Student Name: _____	**Grade**: _____
Date: _____	**Score**: _____

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8 Year 7 Term 3 Week 8 Homework

8.1 Measurements

Some natural units:

- the cubit: the distance from the elbow to the fingertip
- the span: the length of an outstretched hand
- the pace: the distance travelled in one walking step.

The common conversions for length are:

- 1 km = 1000 m
- 1 m = 100 cm
- 1 cm = 10 mm
- 1 m = 1000 mm

Exercise 8.1.1 The table shown below lists the common units of length as well as some lesser known units. Use the information given in the table to convert:

Fraction or multiple of 1 m	Unit
$\frac{1}{1000}$	millimetre (mm)
$\frac{1}{100}$	centimetre cm)
$\frac{1}{10}$	decimetre (dm)
1	metre (m)
10	decametre (dam)
100	hectometre (hm)
1000	kilometre (km)

a. 1.2 m = _____ *dm* *b. 5.6 km* = _____ *dm*

c. 9 dm = _____ *mm* *d. 12.2 dam* = _____ *m*

e. 4 dam = _____ *cm* *f. 4 km* = _____ *hm*

g. 3.5 dam = _____ *cm* *h. 1.5 dm* = _____ *cm*

8.1.1 Length

Exercise 8.1.2

1. *How thick, in cm, is a 580 page book if each page has a thickness of 0.05 mm and the front and back covers each have a thickness of 0.5 mm?*

2. *A builder uses bricks of length 230 mm and height 68 mm to construct a wall. Each level of the wall requires 30 bricks and there are 25 levels, with 7 mm of cement between the bricks. Find, in cm the length and height of the wall.*

3. *On a roll of toilet paper, each small sheet measures 12 cm by 12 cm. Find in metres, the total length of toilet paper if each roll contains 500 sheets of paper.*

4. *Raymond completes 58 laps of a 28 m pool every day including weekends. How many kilometres dose he swim each fortnight?*

5. *What length, in cm remains from a 3.8 m long piece of timber if two prices of 1.73 cm has been cut off?*

8.1.2 Accuracy and precision

- The accuracy of a measurement refers to how close the reading is to the exact value of the quantify.
- The precision of a measuring instrument refers to the smallest unit that is marked on it.
- All measurements are accurate to within $\pm\frac{1}{2}$ of the smallest unit marked on the instrument.

Example 8.1.1

1. *Between what limits will each of the following measurements lie?*
   (a) *The height of a child is 158 cm, correct to nearest cm.*
   Solution: *The exact height lies within the range (*$158 \pm \frac{1}{2}$*) cm, i.e. between 157.5 cm and 158.5 cm.*
   (b) *The length of a driveway is 8 m, correct to the nearest metre.*
   Solution: *The exact length lies within the range (*$8 \pm \frac{1}{2}$*) m, i.e. between 7.5 m and 8.5 m.*
2. *The number of people attending a concert is given as 25400, correct to the nearest hundred people. Within what range does the exact number of people in the crowd lie?*
   Solution: *The exact number of people in the crowd lies within the the range (*$25400 \pm \frac{1}{2} \times 100$*), i.e. between 25350 and 25450 people.*
3. *State the upper and lower bounds for each of the following measurements:*
   (a) *24.8 km*
   Solution: *The upper and lower bounders are (*24.8 ± 0.05*) km. That is, the upper bound is 24.85 km and the lower bound is 24.75 km.*
   (b) *12.46 m*
   Solution: *The upper and lower bounds are (*12.46 ± 0.005*) m. That is the upper bounds is 12.465 m and the lower bound is 12.455 m.*

Exercise 8.1.3 The following measurements are given correct to the nearest metre. Between what limits does the actual length lie?

1. *18 m* _____
2. *65 m* _____
3. *200 m* _____
4. *1 km* _____

Exercise 8.1.4 The following measurements are given correct to the nearest 10 cm. Between what limits does the actual length lie?

1. *30 cm* _____
2. *150 cm* _____
3. *2 m* _____
4. *1860 cm* _____

Exercise 8.1.5

1. *The distance between two towns was given as 500 km. between what limits could the real distance lie, if this measurement was given correct to the nearest:*
   (a) *100 metres?* _____
   (b) *1 kilometre?* _____
   (c) *10 kilometres?* _____
   (d) *100 kilometres?* _____
2. *State the lower and upper bound of each of these measurements:*
   (a) *6.8 m* _____
   (b) *12.5 km* _____
   (c) *3.45 cm* _____
   (d) *250.6 mm* _____
   (e) *2128 m* _____
   (f) *213.57 km* _____
3. *The distance between the Earth and the Sun is given as 149,000,000 km, correct to the nearest million km. Within what range could the real distance is?*

_____

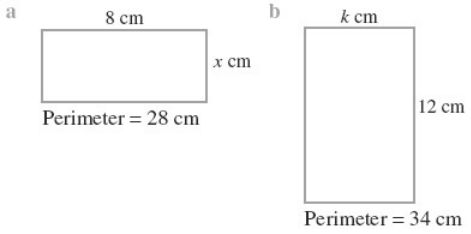
_____

8.1.3 Perimeter

- The perimeter of a figure is the total distance around its boundary.
- The perimeter P of a square with sides of length x is given by $P = 4x$
- The perimeter P of a rectangle with length L and breadth B is given by $P = 2 \times (L + B)$

Exercise 8.1.6

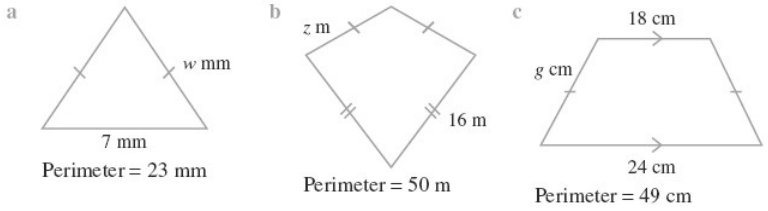
1. *Find the value of the pronumeral in each rectangle.*



(a) $x =$ _____

(b) $k =$ _____

2. *Find the value of the pronumeral in each of these:*

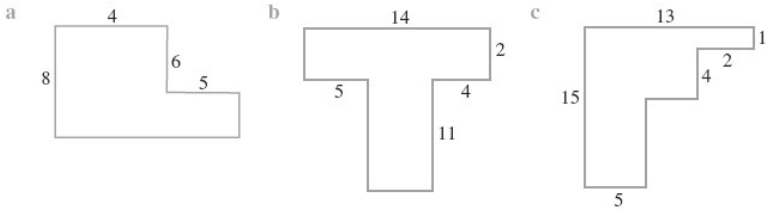


(a) $w =$ _____

(b) $z =$ _____

(c) $g =$ _____

3. *Find the perimeter of each figure:*



(a) $P =$ _____

(b) $P =$ _____

(c) $P =$ _____

8.2 Miscellaneous exercises

Exercise 8.2.1

1. *Between what limits will each of the following measurement/quantities lie?*

   (a) *The length of a street is 1120 m, correct to the nearest 10 m.* _____

   (b) *The number of pages in a book is 250, correct to the nearest 20 pages.* _____

   (c) *The weight of a woman is 95 kg, correct to the nearest kg.* _____

   (d) *The cost of a CD player is $68, correct to the nearest dollar.* _____

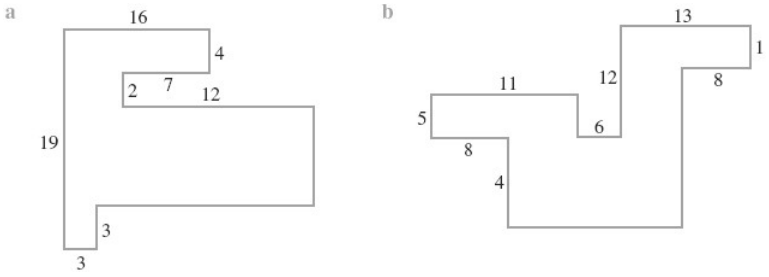
   (e) *The height of a boy is 148 cm, correct to the nearest cm.* _____

2. *The height of a flagpole is given as 12.5 m. What is the shortest possible height of the pole?*

   _____

   _____

3. *Find the total perimeter of each figure. (all angles are right angels and all measurements are in cm.)*



   (a) *Total perimeter =* _____

   (b) *Total perimeter =* _____

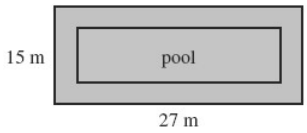
4. *A mobile phone tower is situated in the middle of a square block of land. The old fence surrounding the property is to be replaced at the cost of $48 per metre. Find the side length of the property if the total replacement cost of the the fence is $17,280.*

   _____

   _____

   _____

5. *A swimming pool has a 2 metre side path around its edge as shown below. The outer dimensions of the path are 27 m by 15 m. Find:*

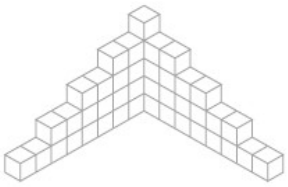


   (a) *The dimension of the pool.*

   (b) *The perimeter of the pool.*

6. *the length of a rectangle is three times its width. Find the dimensions of the rectangle if its perimeter is 64 cm.*

7. *The following figure is constructed by cubes.*



   (a) *How many cubes are there in the structure?*

   (b) *How many faces would needed to be painted in the structure?*

   (c) *How many more cubes would be needed in a structure 10 cubes high?*

8.3 Maths Challenge

Exercise 8.3.1

1. *I am thinking of a rule that converts the number 6 into the number 20. Which of the following could not be my rule?*
   A. add 14 *B. take half then add 17* *C. treble then add 2*
   D. add 4 then square *E. subtract 2 then multiply by 5*

2. *A car can travel r kilometres on s litres of petrol. How many litres of petrol would it need for a journey of t kilometres?*
   A. $\frac{st}{r}$ *B.* $\frac{rs}{t}$ *C.* $\frac{tr}{s}$ *D.* $\frac{r}{st}$ *E.* $\frac{t}{rs}$

3. *Both 4 and 8 can be written as the sum of two prime numbers (4 = 2 + 2, 8 = 5 + 3). How many numbers less than 20 cannot be written as the sum of two prime numbers?*
   A. 3 *B. 5* *C. 6* *D. 7* *E. 8*

4. *How many millimetres are there in 12.3 metres?*
   A. 123 *B. 1230* *C. 12300* *D. 123000* *E. 1230000*

5. *A rectangular fence is supported by posts placed 3 m apart along each side. How many fence posts are needed to support a fence with perimeter 120 m?*

6. *A regular hexagon has been inscribed a circle with diameter 54 cm. Find the perimeter of the hexagon.*

7. *If A, B, C and D are whole numbers and* $B+D=11$, $B+C=9$, $A+B=6$ *and* $C+D=12$, *find the value of A, B, C and D.*