

Academic

Grade 9 Assessment of Mathematics

Exponents and Formulas
Practice Materials



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- 1 The expression below can be simplified.

$$\frac{(x^2y)^3}{(xy)^2}$$

Which of the following shows the expression in its simplest form?

- a x^4y
- b x^4
- c xy
- d x^3y

- 2 Asha receives \$10 000.

Asha keeps **half** his money and gives **the rest** to Bertha.



Bertha keeps **half** her money and gives **the rest** to Calvin.

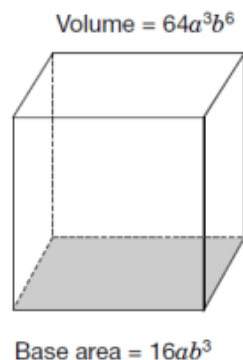
Calvin keeps **half** his money and gives **the rest** to Dane.

Dane keeps **half** his money and gives **the rest** to Evanna.

Which expression shows the dollar amount of money that **Evanna** receives from Dane?

- a $10\,000 \div 2^4$
- b $5000 \times \frac{1}{2} \times \frac{1}{2}$
- c $10\,000 \div \frac{1}{2} \div \frac{1}{2} \div \frac{1}{2} \div \frac{1}{2}$
- d $2500 \div 2$

- 3 Expressions for the base area and volume of a prism are given below.



Which expression represents the height of the prism?

- F $4a^2b^3$
- G $4a^3b^3$
- H $1024a^3b^9$
- J $1024a^4b^9$

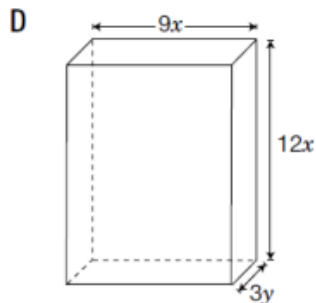
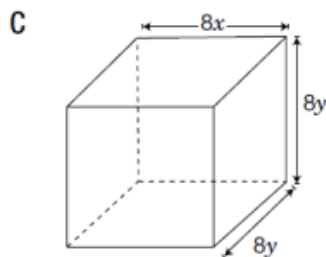
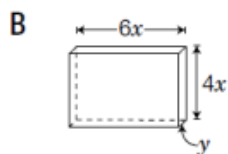
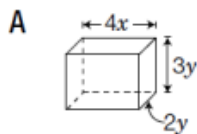
- 4 Meg has been asked to determine the value of the numerical expression below.

$$\frac{2^{400}}{2^{396}} - 2^3$$

Which of the following is the value of Meg's expression?

- A 1
- B 2
- C 4
- D 8

- 5 Which of the following fish tanks would contain an amount of water represented by the expression $V = 24x^2y$ when completely full?



- 6 Simplify the following algebraic expression:

$$\frac{a^6b^4}{a^2b}$$

F $\frac{a^3}{b^3}$

G $\frac{a^4}{b^3}$

H a^3b^3

J a^4b^3

- 7 Simplify the following expression:

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

a $6x^2 - 5x + 3$

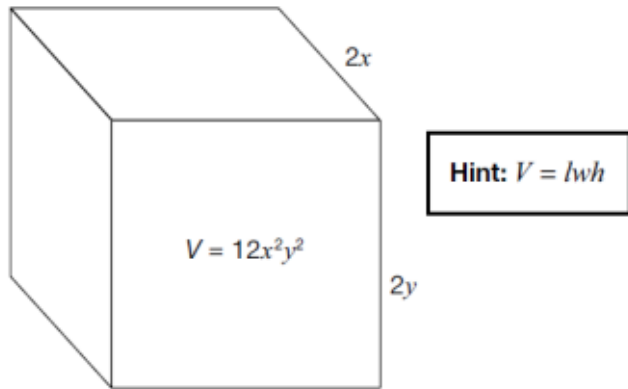
b $6x^2 - 6x$

c $15x^2 - 5x$

d $6x^2 + 4x$

8 Building Boxes

A box with a volume of $12x^2y^2$ is shown below.



What is the width of the box?

Show your work.

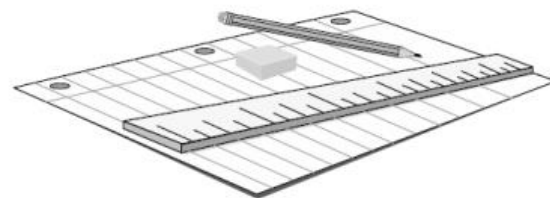
9

Excellent Equation

Expand and simplify.

$$2(3x^2 - 5x) + 4x(7 + x)$$

Show your work.



10 **Water Reservoir**

The volume of water left in a reservoir as it empties is shown by the formula below, where V is the volume of the water, in Litres, and t is the time in minutes.

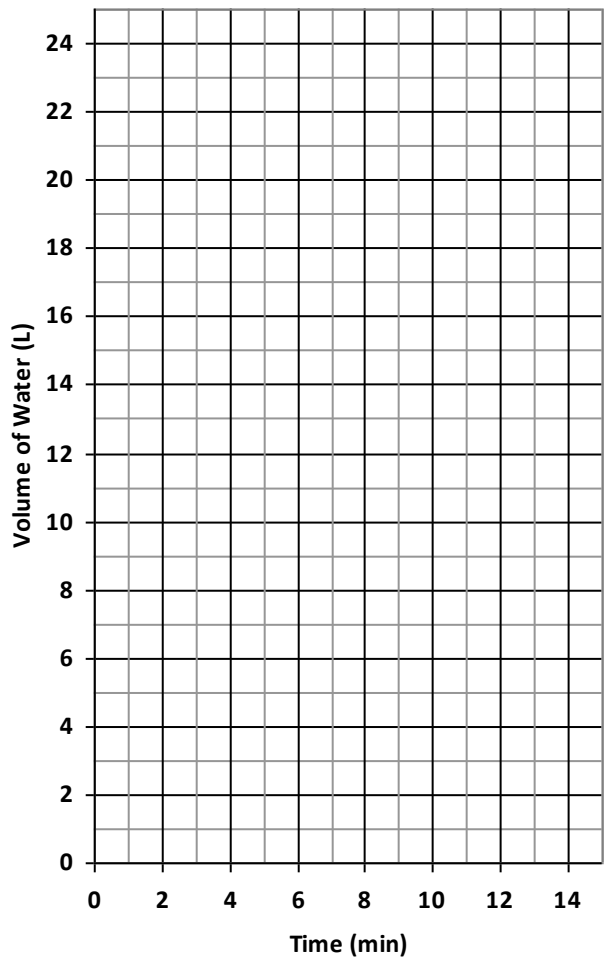
$$V = 20 - \frac{3t}{2}$$

Complete the table of values below and plot the points on the grid provided.

Show your work.

Time (t)	Volume of Water (V)
	17
	11
	5
	2

Volume of Water over Time



11 Evaluating an Expression

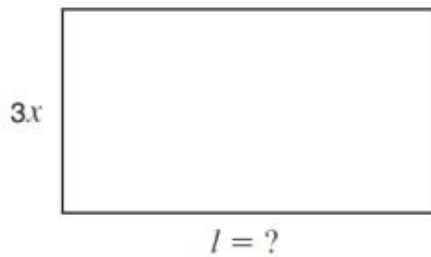
Evaluate the following expression.

$$\frac{(2^3)^{180} \times 2^{600} \times 3^2}{(2^2)^{567}}$$

Show your work.

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The area of the rectangle shown below is $6xy^2$ square units.



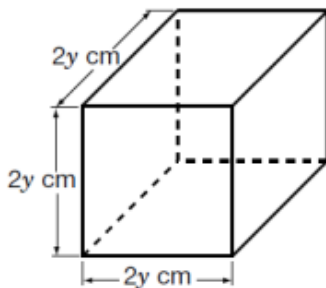
Hint: $A = lw$

If the width is $3x$ units, which expression represents the length of the rectangle?

- a $2xy^2$ units
- b $2y^2$ units
- c $3xy^2$ units
- d $3y^2$ units

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Each side of a cube is $2y$ cm long. What is the volume of the cube?

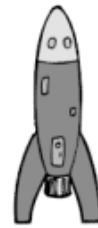


- a $8y^3$ cm³
- b $6y$ cm³
- c $2y^3$ cm³
- d $2y$ cm³

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While experimenting with a toy rocket, Dan determines that he can model the rocket's height, h , in metres, with respect to time, t , in seconds, using the equation

$$h = \frac{1}{2}t^2$$



Which calculation correctly finds the value of h when $t = 10$?

- a $h = \frac{1}{2} \times 10^2$
 $= 5^2$
 $= 25$
- b $h = \frac{1}{2} \times 10^2$
 $= \frac{1}{2} \times 20$
 $= 10$
- c $h = \frac{1}{2} \times 10^2$
 $= \frac{1}{2} \times 100$
 $= 50$
- d $h = \frac{1}{2} \times 10^2$
 $= \frac{1}{4} \times 100$
 $= 25$

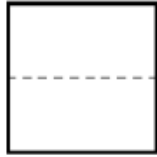
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Simplify the expression $(-3x)^2$.

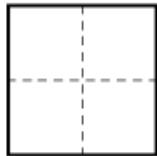
- a $-3x^2$
- b $6x^2$
- c $-9x^2$
- d $9x^2$

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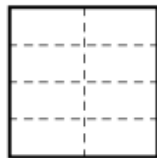
Sylvie folds a large piece of paper in half. The fold divides the paper into two equal parts. She folds it in half again. When she unfolds it, the folds divide the paper into four equal parts.



1 fold, 2 parts



2 folds, 4 parts



3 folds, 8 parts

She continues to fold and unfold the paper until the folds divide the paper into 64 equal parts.

How many times altogether has Sylvie folded the paper?

- F 5 times
- G 6 times
- H 7 times
- J 8 times

17

Tim shows the steps he took in simplifying the following algebraic expression:

$$\frac{(a^2)^3}{a^2 \times a^3}$$

$$= \frac{a^5}{a^2 \times a^3} \quad \text{Step 1}$$

$$= \frac{a^5}{a^{2+3}} \quad \text{Step 2}$$

$$= \frac{a^5}{a^5} \quad \text{Step 3}$$

$$= 1 \quad \text{Step 4}$$

In which step did Tim make an **error**?

- F Step 1
- G Step 2
- H Step 3
- J Step 4

18

Simplify fully:

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

- a $2x^2 - 17x$
- b $2x^2 - 23x$
- c $17x^2 - 5x$
- d $17x^2 - 20x$

Answers	
1]	A
2]	A
3]	F
4]	D
5]	B
6]	H
7]	D
8]	3xy
9]	$10x^2 + 18x$
10]	T
	V
	2
	17
	6
	11
	10
	5
	12
	2
11]	576
12]	B
13]	A
14]	C
15]	D
16]	G
17]	F
18]	D

