x$ .



- a  $x = 18^\circ$
- b  $x = 30^\circ$
- c  $x = 78^\circ$
- d  $x = 83^\circ$  \*



# 1. Clown Factor

Clown Factor is a competition in which clowns do circus stunts to try to become the best clown.

In one event, the clowns tie helium balloons to objects to make them float.

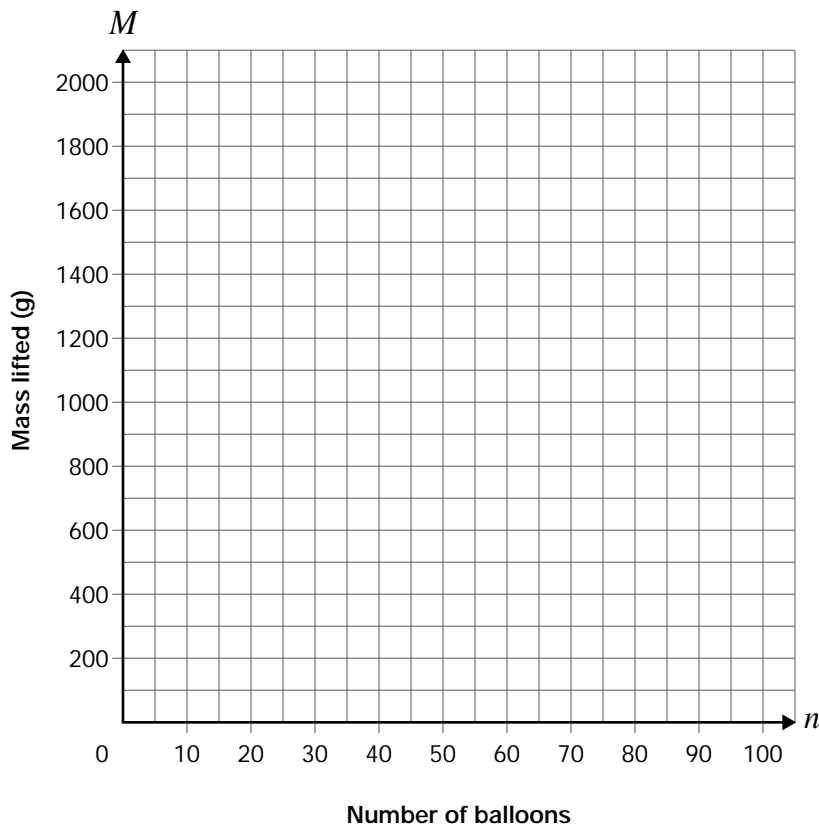
The data below represents the relationship between the mass lifted,  $M$ , in grams and the number of balloons,  $n$ , needed to lift the mass.



Number of balloons, $n$	Mass lifted, $M$ (g)
10	250
20	500
30	750
40	1000

a) Plot the data on the grid below.

Mass Lifted vs. Number of Balloons



- b) Determine the number of balloons needed to lift a mass of 1400 g.  
Justify your answer.
- c) How will the **graph** change if the experiment is repeated with **larger balloons** that lift **greater masses**?  
Justify your answer.
- d) Explain how to find the mass that can be lifted if you know the number of balloons.

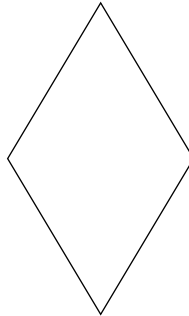
## 2. Paul's Quilt

Paul's grandmother is sewing a quilt for him. A quilt consists of pieces of fabric of different shapes sewn together.



- a) The basic shape that Paul's grandmother uses is a **rhombus** as shown below.

Add marks to the diagram to show all the equal parts of the rhombus.



**Hint:**  
Be sure to mark equal sides and angles.

- b) Paul's grandmother asks him to cut red and white pieces. Every 5 pieces in the quilt consist of 2 red pieces and 3 white pieces.

If the quilt has a total of **300** pieces, how many pieces are there of each colour?  
Show your work.

- c) Some quilts have **star patterns** made using rhombus pieces.

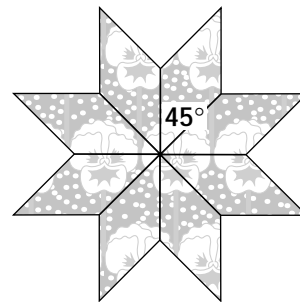
An example of an **eight-pointed** star is shown.

These rhombus pieces have an angle of  $45^\circ$  at the centre.

Paul's grandmother makes star patterns with rhombuses that have an angle of  $40^\circ$  at the centre.

How many points will her stars have?

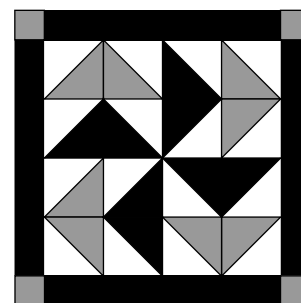
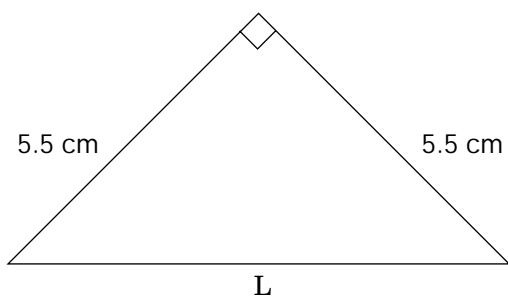
Justify your answer.



- d) Another quilt design uses right-angled triangles.

What is the length of side L of the triangle shown below?

Show your work.



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