Consolidation of Grade 6 EQAO Questions

Measurement

Compiled by Devika William-Yu (SE2 Math Coach)

GRADE SIX EQAO QUESTIONS: Measurement

Overall Expectations

MV1	• Estimate, measure, and record quantities, using the metric measurement system
MV2	• Determine the relationships among units and measurable attributes, including the area of a parallelogram, the area of a triangle, and the volume of a triangular prism

	Spring 2006	Spring 2007	Spring 2008	Spring 2009	Spring 2010	Spring 2011
MV1	MC32	MC4 MC16	MC19	MC19 MC33	MC 21	MC11
MV2	MC1 MC2 MC18 MC21 MC22 MC33 OR11	MC3 MC15 MC24 MC25 MC36 OR10	MC3 MC4 MC20 MC21 MC33 MC34 OR8	MC3 MC4 MC20 MC21 MC34 OR10	MC3 MC4 MC19 MC21 MC22 MC24 MC33 OR10	MC2 MC15 MC16 MC19 MC24 MC34 OR27

Year	Knowledge & Understanding	Problem Solving (Thinking)	Application
Spring 2009	MC19 MC21	MC20 MC34	MC3 MC4 MC33 OR10
Spring 2010	MC19 MC21	MC22 MC24	MC3 MC4 MC33 OR10
Spring 2011	MC11 MC24	MC2 MC16 OR27	MC15 MC19 MC34

MEASUREMENT: Attributes, Units, and Measurement Sense

Grade 4	Grade 5	Grade 6
Overall Expectation #1		
- Estimate, measure, and record length, perimeter, area, mass, capacity, volume, and elapsed time, using a variety of strategies	- Estimate, measure, and record perimeter, area, temperature change, and elapsed time, using a variety of strategies	- Estimate, measure, and record quantities, using the metric measurement system
Specific Expectations		
- Estimate, measure, and record length, height, and distance, using standard units (i.e., millimetre, centimetre, metre, kilometre)		- Demonstrate an understanding of the relationship between estimated and precise measurements, and determine and justify when each kind is appropriate
- Draw items using a ruler, given specific lengths in millimetres or centimetres		
- Estimate, measure (i.e., using an analogue clock), and represent time intervals to the nearest minute	- Estimate, measure (i.e., using an analogue clock), and represent time intervals to the nearest second	
- Estimate and determine elapsed time, with and without using a time line, given the durations of events expressed in five-minute intervals, hours, days, weeks, months, or years	- Estimate and determine elapsed time, with and without using a time line, given the durations of events expressed in minutes, hours, days, weeks, months, or years	
	- Measure and record temperatures to determine and represent temperature changes over time	
- Estimate, measure using a variety of tools and strategies, and record the perimeter and area of polygons	- Estimate and measure the perimeter and area of regular and irregular polygons, using a variety of tools	
- Estimate, measure, and record the mass of objects, using the standard units of the kilogram and the gram		- Estimate, measure, and record length, area, mass, capacity, and volume, using the metric measurement system
- Estimate, measure, and record the capacity of containers, using the standard units of the litre and the millilitre		
- Estimate, measure using concrete materials, and record volume, and relate volume to the space taken up by an object		

MEASUREMENT: Measurement Relationships

Grade 4	Grade 5	Grade 6
Overall Expectation #2		
- Determine the relationships among units and measurable attributes, including the area and perimeter of rectangles	- Determine the relationships among units and measurable attributes, including the area of a rectangle and the volume of a rectangular prism	- Determine the relationships among units and measurable attributes, including the area of a parallelogram, the area of a triangle, and the volume of a triangular prism
Specific Expectations		
- Describe, through investigation, the relationship between various units of length (i.e., millimetre, centimetre, decimetre, metre, kilometre)	- Select and justify the most appropriate standard unit (i.e., millimetre, centimetre, decimetre, metre, kilometre) to measure length, height, width, and distance, and to measure the perimeter of various polygons	- Select and justify the appropriate metric unit (i.e., millimetre, centimetre, decimetre, metre, decametre, kilometre) to measure length or distance in a given real-life situation
- Select and justify the most appropriate standard unit (i.e., millimetre, centimetre, decimetre, metre, kilometre) to measure the side lengths and perimeters of various polygons		
	- Solve problems requiring conversion from metres to centimetres and from kilometres to metres	- Solve problems requiring conversion from larger to smaller metric units
		- Determine, using concrete materials, the relationship between units used to measure area (i.e., square centimetre, square metre), and apply the relationship to solve problems that involve conversions from square metres to square centimetres
- Determine, through investigation, the relationship between the side lengths of a rectangle and its perimeter and area	- Determine, through investigation using a variety of tools and strategies, the relationships between the length and width of a rectangle and its area and perimeter, and generalize to develop the formulas [i.e., *Area* = *length* x *width*; *Perimeter* = (2 x *length*) + (2 x *width*)];	- Determine, through investigation using a variety of tools and strategies, the relationship between the area of a rectangle and the areas of parallelograms and triangles, by decomposing and composing
		- Develop the formulas for the area of a parallelogram (i.e., *Area of parallelogram* = *base* x *height*) and the area of a triangle [i.e., *Area of triangle* = (*base* x *height*) ÷ 2], using the area relationships among rectangles, parallelograms, and triangles
- Pose and solve meaningful problems that require the ability to distinguish perimeter and area	- Solve problems requiring the estimation and calculation of perimeters and areas of rectangles	- Solve problems involving the estimation and calculation of the areas of triangles and the areas of parallelograms
- Compare and order a collection of objects, using standard units of mass (i.e., gram, kilogram) and/or capacity		

SE2 Families of Schools

(i.e., millilitre, litre)		
- Determine, through investigation, the relationship between millilitres and litres		
- Determine, through investigation, the relationship between grams and kilograms	- Select and justify the most appropriate standard unit to measure mass (i.e., milligram, gram, kilogram, tonne)	
- Select and justify the most appropriate standard unit to measure mass (i.e., milligram, gram, kilogram) and the most appropriate standard unit to measure the capacity of a container (i.e., millilitre, litre)		
- Solve problems involving the relationship between years and decades, and between decades and centuries	- Solve problems involving the relationship between a 12-hour clock and a 24-hour clock	
- Compare, using a variety of tools, two-dimensional shapes that have the same perimeter or the same area	- Create, through investigation using a variety of tools and strategies, two-dimensional shapes with the same perimeter or the same area	- Construct a rectangle, a square, a triangle, and a parallelogram, using a variety of tools given the area and/or perimeter
	- Determine, through investigation using stacked congruent rectangular layers of concrete materials, the relationship between the height, the area of the base, and the volume of a rectangular prism, and generalize to develop the formula (i.e., *Volume = area of base x height*)	determine, through investigation using a variety of tools and strategies the relationship between the height, the area of the base, and the volume of a triangular prism, and generalize to develop the formula (i.e., *Volume = area of base x height*)
		- Determine, through investigation using a variety of tools and strategies, the surface area of rectangular and triangular prisms
	- Determine, through investigation, the relationship between capacity (i.e., the amount a container can hold) and volume (i.e., the amount of space taken up by an object), by comparing the volume of an object with the amount of liquid it can contain or displace	
		- Solve problems involving the estimation and calculation of the surface area and volume of triangular and rectangular prisms
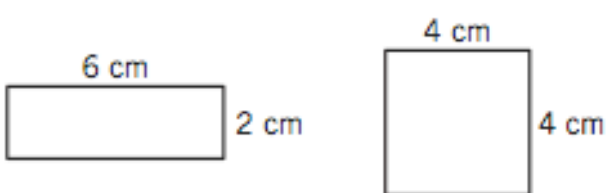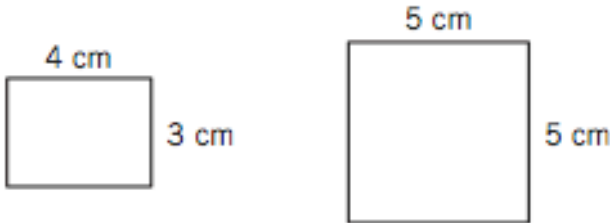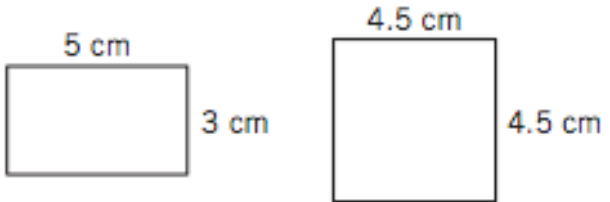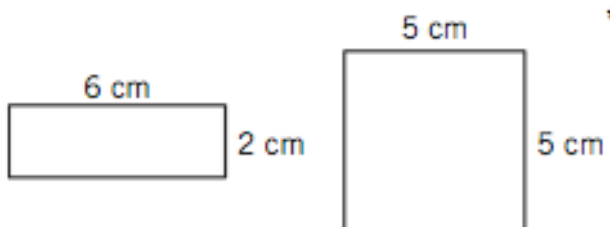
SE2 Families of Schools

GRADE SIX EQAO QUESTIONS: Measurement

32 Ms. Vanstone asks her students to draw a rectangle and a square with the areas and perimeters given below.

	Rectangle	Square
Area	12 cm^2	25 cm^2
Perimeter	16 cm	20 cm

Which shows two correct drawings?

a

6 cm — 2 cm

4 cm — 4 cm

b

4 cm — 3 cm

5 cm — 5 cm

c

5 cm — 3 cm

4.5 cm — 4.5 cm

d

6 cm — 2 cm

5 cm — 5 cm ★

GRADE SIX EQAO QUESTIONS: Measurement

4 Frank measures the width of a desk by using a metre stick. He marks a spot on the metre stick to indicate the width of the desk, as shown below.

Which is closest to the width of the desk?

    F 0.70 metres

    G 0.75 metres

    H 15 centimetres

    J 80 centimetres

16 Sometimes measurement can be estimated, and at other times it must be very accurate. A list of locations where running times might be measured is shown below.

1. Olympics

2. on the playground

3. school track meet

Which list shows the locations in order from the greatest to the least need for accuracy?

    F 3, 2, 1

    G 3, 1, 2

    H 1, 2, 3

    J 1, 3, 2

19 The time spent on which of the following activities would **best** be measured to the nearest hundredth of a second?

    a   playing at recess

    b   walking to school

    c   working on homework

    d   running a 50-metre race

19 What is the area of the triangle shown below?
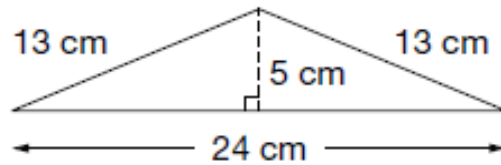
a 60 cm^2

b 65 cm^2

c 120 cm^2

d 156 cm^2

33 Samantha spills a milkshake on a rectangular piece of paper as shown below.

30 cm

20 cm
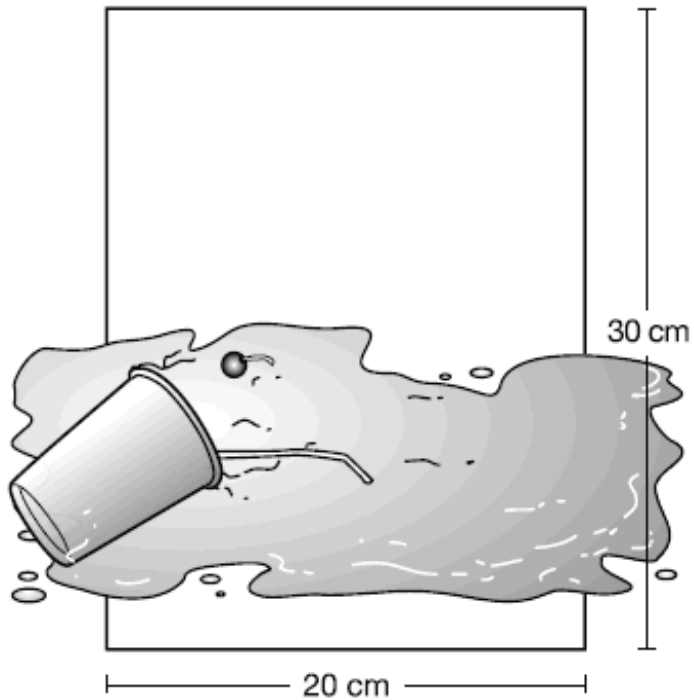
Which of the following **best** approximates the area of the entire spill?

a   100 cm^2

b   300 cm^2

c   400 cm^2

d   600 cm^2

21 Which is equivalent to 1 m^2?

    a 10 cm^2

    b 100 cm^2

    c 1000 cm^2

    d $10\ 000 \text{ cm}^2$

11 Consider the line segment below.

Which of the following is closest to its length?

a   3.7 cm

b   4.2 cm

c   47 mm

d   57 mm

1 Which is the most appropriate unit of measurement to describe the area of the floor of a gym?

a km^2

b cm^3

c m^2 *

d m^3

2 Joseph has a measuring wheel that clicks once for every metre he walks. How many times will the wheel click when Joseph walks 2.6 km?

a   2

b   26

c   260

d   2600 *

18 Four students calculate the volume of the shoe box shown below.
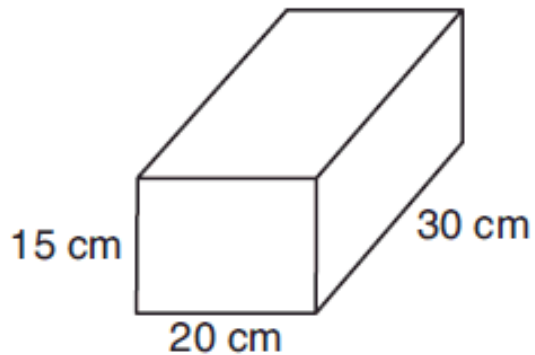
15 cm   20 cm   30 cm

The following number sentences show the students' calculations. Which calculation is correct?

    a $15 \text{ cm} \times 20 \text{ cm} = 300 \text{ cm}^2$

    b $20 \text{ cm} \times 30 \text{ cm} = 600 \text{ cm}^2$

    c $20 \text{ cm} + 30 \text{ cm} + 15 \text{ cm} = 65 \text{ cm}^3$

    d $15 \text{ cm} \times 20 \text{ cm} \times 30 \text{ cm} = 9000 \text{ cm}^3$ *

GRADE SIX EQAO QUESTIONS: Measurement

21 A cube is shown below. It is 10 cm wide, 10 cm long and 10 cm high.
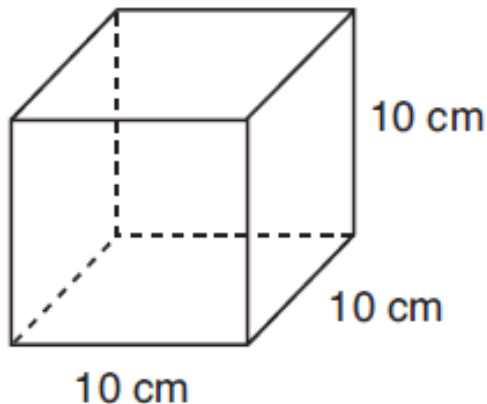
What is the area of one of the faces of the cube?

a 10 cm^2

b 30 cm^2

c 100 cm^2 *

d 1000 cm^2

---

22 Sam buys 4 items in a store. The mass of each item is recorded below.

9000 mg, 400 g, 0.04 kg, 0.009 kg

Which item has the greatest mass?

a   9000 mg

b   400 g *

c   0.04 kg

d   0.009 kg

33 Twelve cubes measuring 3 cm by 3 cm by 3 cm fit perfectly into the rectangular prism shown below.

3 cm

3 cm

3 cm
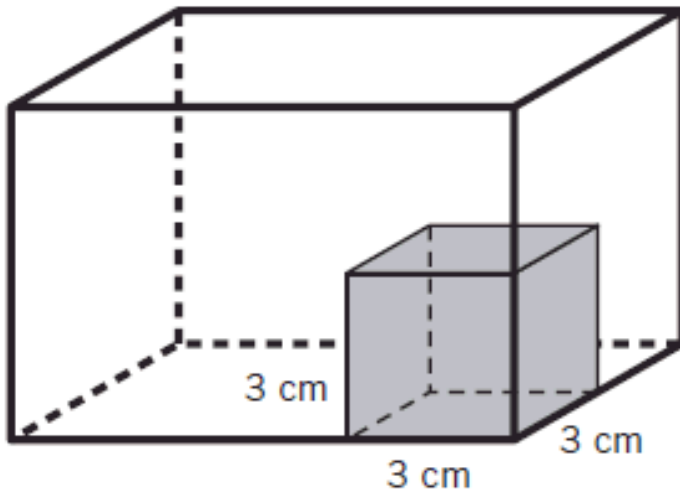
What is the volume of the rectangular prism in cm³?

a   36 cm³

b   162 cm³

c   288 cm³

d   324 cm³ *

GRADE SIX EQAO QUESTIONS: Measurement

11 Susie wants to tile the floor of her family's rectangular play room. The tiles she plans to use are 10 cm by 10 cm squares. A drawing of the room is shown below.

10 m

5 m
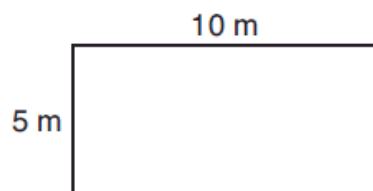
How many of the square tiles will Susie need to cover the floor of the play room?

Show your work.

Susie will need _____ tiles.

3 The dimensions of a rectangular prism are shown below.

- 5 cm wide

- 4 cm long

- 4 cm high

What is the total surface area of this rectangular prism?

A   57 cm^2

B   80 cm^2

C   96 cm^2

D   112 cm^2

15 An artist has some paintings that are rectangular and some that are parallelograms. One of her paintings is shaped like the rectangle shown below.

30 cm

50 cm
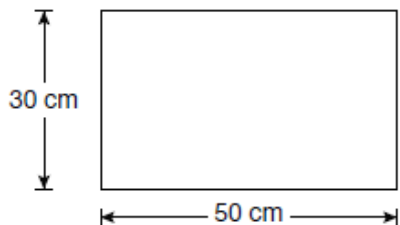
Which of the following parallelograms has the same area as the rectangle?

A

30 cm   20 cm

50 cm

B

50 cm   40 cm

30 cm

C

40 cm   30 cm

50 cm

D

50 cm   30 cm

20 cm

24 A box of modelling clay that weighs 3.5 kg is divided equally among 14 students. How many grams does each student receive?

    F   0.25 g

    G   4 g

    H   49 g

    J   250 g

25 Cynthia purchases a tent for her camping trip, as shown below. During one night of the camping trip, it rains. The floor of the tent is the only part that stays dry.

1.96 m

1.82 m

1.53 m

2.41 m
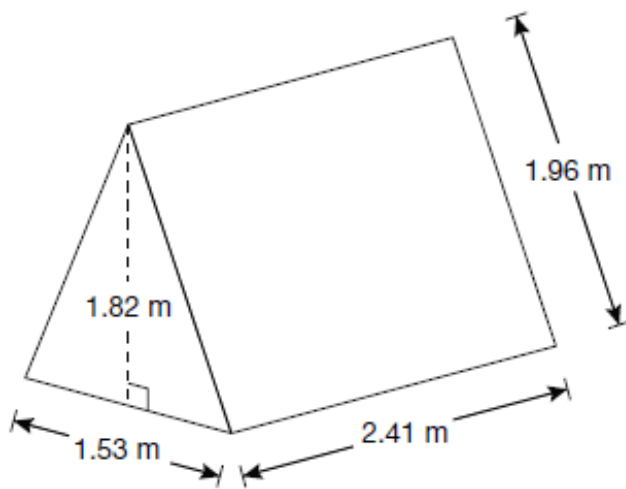
What is the area of the part of Cynthia's tent that gets wet?

    A   10.84 m^2

    B   12.23 m^2

    C   15.01 m^2

    D   16.96 m^2

36 Four triangles are shown on the grid below.

Triangle 1

Triangle 2

Triangle 3
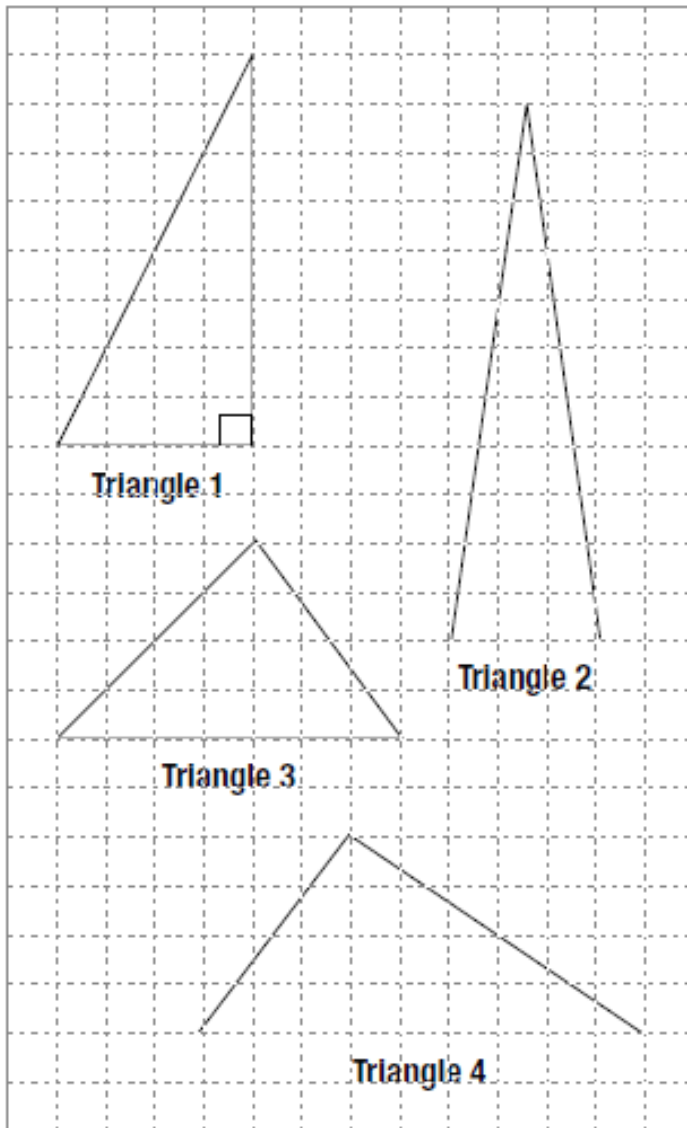
Triangle 4

Which triangle has an area of 18 square units?

F Triangle 1

G Triangle 2

H Triangle 3

J Triangle 4

10 Jude's fish tank, shown below, holds 100 000 cm^3 of water when full. Jude decides to pour in water to a height of 5 cm below the top of the tank.

1 m

40 cm
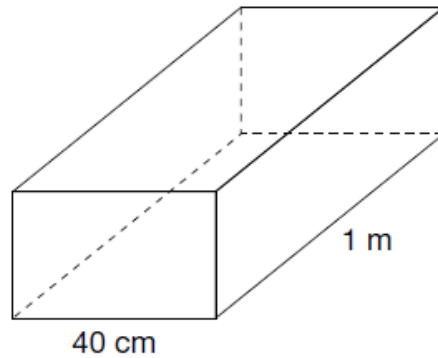
How much water, in cm^3, will Jude need to pour into the tank so that the water is 5 cm below the top?

Show your work.

GRADE SIX EQAO QUESTIONS: Measurement
Overall Expectation #2
Spring 2008

3 What is the total surface area of the rectangular prism below?

1 cm

3 cm

2 cm
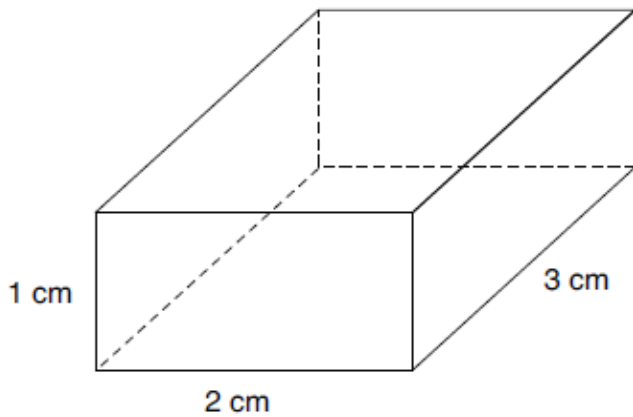
a 6 cm^2

b 11 cm^2

c 16 cm^2

d 22 cm^2

4 What is the area of a parallelogram with a height of 2 m and a base of 3.5 m?

a 1.75 m^2

b 3.50 m^2

c 7.0 m^2

d 11.0 m^2

20 Mr. Clarke wants to tile a floor that is 6 metres long and 4 metres wide. The dimensions of each square tile are 20 cm by 20 cm. What is the minimum number of tiles that Mr. Clarke will need to tile the entire floor?

   a   24

   b   400

   c   600

   d   1200

21 Which of the following would be the **most** appropriate metric unit to measure the length of Johann's arm?

   a   decimetre

   b   decametre

   c   millimetre

   d   kilometre

33 A group of 6 people equally shares 12 litres of juice. How many millilitres of juice does each person receive?

   a   2

   b   72

   c   2000

   d   12 000

34 A pool in the shape of a rectangular prism is shown below.

10 m

25 m

2 m
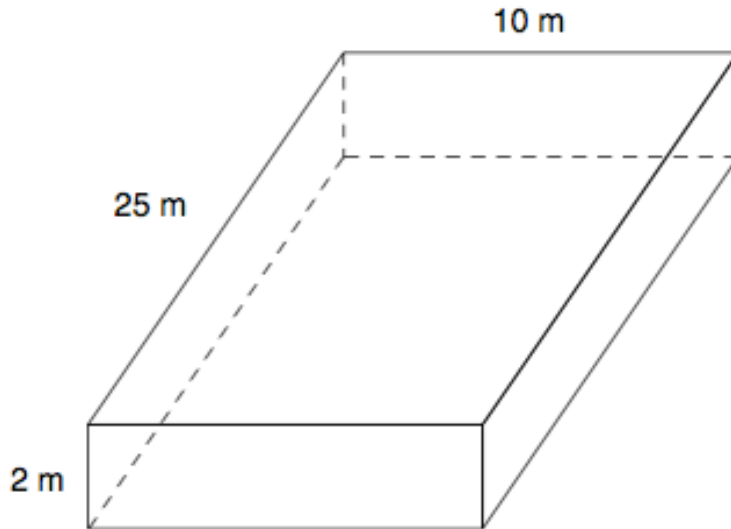
Hint:
$1 \text{ m}^3 = 1000 \text{ L}$

How many litres of water are needed to completely fill the swimming pool?

a 500 000

b 50 000

c 5000

d 500

8 Daneen builds a model train with 5 cubes as shown below. The dimensions of each cube are 2 cm × 2 cm × 2 cm.
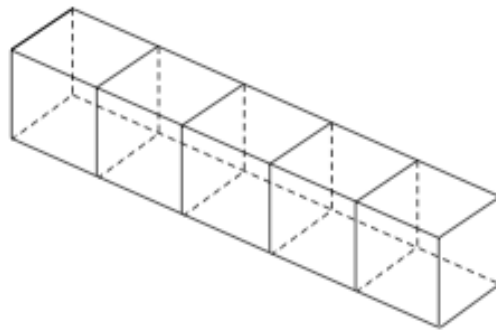
Daneen wants to paint the outside of the model train with red paint. The cost to paint 1 cm^2 of the train is $0.75. How much will it cost to paint the outside of the model train?

Show your work.

3 Rebecca creates a net of a rectangular prism, as shown below.

30 cm

5 cm

5 cm

5 cm
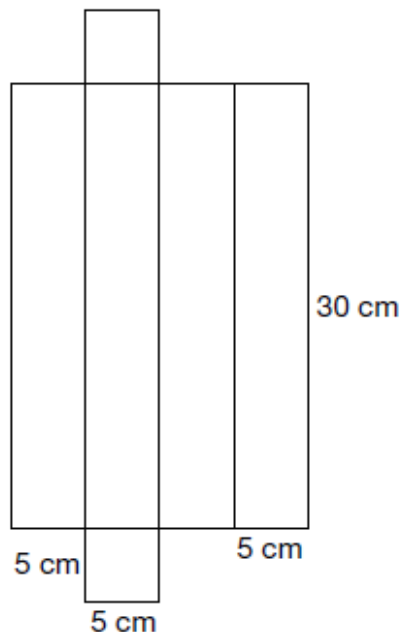
What is the total surface area of the rectangular prism?

    a   450 cm^2

    b   600 cm^2

    c   650 cm^2

    d   750 cm^2

4 Ravi makes 2.80 L of pudding. He wants to completely fill 350 mL cups with pudding. Which of the following expressions can be used to find how many 350 mL cups Ravi can fill?

    a   2.80 × 1000 ÷ 350

    b   2.80 × 1000 + 350

    c   2.80 × 350 × 1000

    d   2.80 × 350 ÷ 1000

GRADE SIX EQAO QUESTIONS: Measurement

20 Elda has a rectangular piece of paper with an area of 0.12 m^2. She cuts this piece of paper into small rectangles each with an area of 200 cm^2.

What is the maximum number of these small rectangles that Elda can cut?

a   6

b   12

c   24

d   60

21 A diagonal of a parallelogram is drawn forming 2 triangles. If the area of one of the triangles is 34 cm^2, what is the area of the parallelogram?

a 17 cm^2

b 34 cm^2

c 68 cm^2

d 136 cm^2

34 Which expression can be used to find the area of the shaded region?
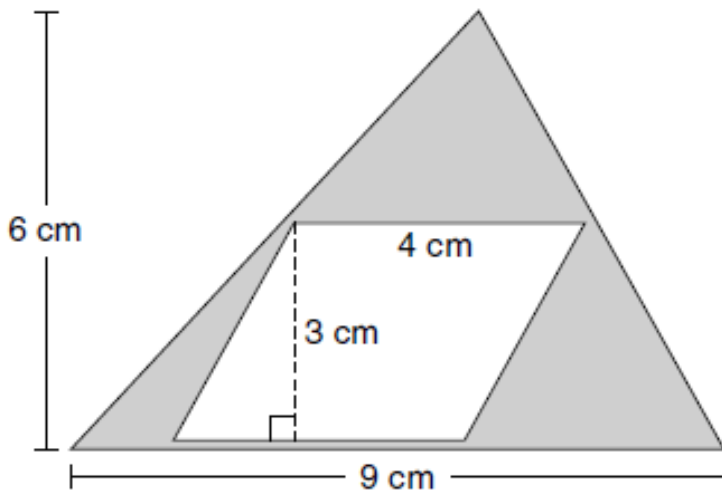
a $54 \div 2 - 12$

b $54 - 4 \times 12 \div 2$

c $12 \div 2 - 54$

d $12 - 54 \div 2$

10 Determine the area of the parallelogram below.

3 units

2 units

4 units
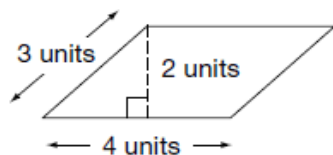
The area of the parallelogram is _____.

Draw a triangle and a rectangle each with the same area as the parallelogram. Use the grid below.
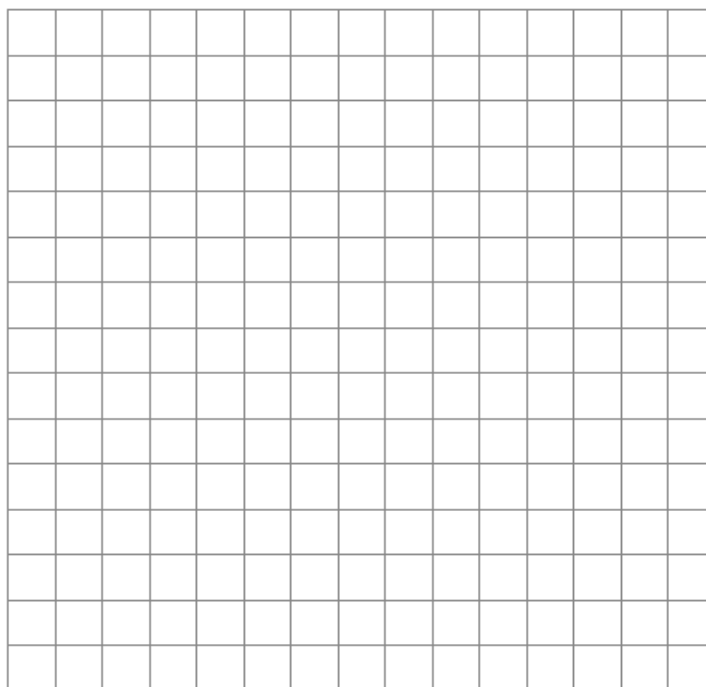
Justify your answers.

3 Enrico pours 80 L of water into 200 mL cups. If he fills the cups completely, how many cups does he fill?

    a   250

    b   400

    c   2500

    d   4000

4 Which parallelogram has an area of 24 m^2 and a perimeter of 28 m?
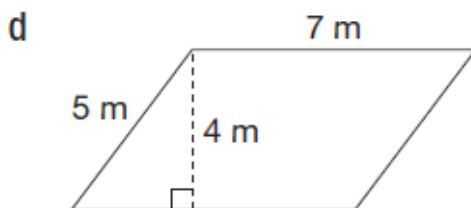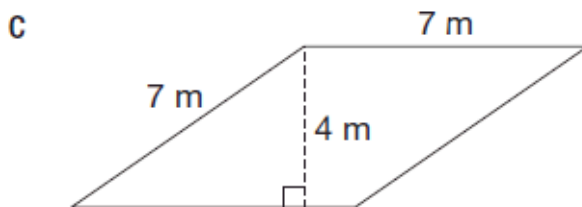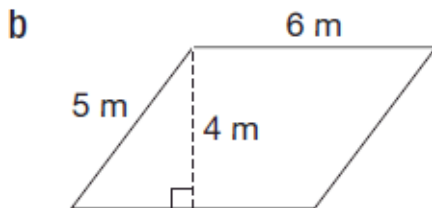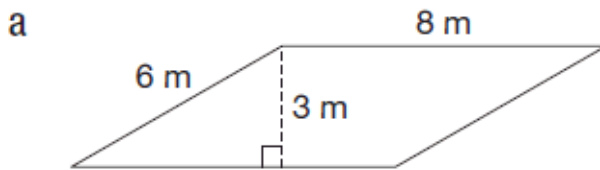
a

8 m
6 m
3 m

b

6 m
5 m
4 m

c

7 m
7 m
4 m

d

7 m
5 m
4 m

19 Which unit of measure is most appropriate to describe the length of a page in a textbook?

    a   centimetre

    b   kilometre

    c   metre

    d   millimetre

21 Which is equivalent to 1 m^2?

    a 10 cm^2

    b 100 cm^2

    c 1000 cm^2

    d $10\ 000 \text{ cm}^2$

22 Look at the two parallelograms below.

2 cm

2 cm

18 cm

14 cm
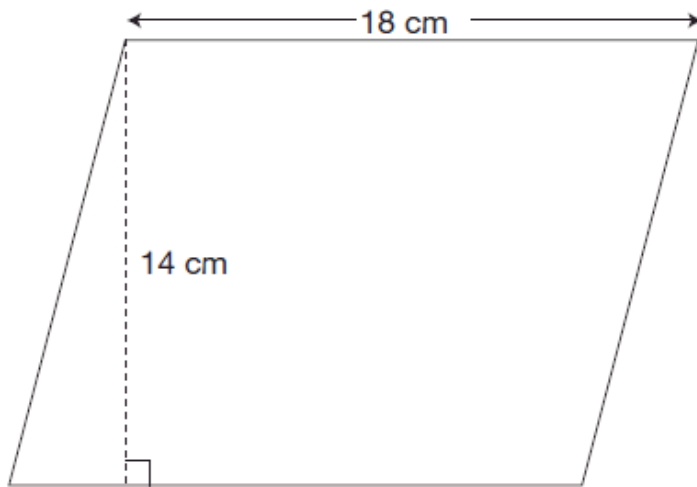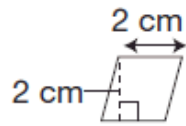
What is the minimum number of small parallelograms needed to cover the larger parallelogram completely?

a   16

b   63

c   126

d   252

24 A turkey weighs 9.75 kilograms. It takes about 20 minutes to cook 500 grams of this turkey. Approximately how many minutes does it take to cook the whole turkey?

   a   39

   b   74

   c   390

   d   488

33 Look at the parallelogram below.
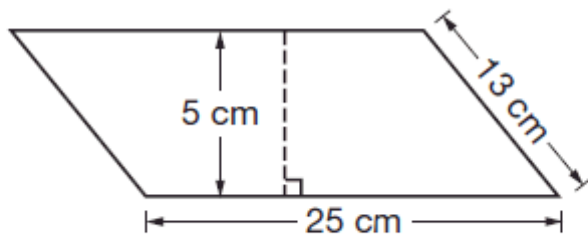
Dylan wants to split the parallelogram into two congruent triangles.

Which expression can he use to find the area, in square centimetres, of each triangle?

   a $(25 \times 5) \div 2$

   b $(25 \times 5) \times 2$

   c $(25 \times 13) \div 2$

   d $(25 \times 13) \times 2$

10 Determine the area of the unshaded part of the rectangle below. Use a ruler.
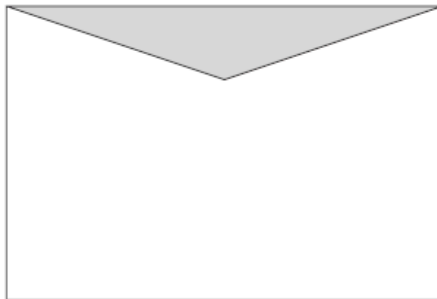
Justify your answer.

The area of the unshaded part of the rectangle is _____.

2 Jacob paints the outside of the rectangular prism below, except for the bottom.
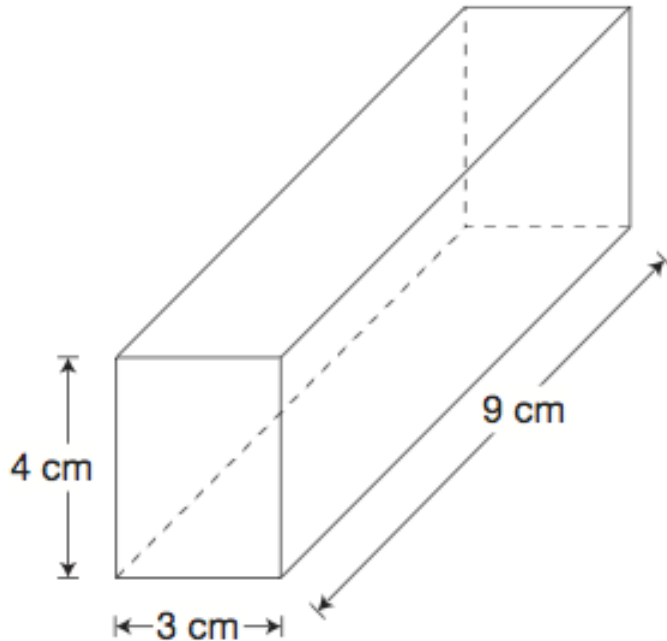
What is the total area that he paints?

a 108 cm^2

b 123 cm^2
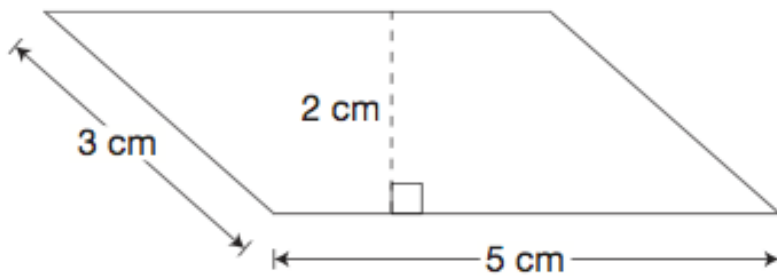
c 132 cm^2

d 150 cm^2

15 Consider the parallelogram below.

Which expression can be used to find the area, in square centimetres, of this parallelogram?

   a 5×2

   b 5×3

   c $2 + 3 + 5$

   d $3 + 5 + 3 + 5$

16 The measurements of a triangular prism are shown below in centimetres.
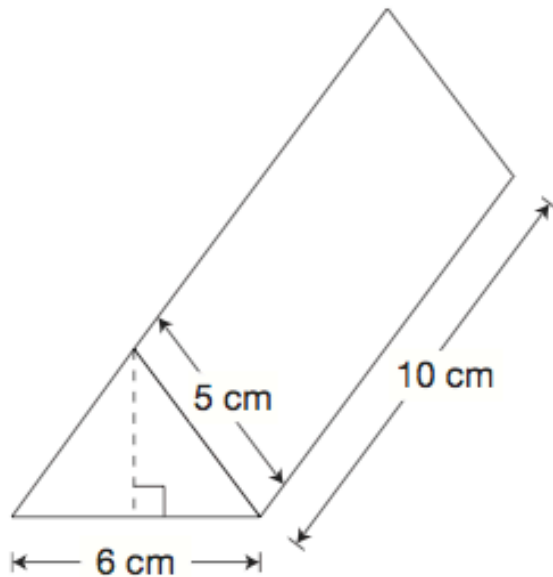
One face has an area of 12 cm². Another face has an area of 60 cm².

What are the areas, in cm², of the remaining 3 faces?
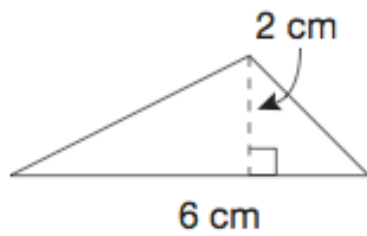
a 12, 12, 50

b 12, 12, 60

c 12, 50, 50

d 12, 60, 60

19 Which shape below has an area of 12 cm²?
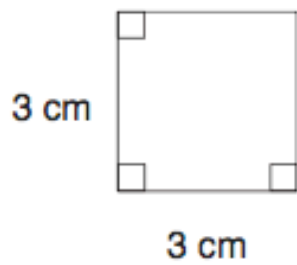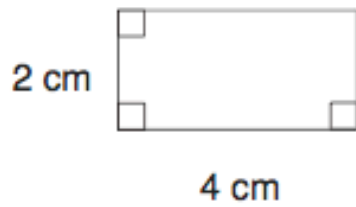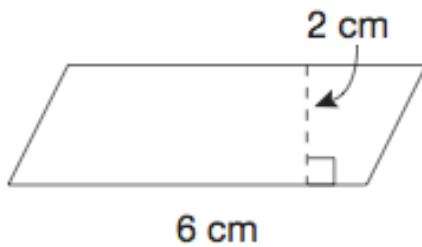
a

2 cm

6 cm

b

3 cm

3 cm

c

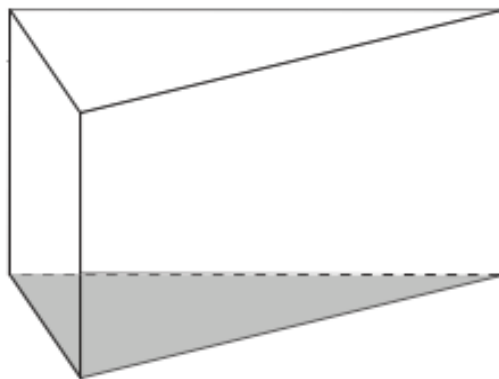2 cm

4 cm

d

2 cm

6 cm

24 Ming makes 4.8 litres of lemonade.

How many millilitres does she make?

    a 0.048

    b 0.48

    c 480

    d 4800

34 Consider the triangular prism pictured below.

The area of the triangular base is 36 cm². The volume of the triangular prism is 396 cm³.
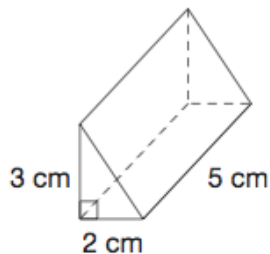
What is the height of the triangular prism?

    a 6 cm

    b 9 cm

    c 11 cm

    d 12 cm

27 Jackie fills the triangular prism pictured below with water. Then she empties the water into a rectangular prism.

3 cm 5 cm

2 cm

Determine the number of times that Jackie must fill the triangular prism with water to fill a rectangular prism that is 10 cm long, 2 cm wide and 12 cm high.

Justify your answer.