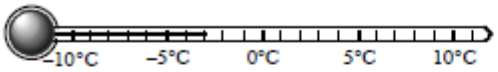
S3 National 4 Block Test 2 Revision Booklet

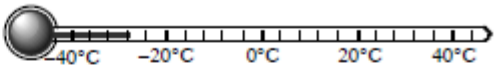
Contents

Integers

Exercise 9.3

1. Write down the temperature shown on each thermometer :-

   a 

   b 

2. a The temperature last night dropped from 3°C to −5°C.
   By how many degrees did the temperature drop ?

   b Two hours ago the temperature read −1°C.
   The temperature has risen by 8°C.
   What is the new temperature ?

3. a My bank balance showed −£35. I withdrew £25. How much does my account now show ?

   b Ed's account shows (−£3550). He deposits £1650. What does his account show now ?

4. Which integer is **halfway** between :-

   a −12 and 14 b −11 and 13 c −111 and 113.

Exercise 9.4

1. Write down the temperature that is :-

   a 8°C down from 2°C b 5°C up from −3°C c 18°C down from −11°C.

2. 4°C is **6°C up from** −2°C. Copy and complete :-

   a 3°C is ..... from −3°C b 5°C is ..... from −1°C

   c −11°C is ..... from −20°C d −23°C is ..... from −57°C.

3. A chemical freezing unit starts at −3°C and drops 8°C every hour.
   What is the temperature after :-

   a 3 hours b 5 hours c 8·5 hours ?

Integers

Exercise 9.5

1. Find :-

a $2 + (-1)$	b $5 + (-4)$	c $8 + (-3)$
d $(-1) + 3$	e $(-3) + 6$	f $(-9) + 3$
g $15 - 23$	h $37 - 58$	i $123 - 141$
j $(-3) - 1$	k $(-12) - 5$	l $(-56) - 23$
m $(-5) + (-5)$	n $(-8) + (-3)$	o $(-134) + (-156)$
p $(-2) + 4 - 6$	q $(-1) + 1 + (-1)$	r $(-23) + (-12) - 17$.

Exercise 9.6

1. Copy and complete :-

a $4 - (-2)$
$= 4 + 2$
$=$ .....

b $-3 - (-2)$
$= -3 + 2$
$=$ .....

2. Find :-

a $3 - (-4)$	b $5 - (-7)$	c $12 - (-12)$
d $(-2) - (-1)$	e $(-6) - (-3)$	f $(-11) - (-12)$
g $(-23) - (-34)$	h $(-123) - (-234)$	i $(-100) - (-100) - 100$.

3. Find :-

a $(-1{\cdot}4) - (-2{\cdot}3)$ b $(-5{\cdot}7) - (-6{\cdot}8)$.

Exercise 9.7

1. Find :-

a $3 \times (-1)$	b $5 \times (-3)$	c $8 \times (-8)$
d $(-6) \times 3$	e $(-5) \times 4$	f $(-7) \times 4$
g $16 \div (-2)$	h $24 \div (-3)$	i $45 \div (-5)$
j $(-60) \div 6$	k $(-124) \div 4$	l $(-312) \div 3$
m $(-3) \times 2 \times 5$	n $3 \times (-1) \times 2$	o $6 \times 3 \times (-2)$.

Exercise 9.8

1. Find :-

a $(-2) \times (-3)$	b $(-5) \times (-3)$	c $(-8) \times (-1)$
d $(-3) \times (-3)$	e $(-7) \times (-6)$	f $(-9) \times (-9)$
g $(-12) \div (-4)$	h $(-15) \div (-5)$	i $(-100) \div (-20)$
j $(-23) \times (-30)$	k $(-250) \div (-50)$	l $(-12) \times (-3) \div 4$.

Answers

Exercise 9.3

1. a −3°C b −28°C
2. a 8°C b 7°C
3. a −£60 b −£1900
4. a 1 b 1 c 1

Exercise 9.4

1. a −6°C b 2°C c −29°C
2. a 6°C up b 6°C down c 9°C up d 34°C down
3. a −27°C b −43°C c −71°C

Exercise 9.5

1. a 1 b 1 c 5 d 2
   e 3 f −6 g −8 h −21
   i −18 j −4 k −17 l −79
   m −10 n −11 o −290 p −4
   q −1 r −52

Exercise 9.6

1. a 6 b −1
2. a 7 b 12 c 24 d −1
   e −3 f 1 g 11 h 111
   i −100
3. a 0·9 b 1·1

Exercise 9.7

1. a −3 b −15 c −64 d −18
   e −20 f −28 g −8 h −8
   i −9 j −10 k −31 l −104
   m −30 n −6 o −36

Exercise 9.8

1. a 6 b 15 c 8 d 9
   e 42 f 81 g 3 h 3
   i 5 j 690 k 5 l 9

Algebra

Exercise 2 Breaking Brackets

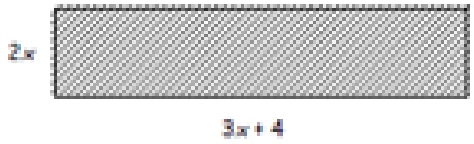
1. Multiply out each bracket :-

a	$3(x+4)$	b	$7(y-3)$	c	$5(2k+5)$	d	$11(6y-7)$
e	$y(y+2)$	f	$k(k-3)$	g	$u(3u+4)$	h	$3r(3r-4)$
i	$-3(q+5)$	j	$-4(2t+6)$	k	$-5(j-2)$	l	$-2(3f-8)$
m	$-y(y+7)$	n	$-h(h-3)$	o	$-2w(2w+1)$	p	$-5k(3-4k)$.

2. Write down the **area** and **perimeter** of this rectangle :-

   a using brackets

   b without brackets.

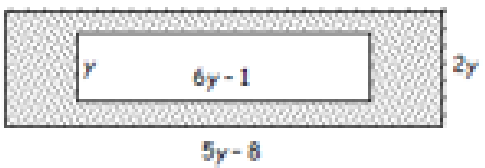


Exercise 3 Breaking Brackets and Simplifying

1. Multiply out the brackets and simplify fully where necessary :-

a	$5(k+2)+3$	b	$8(2y+4)-12$	c	$7(3e-2)+11$
d	$8+2(t+3)$	e	$11-3(3+w)$	f	$15-(g+15)$
g	$3(w-1)+2(w+1)$	h	$4(2y-3)+5(4y+3)$	i	$2(4r+3)-6$
j	$3w-(w+4)+2(2-w)$	k	$4(3y+4)-2(5y-1)-18$		
l	$3p+2(4p-6)-(9p+12)$	m	$5(3-2m)+3(2m-6)-4(1-8m)+2m+7$.		

2. Calculate the shaded area of the rectangle shown, in terms of y.



Algebra

Exercise 1 — Solving Equations

1. Copy each equation and solve to find the value of x :-

a $x + 6 = 11$	b $x + 1 = 23$	c $x + 7 = 6$
d $x + 14 = 14$	e $x - 7 = 8$	f $x - 3 = 2$
g $13 + x = 17$	h $9 + x = 7$	i $17 - x = -17$.

2. Copy each equation and solve to find the value of the letter :-

a $4x = 12$	b $5p = 35$	c $6k = 24$
d $3h = 33$	e $4g = 56$	f $7n = 0$
g $4m = 144$	h $6c = 9$	i $8d = 1$.

3. Find the value of x in the following equations (*Set down ALL your working*).

a $2x + 6 = 14$	b $5x + 4 = 29$	c $4x + 7 = 39$
d $3x + 1 = 31$	e $4x - 8 = 16$	f $7x - 11 = 3$
g $10x - 9 = 41$	h $3x - 6 = 0$	i $11x - 7 = 37$
j $6x - 3 = 12$	k $8x + 12 = 15$	l $9x + 1 = 43$.

Exercise 2 — Harder Equations

1. Copy and complete :-

*(You may have been shown a different method)

a

$$8x + 1 = 6x + 17$$
$$\Rightarrow 2x + 1 = \ldots.$$
$$\Rightarrow 2x = \ldots.$$
$$\Rightarrow x = \ldots.$$

b

$$7x - 3 = x + 15$$
$$\Rightarrow 7x - \ldots = \ldots.$$
$$\Rightarrow 7x = \ldots.$$
$$\Rightarrow x = \ldots.$$

2. Solve these equations :-

a $5x + 4 = 2x + 19$	b $3x + 7 = x + 11$	c $8x + 6 = 7x + 22$
d $4x - 5 = x + 16$	e $11x - 1 = 2x + 17$	f $6x - 4 = 4x + 23$.

3. These equations are a little "different". Solve :-

a $5x = 4x + 3$	b $3x = x + 44$	c $7x = 4x + 42$
d $12x = 8x + 1$	e $15x = 3x + 18$	f $6x - 2 = 8x$.

4. Joe bought 5 bags of marbles. Harry bought 3 bags, but he already had 20 loose marbles. They then had exactly the same number of marbles.

a Make up an equation to show this information.

b Solve the equation to determine how many marbles there are in a bag.

Solutions

Exercise 2 - Breaking Brackets

1. a $3x + 12$ b $7y - 21$
   c $10k + 25$ d $66y - 77$
   e $y^2 + 2y$ f $k^2 - 3k$
   g $3u^2 + 12u$ h $9r^2 - 12r$
   i $-3q - 15$ j $-8t - 24$
   k $-5j + 10$ l $-6f + 16$
   m $-y^2 - 7y$ n $-h^2 + 3h$
   o $-4w^2 - 2w$ p $-15k + 20k^2$

2. a $A = 2x(3x + 4)$ b $A = 6x^2 + 8x$

Exercise 3 - Breaking Brackets & Simplifying

1. a $5k + 13$ b $16y + 20$ c $21e - 3$
   d $2t + 14$ e $2 - 3w$ f $-g$
   g $5w - 1$ h $28y + 3$ i $8r$
   j 0 k $2y$
   l $2p - 24$ m $30m$
2. $A = 2y(5y - 8) - y(6y - 1) = 10y^2 - 16y - 6y^2 + y$
   $A = 4y^2 - 15y$

Solutions

Ch 5 Ex 1 Solving Equations

1.	a	5	b	22	c	-1
	d	0	e	15	f	5
	g	4	h	-2	i	34
2.	a	3	b	7	c	4
	d	11	e	14	f	0
	g	36	h	$^{3}/_{2}$	i	$^{1}/_{8}$
3.	a	4	b	5	c	8
	d	10	e	6	f	2
	g	5	h	2	i	4
	j	$^{15}/_{6} = 2{\cdot}5$	k	$^{3}/_{8}$		
	l	$^{42}/_{9} = ^{14}/_{3} = 4\,^{2}/_{3}$				

Ch 5 Ex 2 Harder Equations

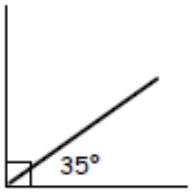
1.	a	8	b	3		
2.	a	5	b	2	c	16
	d	7	e	2	f	$^{27}/_{2}$
3.	a	3	b	22	c	14
	d	$^{1}/_{4}$	e	$^{18}/_{12} = 1{\cdot}5$	f	-1
4.	a	$5x = 3x + 20$			b	10

Angles

Exercise 1 Complementary & Supplementary Angles

1. Calculate the missing angles in each of the following :-

a



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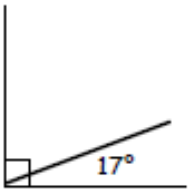

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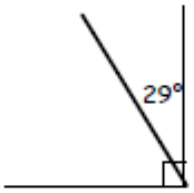

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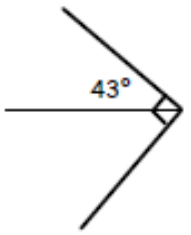

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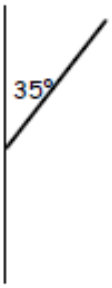

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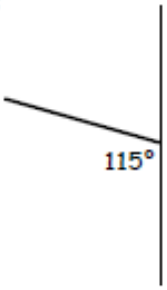

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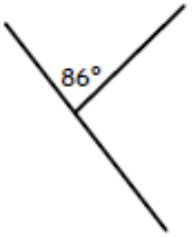

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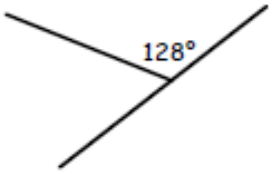

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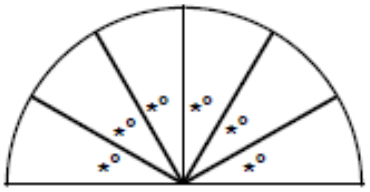
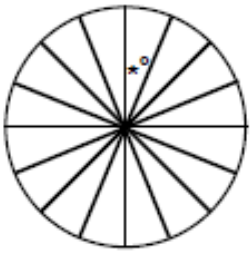


all equal angles

j



all angles equal

2. Write down the complement of :-

a 60° b 20° c 37° d 1°.

3. Write down the supplement of :-

a 30° b 110° c 77° d 9·5°.

4. What angle is its own :- a complement b supplement ?

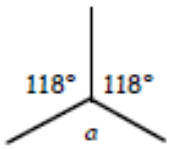
5. What is the **sum** of all the angles round a point ?

Angles

Exercise 2 Angles Round a Point

1. Calculate (do not measure) the sizes of the angles marked *a*, *b*, *c*, ...

a



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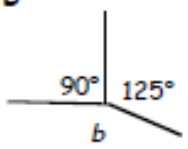

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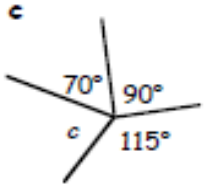

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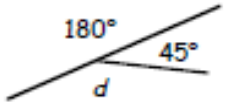

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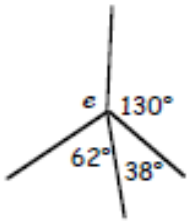

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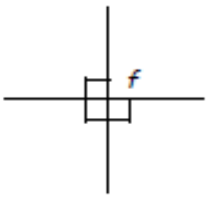

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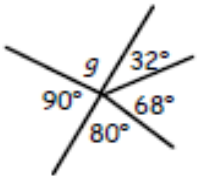

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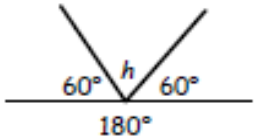

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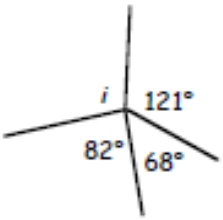

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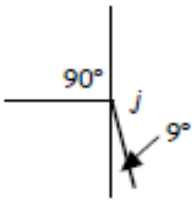

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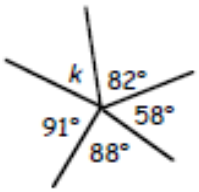

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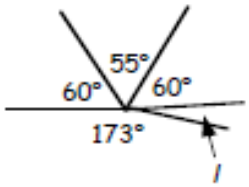
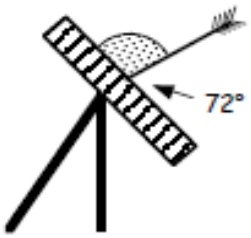
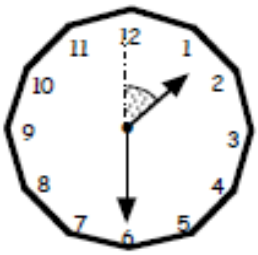


2. An arrow lands on a target as shown.
Calculate the size of the shaded angle.



3.



This clock shows a time of 1.30.
Calculate the size of the shaded angle.

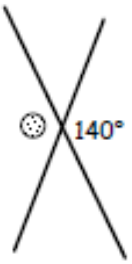
4. Five angles round a point are 39°, 122°, 77°, and two unknown **equal** angles.
Find one of the unknown angles.

Angles

Exercise 3 Vertically Opposite Angles

1. Write down the sizes of all the angles marked with a ⊛ .

a



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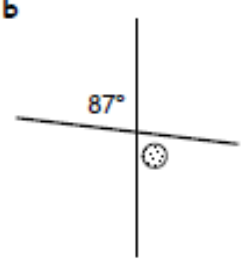

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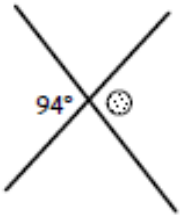

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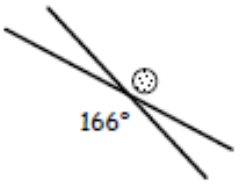

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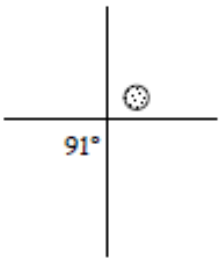

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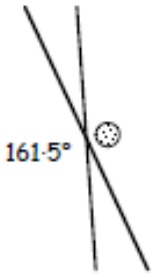
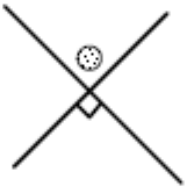
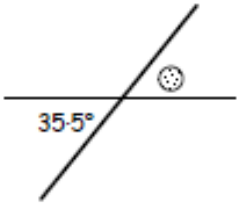


g



h

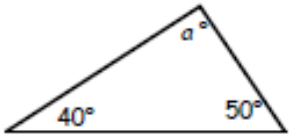


2. Sketch all the diagrams above and fill in **all** the missing angles.

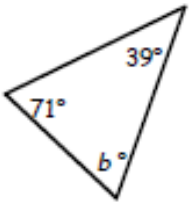
Exercise 4 Angles in a Triangle

1. Calculate the size of the angles marked *a*, *b*, *c*, ...

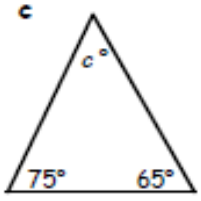
a



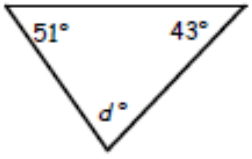
b



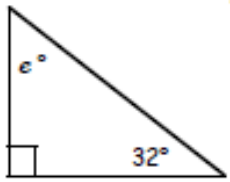
c



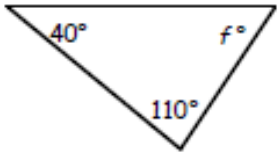
d



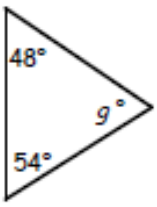
e



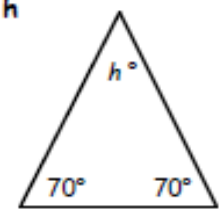
f



g



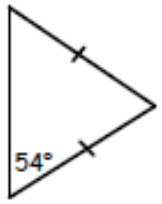
h



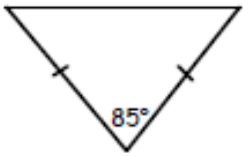
Anales

2. Copy each diagram below and fill in all the missing angles :-

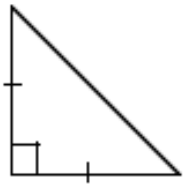
a



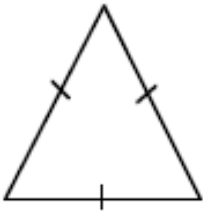
b



c

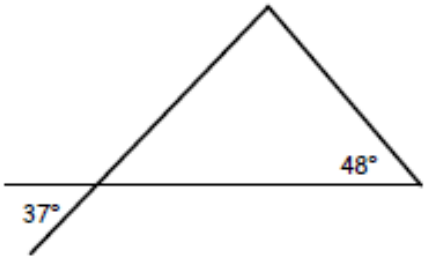


d

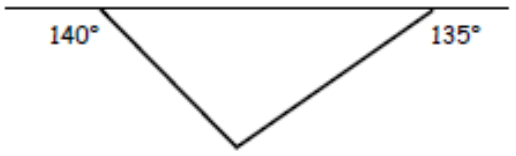


3. Copy each diagram below and fill in **all** the missing angles :-

a



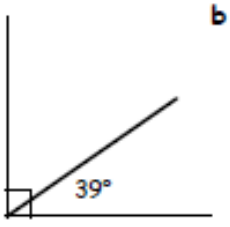
b



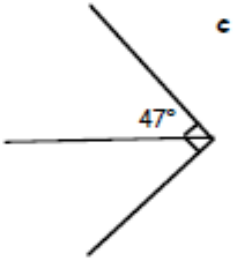
Exercise 5 Angles Mixed Exercise

1. Copy all the diagrams below filling in **all** missing angles :-

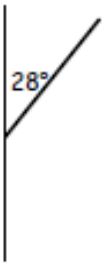
a



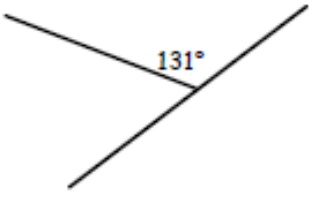
b



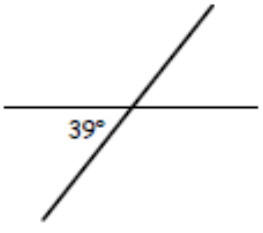
c



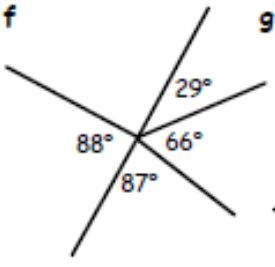
d



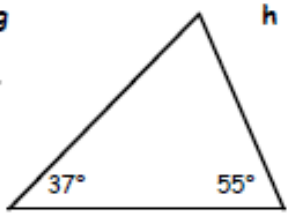
e



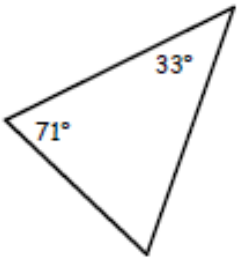
f



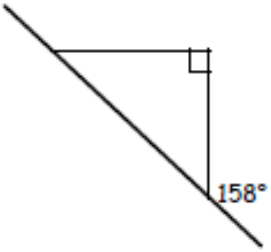
g



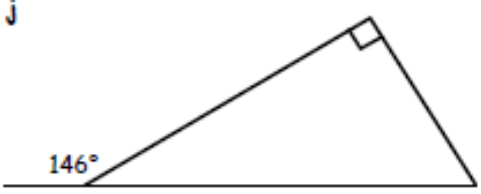
h



i



j



Answers

Answers to Chapter 3

Exercise 1 - Complementary & Supplementary Angles

1. a 55° b 73° c 61° d 47°
   e 145° f 65° g 94° h 52°
   i 30° j 22·5°
2. a 30° b 70° c 53° d 89°
3. a 150° b 70° c 103° d 170·5°
4. 45° b 90°
5. 360°

Exercise 2 - Angles Round a Point

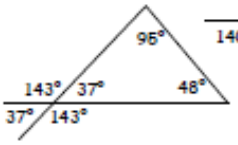
1. a 124° b 145° c 85° d 135°
   e 130° f 90° g 90° h 60°
   i 89° j 171° k 41° l 12°
2. 108°
3. 45°
4. 61°

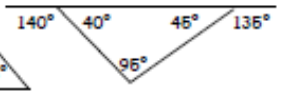
Exercise 3 - Vertically Opposite Angles

1. a 140° b 87° c 94° d 166°
   e 91° f 161·5° g 90° h 35·5°
2. See drawings

Exercise 4 - Angles in a Triangle

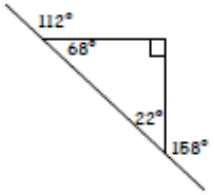
1. a 90° b 70° c 40° d 86°
   e 58° f 30° g 78° h 40°
2. a 54°, 72° b 47·5°, 47·5°
   c 45°, 45° d 60°, 60°, 60°
3. a b

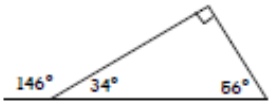




Exercise 5 - Mixed Exercise

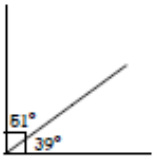
1. a 51° b 43° c 152° d 49°
   e 39°,141° f 90° g 88° h 76°
   i j

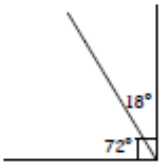




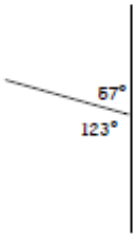
Review - Revisit - Revise Exercise 3

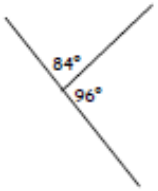
1. a 25° b 65°
2. a b





c d



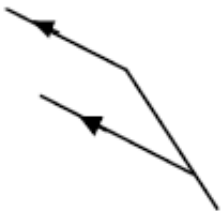


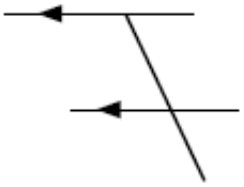
More Angles

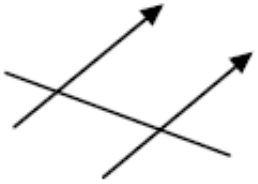
Exercise 1 Corresponding Angles

1. Copy and complete :- Corresponding (F) angles are e.....

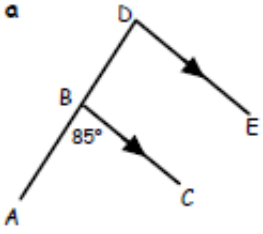
2. Copy the diagrams and mark all the corresponding (F) angles with a * :-

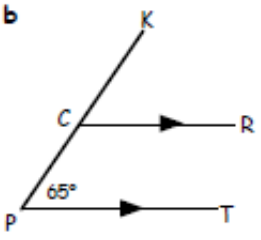
a 

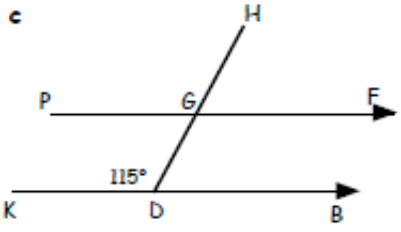
b 

c 

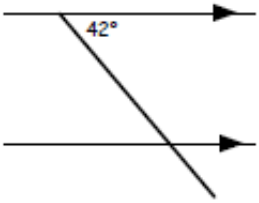
3. Write down the sizes of all the angles in the following diagrams :- ($\angle ABC = 85°$).

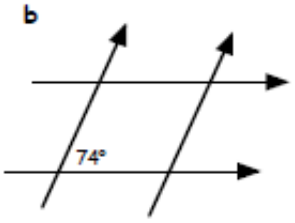
a 

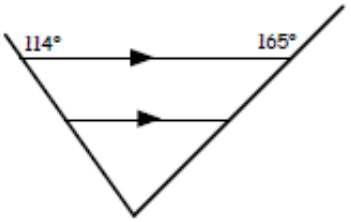
b 

c 

4. Sketch each of the following and fill in all the missing angles :-

a 

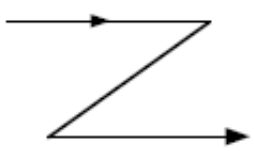
b 

c 

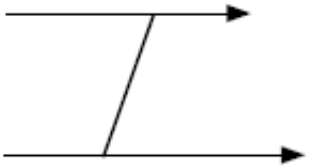
Exercise 2 Alternate Angles

1. Copy and complete :- Alternate (Z) angles are e.....

2. Copy the diagrams and mark all the alternate (Z) angles with a * :-

a 

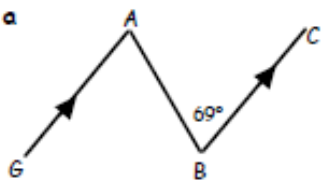
b 

c 

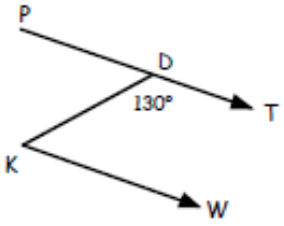
More Angles

3. Write down all the sizes of the angles in the following diagrams :- (e.g. $\angle ABC = 69°$).

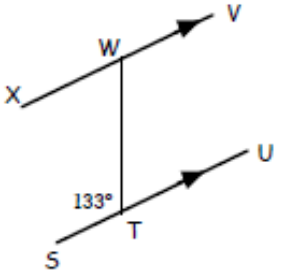
a



b

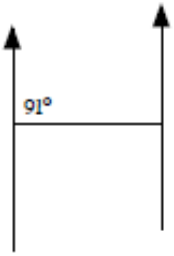


c

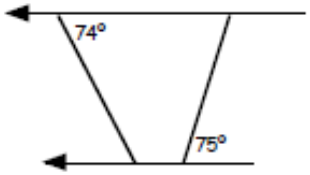


4. Sketch each of the following and fill in all the missing angles :-

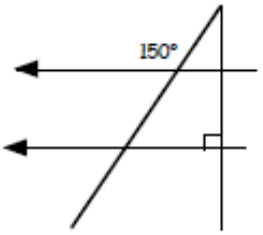
a



b



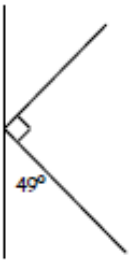
c



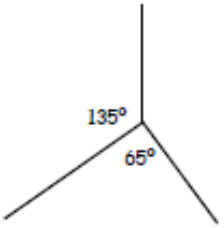
Exercise 3 **Mixed Exercise**

1. Make a neat rough sketch of each of the following diagrams.
   Fill in all the missing angles.

a

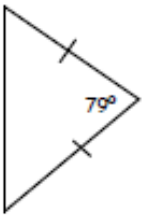


b



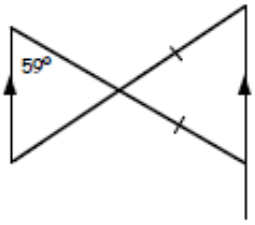
c

d

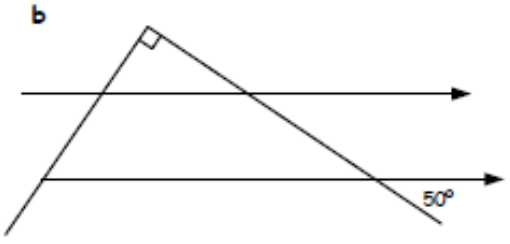


2. Sketch each of the following and fill in all the missing angles :-

a



b



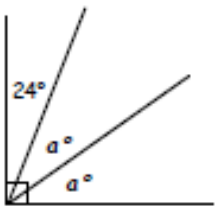
More Angles

1. a What size of angle is **complimentary** to 34° ?

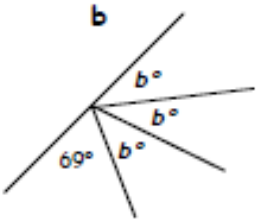
   b Write down the **supplement** of 85°.

2. Make a neat sketch of each diagram and find the value of each letter :-

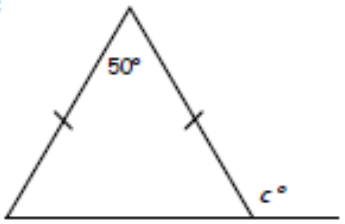
a



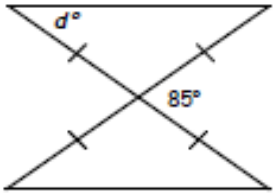
b



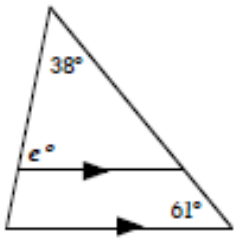
c



d



e



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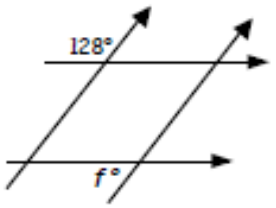
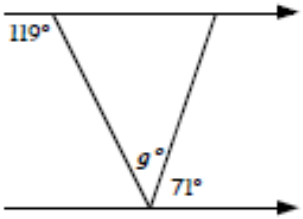
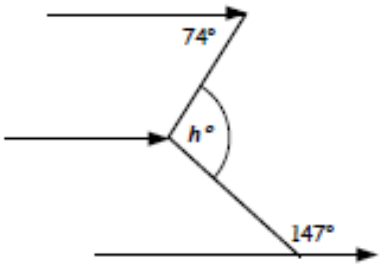


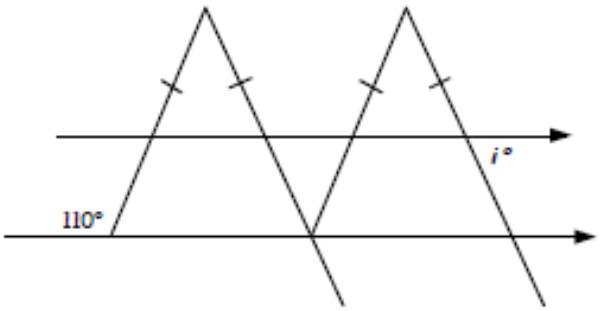
g



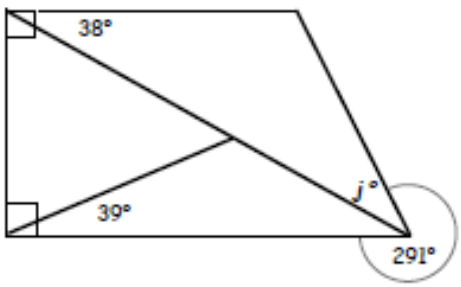
h



i



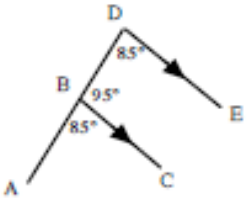
j



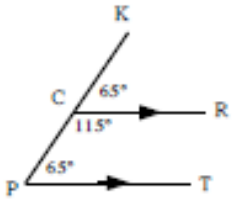
Answers

Ch 6 Ex 1 Corresponding Angles

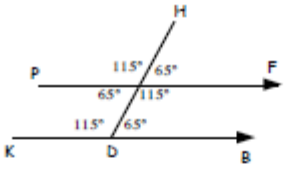
1. equal
2. Check diagrams
3. a



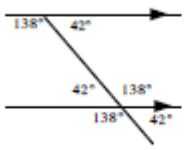
b



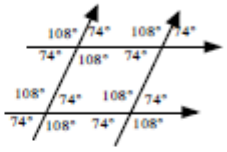
c



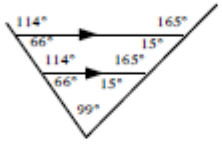
4. a



b

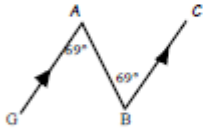


c

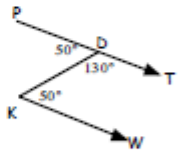


Ch 6 Ex 2 Alternate Angles

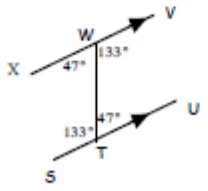
1. equal
2. check diagrams
3. a



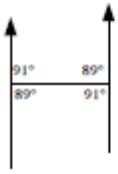
b



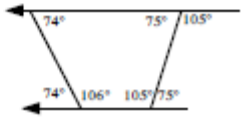
c



4. a

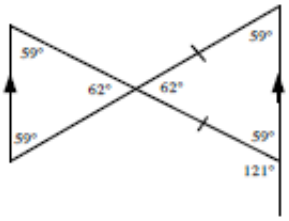


b

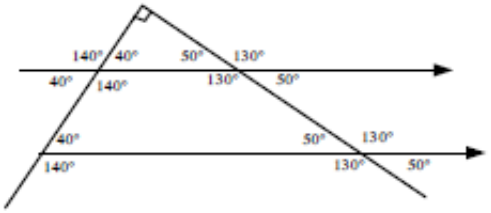


Ch 6 Ex 3 Mixed Exercise

1. a 41° b 160°
   c 54°, 126°, 126° d 50·5°, 50·5°
2. a



b



Ch 6 Revisit – Review – Revise 6

1. a 56° b 95°
2. a 33° b 37° c 115°
   d 42·5° e 81° f 52°
   g 48° h 107° i 70°
   j 31°

Ch 6 Cumulative Ex 2 (Chapters 1-6)

1. a 9 b 169 c 81
   d 11 e 2
2. small 90p per 50g, large 80p per 50g
   large tin is cheaper
3. a 60 b 1
4. 2, 3, 5, 7, 11, 13, 17, 19, 23, 29
5. 2 x 2 x 2 x 5 x 7
6. a $y = 4x - 1$ b $y = x - 5$
7. a 5 b 7 c 3
   d 1 e 2 f -5
8. a $x < 5$ b $x < 4$ c $x \geq 4$
9. a $x = 107°$ b $y = 122°$
10. 1 didlii – 25000 splinkiis

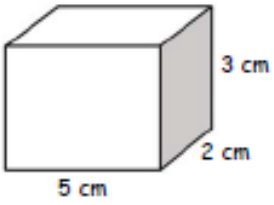
Volume

Exercise 1 Volumes of Cubes & Cuboids

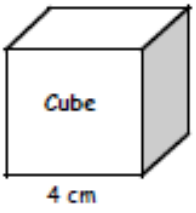
1. Copy and complete :- Volume = length x br..... x h.....

2. Use the formula to calculate the **volume** of the following cuboids :-

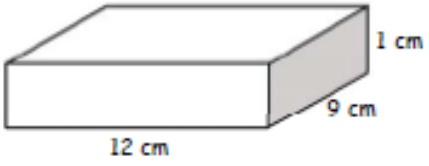
a



b

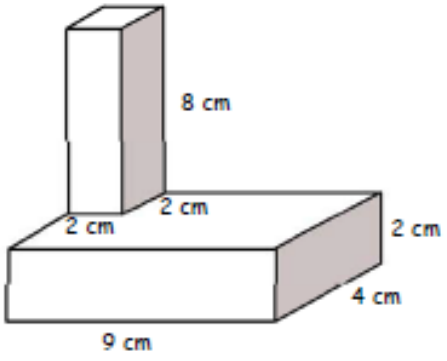


c

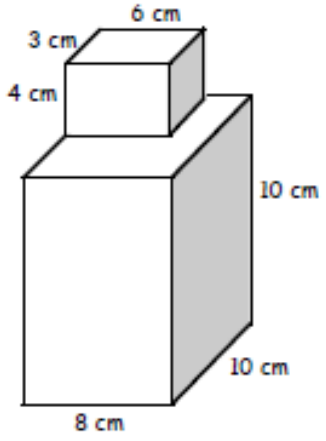


3. Find the total **volume** of each of the following shapes :-

a

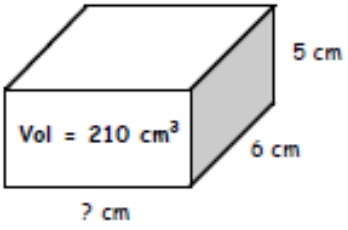


b

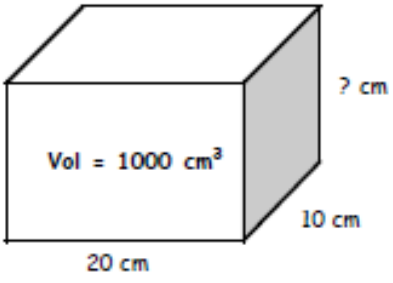


4. Calculate the length of the missing edge of each of the following cuboids :-

a



b



Answers

Answers to Chapter 12

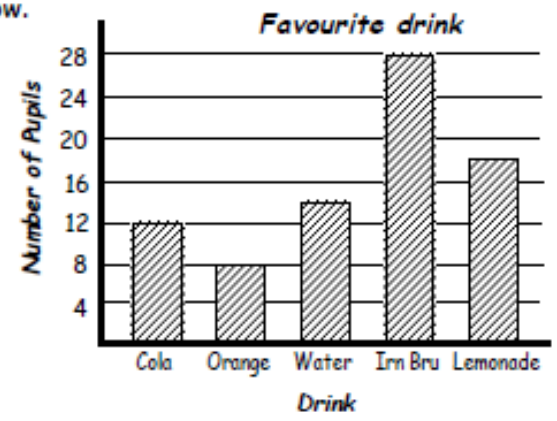
Exercise 1 - Volumes of Cubes & Cuboids

1. $V = L \times B \times H$
2. a $30\ cm^3$ b $64\ cm^3$ c $108\ cm^3$
3. a $104\ cm^3$ b $872\ cm^3$
4. a $7\ cm$ b $5\ cm$

Statistics

Exercise 1 — Bar Graphs & Line Graphs

1. A group of children were asked to name their favourite drink.
The results are shown in the bar-graph below.



   a. How many children chose :-
      (i) Cola (ii) Orange
      (iii) Water (iv) Irn Bru
      (v) Lemonade ?

   b. List the drinks in order of **most** to **least** popular.

   c. How many children were asked in the survey ?

2. A primary 5 class were asked about the towns they had visited.

London	Inverness	Carlisle	Newcastle	Leeds	Liverpool
6	8	3	7	1	5

Draw and label a neat **bar graph** to show this information.

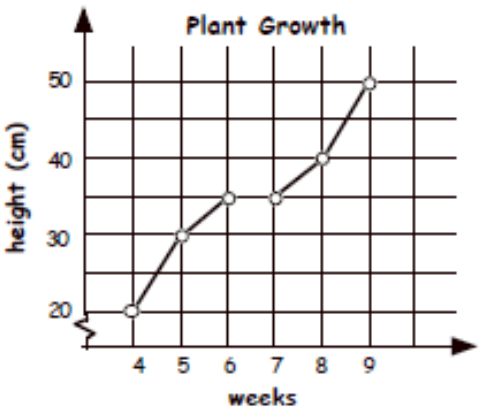
3. Pupils in the Primary 7 classes were asked to name the most commonly used vowel.
The table shows their list of answers.

A	E	A	E	I	O	U	A	E	E	E	E	E	E
U	I	A	E	A	E	I	O	U	A	E	E	E	E
E	E	U	I	A	E	A	E	I	O	U	A	E	E
E	E	E	E	E	E	U	I	A	A	O	E	O	E

   a. Make a frequency table and use tally marks to complete it.

   b. Draw and label a neat bar graph from your frequency table.

4. The line graph shows the height of a plant over a period of time.



   a. How tall was the plant after :-
      (i) 4 weeks (ii) 5 weeks
      (iii) 9 weeks (iv) 7 weeks ?

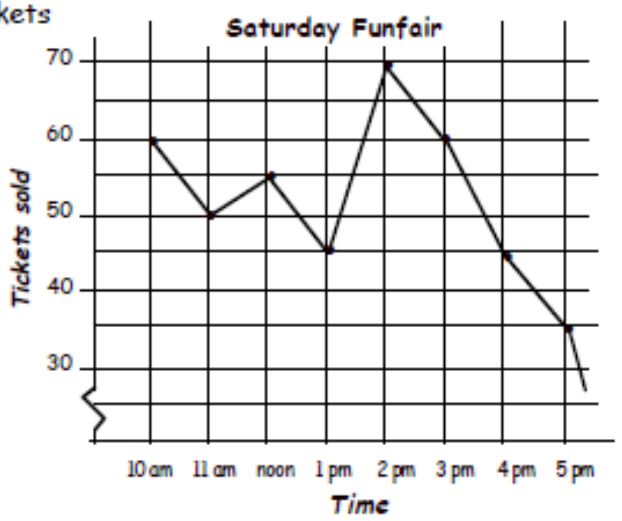
   b. On which week was the plant :-
      (i) 35 cm (ii) 40 cm tall ?

   c. One week the plant was not given any water. Which week do you think it was ?

   d. Estimate the height of the plant at $8\frac{1}{2}$ weeks.

Statistics

5. The line graph shows the number of tickets sold each hour at a Saturday Funfair.



   a. How many tickets were sold :-
      (i) at 10 am (ii) at 11 am
      (iii) at 12 noon (iv) at 5 pm ?

   b. What was the main peak time (most tickets sold) ?

   c. Between which two times was there the biggest increase in ticket sales ?

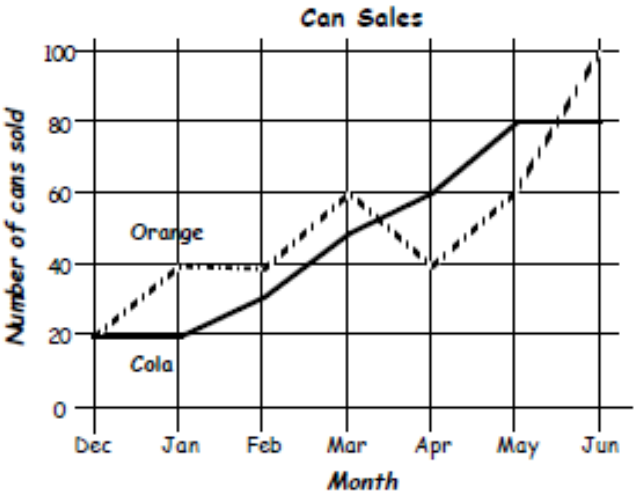
   d. Why do you think the ticket sales dropped after two o'clock ?

6. Another plant's height was recorded over a period of time.

   Use the information from the table shown to draw a line graph.

Week 4 – 25 cm	Week 5 – 30 cm
Week 6 – 35 cm	Week 7 – 40 cm
Week 8 – 50 cm	Week 9 – 65 cm

7. The comparative line graph shows the sales of Orange and Cola from the tuck shop.



   a. Which drink sold better in :-
      (i) January (ii) March
      (iii) April (iv) June ?

   b. How many cans of Cola were sold in :-
      (i) January (ii) June ?

   c. How many cans of Orange were sold in total ?

8. This table shows 6 months of car sales from two different car dealers, Arnold Clunk and Reg Barney.

   Construct a **comparative line graph** to show this information.

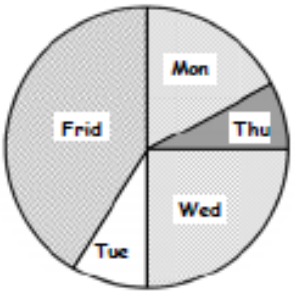
	Jul	Aug	Sep	Oct	Nov	Dec
Clunk's	100	250	300	250	400	200
Barney's	300	200	350	450	100	150

Statistics

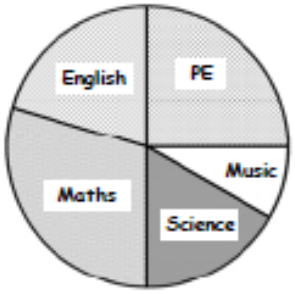
Exercise 4 Interpreting & Drawing Pie Charts

1. A class surveyed the most popular schoolday and favourite subject. The results are displayed using the pie charts below.

Favourite Schoolday



Favourite Subject



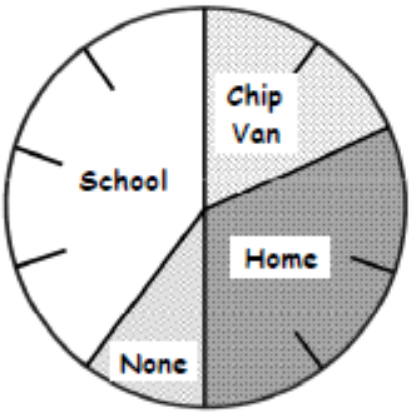
a Write the classes' favourite :- (i) schoolday (ii) subject.

b List the favourite days in order, from most popular.

c List the favourite subjects in order, from least popular.

Statistics

2. The pie chart, which has been split into 10 sections, shows the results of a class survey into favourite lunchtime places to eat.



   a What **fraction** of the class chose :-

      (i) Chip Van (ii) Home

      (iii) None (iv) School.

   b List the places in order, from most popular to least popular.

3. Look at the pie chart in question 2.

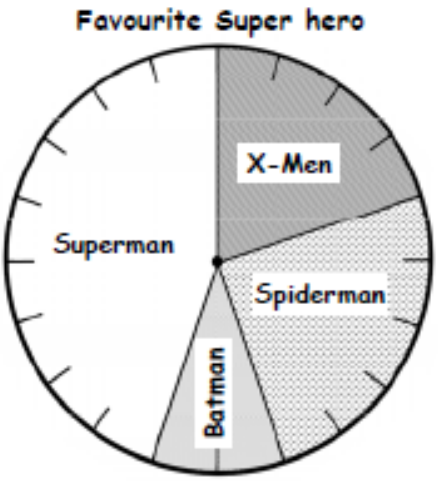
   50 pupils were asked their favourite lunchtime place.

   a How many pupils does each individual section stand for ?

   b How many pupils chose :-

      (i) School (ii) Chip Van (iii) Home (iv) None ?

4. This pie chart has been divided into 20 equal parts.



   a What fraction does each part stand for ?

   b What fraction represents :-

      (i) Superman (ii) X-Men

      (iii) Spiderman (iv) Batman ?

   100 people were questioned in the survey.

   c How many people does each small section represent ?

   d How many people chose :-

      (i) Superman (ii) X-Men

      (iii) Spiderman (iv) Batman ?

Statistics

Exercise 6 — Mean and Range

1. The **range** (= highest – lowest).

   For each set of data, find the **RANGE** of numbers :-

   a 7, 9, 8, 12, 6, 15, 8, 7, 10, 10, 12, 5, 9, 11

   b 73, 57, 44, 11, 33, 8, 26, 1, 4, 2, 74, 16, 15, 7.

2. Find the **mean** of :-

   a 8, 10, 12, 14

   b 14, 50, 23, 41, 62, 50

   c £2, £5, £8, £26, £20, £11.

   d 9·1 cm, 10·3 cm, 7·6 cm, 4·1 cm, 3·9 cm.

3. Ten boxes of matches have their contents counted.

   It is found that they contain the following number :-

   60, 62, 64, 62, 65, 61, 63, 60, 64, 64.

   a Work out the range.

   b Calculate the **mean** number of matches.

   c The Match Company claim that each of their boxes should contain an average of 63 matches.

   Is the company's claim correct ? (*Explain*)

4. Tom sat two mental tests (each out of 10). His **mean** score for the tests was 6.

   If Tom scored 9 in the first test, what must he have scored in the second ?

Exercise 7 — Median & Mode

1. Find the **mode** for each set of data :-

   a 1, 1, 2, 3, 5, 8, 13, 21, 34, 55

   b 3, 2, 1, 8, 4, 5, 9, 2, 7, 6, 0

   c 1·7, 2·3, 1·6, 3, 2·3, 3·7, 2·9

   d A, C, F, G, H, Y, T, E, D, D, G, H, G.

2. For each set of data, find the **MEDIAN** :-

   (Make sure you put the numbers in order first)

   a 5, 6, 6, 7, 8, 9, 9, 10, 11

   b 16, 18, 18, 20, 24, 26, 28, 32

   c 17, 9, 3, 9, 9, 5, 7, 13, 11, 15, 15, 9, 9, 7, 1, 1, 17, 15, 13, 13, 7.

Statistics

3. Find the **mean**, **median**, **mode** and **range** of each set of data :-

   a 10, 12, 14, 15, 16, 19, 22, 23, 23 **b** 46, 31, 66, 73, 83, 43, 16, 66

   c 4, 1, 14, 12, 6, 7, 11, 13, 9, 1 **d** All the prime numbers between 30 and 50.

4. 

   The mean weight of 4 boxes is 75 kg.
   Three of the boxes each weigh 85 kg.
   What is the weight of the fourth box ?

Exercise 8 Stem & Leaf Diagrams

1. The stem and leaf diagram shows the ages of people in a post office queue.

   a Write a key for the diagram.

   b Write down all the ages.

   c How old was the youngest person ?

   d What was the modal age ?

   e Find the median.

Peoples' Ages

2	2 2 6 9
3	0 4 5 6
4	0 1 1 1 2 4
5	2
6	0 3

2. For each set of data shown :-

   (i) Construct an **ordered** stem and leaf diagram. (ii) Find the mode and median.

   a Ages of mature students at a University.

23	42	27	37	25	60	29	35	26	45	35	26
50	39	27	26	42	47	26	59	42	23	29	29
20	51	43	44	28	46	42	27	52	30	30	42

   b Distances (in metres) jumped from a standing position.

1·62	1·23	1·41	1·15	0·97	1·31	1·23	1·26	1·5
1·33	1·29	1·12	1·23	1·19	1·36	1·53	1·08	1·23
0·9	1·2	1·51	1·03	1·66	1·53	1·44	1·23	1·39

Statistics

3. a Draw an **ordered** back to back stem and leaf diagram showing the details about how far (*in centimetres*) S1 and S2 pupils could jump from a standing position.

S1	148	156	172	181	160	157	164	132	184	146	157	139
S2	182	174	138	145	175	162	159	175	167	173	144	150

b Find the modal and median heights of :- (i) S1 (ii) S2.

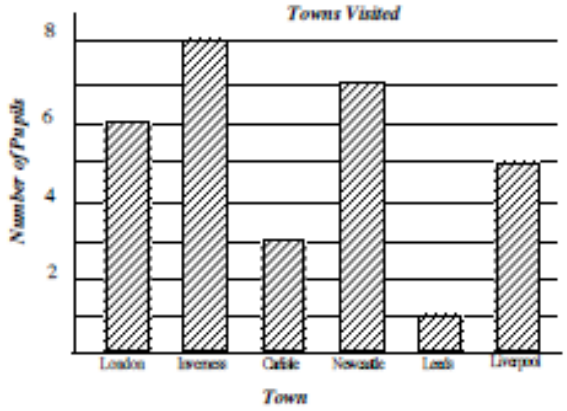
c Write a few sentences comparing the mode and the median of both groups.

Answers

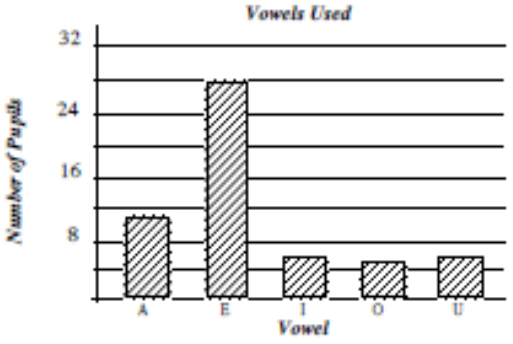
Ch 12 Ex 1 **Bar Graphs & Line Graphs**

1. a (i) 12 (ii) 8 (iii) 14
   (iv) 28 (v) 18
   b Irn Bru, Lemonade, Water, Cola, Orange
   c 80

2.



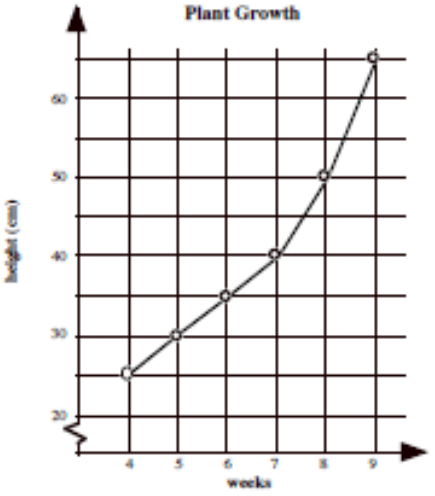
3. a A - 11, E - 28, I - 6, O - 5, U - 6
   b



4. a (i) 20 cm (ii) 30 cm
   (iii) 50 cm (iv) 35 cm
   b (i) 6, 7 (ii) 8
   c 6 d 45 cm

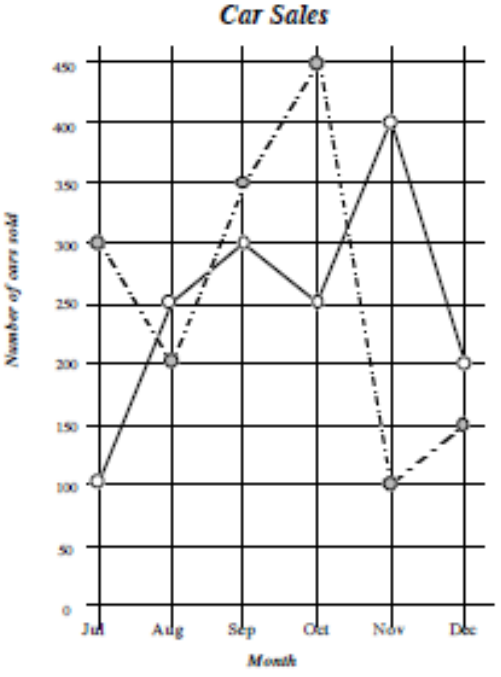
5. a (i) 60 (ii) 50
   (iii) 55 (iv) 35
   b 2 pm c 1 - 2 pm
   d later - so less time on rides.

6.



7. a (i) orange (ii) orange
   (iii) cola (iv) orange
   b (i) 20 (ii) 80 c 360

8.



Answers

Ch 12 Ex 4 Interpreting & Drawing Pie Charts

1. a (i) Friday (ii) Maths
   b Fri, Wed, Mon, Thu, Tue
   c Maths, PE, English, Science, Music
2. a (i) $^{2}/_{10} = {}^{1}/_{5}$ (ii) $^{3}/_{10}$
   (iii) $^{1}/_{10}$ (iv) $^{4}/_{10} = {}^{2}/_{5}$
   b School, Home, Chip van, none
3. a 5
   b (i) 20 (ii) 10
   (iii) 15 (iv) 5
4. a $^{1}/_{20}$
   b (i) $^{9}/_{20}$ (ii) $^{4}/_{20} = {}^{2}/_{10}$
   (iii) $^{5}/_{20} = {}^{1}/_{4}$ (iv) $^{2}/_{20} = {}^{1}/_{10}$
   c 5
   d (i) 45 (ii) 20
   (iii) 25 (iv) 10
5. 

Ch 12 Ex 5 Drawing Pie Charts with a protractor

1. a Indian $^{7}/_{30}$, 84° Chinese $^{6}/_{30}$, 72°
   French $^{5}/_{30}$, 60° British $^{12}/_{30}$, 144°
   b 

2. a

Apple	16	$^{16}/_{42}$	137°
Orange	10	$^{10}/_{42}$	86°
Banana	6	$^{6}/_{42}$	51°
Plum	6	$^{6}/_{42}$	51°
Pear	4	$^{4}/_{42}$	34°

   b 

Ch 12 Ex 6 Mean & Range

1. a 10 b 73
2. a 11 b 40
   c £12 d 7 cm
3. a 5 b 62·5
   c No - 62·5 < 63
4. 3

Ch 12 Ex 7 Median & Mode

1. a 1 b 2
   c 2·3 d 6
2. a 8 b 22 c 9
3. a mean - 17·1 median - 16 mode - 23
   b mean - 53 median - 56 mode - 66
   c mean - 7·8 median - 8 mode - 1
   d 31, 37, 41, 43, 47
   mean - 39·8 median - 41 mode - none
4. 45 kg

Ch 12 Ex 8 Stem & Leaf Diagrams

1. a 3 | 4 means 34 years old
   b 22, 22, 26, 29, 30, 34, 35, 36, 40,
   41, 41, 41, 42, 44, 52, 60, 63
   c 22 d 41 e 40

Answers

Ch 12 Ex 8 Stem & Leaf Diagrams

1. a 3 | 4 means 34 years old

b 22, 22, 26, 29, 30, 34, 35, 36, 40,
41, 41, 41, 42, 44, 52, 60, 63

c 22 d 41 e 40

2. a (i) with key

2	0 3 3 5 6 6 6 6 7 7 7 8 9 9 9
3	0 0 5 5 7 9
4	2 2 2 2 2 3 4 5 6 7
5	0 1 2 9
6	0

(ii) mode - 42, median - 35

b (i) with key

0·9	0 7
1·0	3 8
1·1	2 5 9
1·2	0 3 3 3 3 3 6 9
1·3	1 3 6 9
1·4	1 4
1·5	0 1 3 3
1·6	2 6

(ii) mode – 1·23, median – 1·26

3. a with key

9 2	13	8
6 8	14	4 6
7 7 6	15	0 9
4 0	16	2 7
2	17	3 4 6 6
4 1	18	2

b (i) S1 : mode – 157, median – 157
(ii) S2 : mode – 175, median – 164·5

c both averages are higher for S2
(but they are older and probably taller)

Patterns

Exercise 1 — Sequences & Patterns

1. Give a rule for each of these sequences :- (*begin with " start at ... and then ....."*).

   a 2, 5, 8, 11, 14, ... b 7, 13, 19, 25, ... c 25, 20, 15, 10, ...

   d 98, 81, 64, 47, ... e 3, 9, 27, 81, ... f 1, 6, 36, 216, ...

2. Write down the next two numbers in each sequence from question 1.

3. Find the next two numbers in each sequence :-

   a 7, 9, 11, 13, ... b 5, 9, 13, 17, ... c 24, 22, 20, ...

   d 70, 58, 46, 34, ... e 1, 3, 9, ... f 2, 4, 8, 16, ...

4. Shown is the pattern for **square numbers**.
   Write down the first 12 square numbers.

5. A pattern of numbers is defined as :- (2 x 3), (3 x 4), (4 x 5), (5 x 6) ....

   Write down the :- a 10^{th} term b 1000^{th} term c n^{th} term.

Exercise 2 — Simple Linear Patterns

1. Each door has six window panes.

   a Copy and complete the table.

   b Copy and complete the formula :- P = ... x D

   c How many panes would there be in 11 doors ?

   d How many doors are there if there are 78 panes ?

No. of Doors (D)	1	2	3	4	5
No. of Panes (P)	6	12	?	?	?
rises by : →		6	6	?	?	?

2. For the tables below :- (i) complete each one (ii) construct a formula.

   a No. of toys and price

T	1	2	3	4	5	6
P	9	18	27	..	..	..

P = ... x T

   b No. of seconds and no. of minutes

M	1	2	3	4	5	6
S	60	120	180	..	..	..

S = ... x M

   c No. of pentagons and no. of vertices

P	1	2	3	4	5	6
V	5	10	15	..	..	..

   d No. of tables to legs

T	1	2	3	4	5	6
L	8	16	24	..	..	..

Patterns

3. **Linear Graphs** – For each of the tables below :-

(i) complete each table (ii) construct a formula

(iii) take each pair of numbers as coordinates (iv) plot on a coordinate graph

(v) draw a line through the points and label the line with your formula.

a

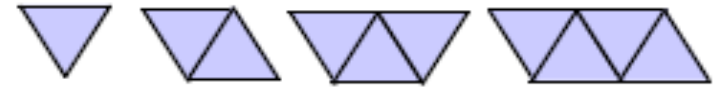
x	0	1	2	3	4	5
y	0	3	6	9	..	..

b

x	0	1	2	3	4	5
y	0	2	4	6	..	..

Exercise 3 Harder Linear Patterns

1. Look at the pattern shown.



1 triangle perimeter 3 | 2 triangle perimeter 4 | 3 triangle perimeter 5 | 4 triangle perimeter 6

a Copy and complete the table shown.

No. of triangles (T)	1	2	3	4	5	6
Perimeter (P)	3	4	5	..	..	..

1 1 1

b Copy and complete the formula for the above pattern :- $P = \ldots \times T + \ldots$

c Find the perimeter of the pattern with 21 triangles.

d Find the number of triangles if the perimeter is 27.

2. For each of the tables below :-

(i) complete each table (ii) construct a formula.

a

x	0	1	2	3	4	5
y	3	5	7	9	..	..

b

x	0	1	2	3	4	5
y	5	6	7	8	..	..

c

x	0	1	2	3	4	5
y	-2	1	4	7	..	..

d

x	0	1	2	3	4	5
y	-1	4	9	14	..	..

e

x	-2	-1	0	1	2	3
y	..	-4	-2	0	2	...

f

x	-2	-1	0	1	2	3
y	...	-11	-4	3	...	...

Answers

Ch 4 Ex 1 Sequences & Patterns

1. a start at 2 then add 3
   b start at 7 then add 6
   c start at 25 then subtract 5
   d start at 98 then subtract 17
   e start at 3 then times by 3
   f start at 1 then times by 6
2. a 17, 20 b 31, 37 c 5, 0
   d 30, 13 e 243, 729 f 1296, 7776
3. a 15, 17 b 21, 25 c 18, 16
   d 22, 10 e 27, 81 f 32, 64
4. 1, 4, 9, 16, 25, 36, 49, 64, 81, 100, 121, 144
5. a 11×12 b 1001×1002 c $(n+1) \times (n+2)$

Ch 4 Ex 2 Simple Linear Patterns

1. a 1 2 3 4 5 6
   6 12 18 24 30 36
   b $P = 6D$ c 66 d 13
2. a 1 2 3 4 5 6
   9 18 27 36 45 54 $P = 9T$
   b 1 2 3 4 5 6
   60 120 180 240 300 360 $S = 60M$
   c 1 2 3 4 5 6
   5 10 15 20 25 30 $V = 5P$
   d 1 2 3 4 5 6
   8 16 24 32 40 48 $L = 8T$
3. a 0 1 2 3 4 5 6
   0 3 6 9 12 15 18 $y = 3x$
   check linear diagram
   b 0 1 2 3 4 5 6
   0 2 4 6 8 10 12 $y = 2x$
   check linear diagram

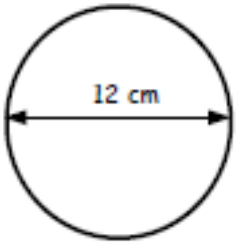
Ch 4 Ex 3 Harder Linear Patterns

1. a 1 2 3 4 5 6
   3 4 5 6 7 8
   b $P = T + 2$ c 23 d 25
2. a 0 1 2 3 4 5
   3 5 7 9 11 13 $y = 2x + 3$
   b 0 1 2 3 4 5
   5 6 7 8 9 10 $y = x + 5$
   c 0 1 2 3 4 5
   -2 1 4 7 10 13 $y = 3x - 2$
   d 0 1 2 3 4 5
   -1 4 9 14 19 24 $y = 5x - 1$
   e -2 -1 0 1 2 3
   -6 -4 -2 0 2 4 $y = 2x - 2$
   f -2 -1 0 1 2 3
   -18 -11 -4 3 10 17 $y = 7x - 4$

The Circle (No Solutions)

Exercise 1

1. Calculate the circumference of this circle with diameter 12 cm.



Copy and complete : -

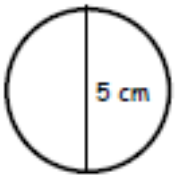
$\Rightarrow \quad C = \pi D$

$\Rightarrow \quad C = 3{\cdot}14 \times 12$

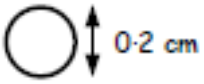
$\Rightarrow \quad C =$ ..... cm.

2. Showing 3 lines of working for each case, calculate the circumference of each of these circles :-

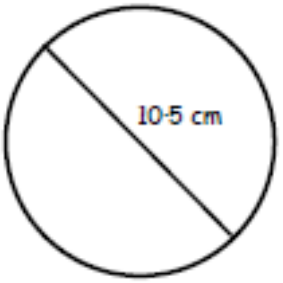
(a)



(b)



(c)



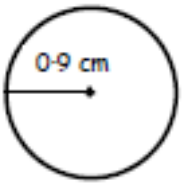
3.

Calculate the circumference of the alloy wheel-trim shown opposite.

4. Calculate the circumference of each of these circles, showing your 3 lines of working each time :-

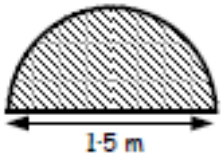
(a)

(b)



(c)

5.

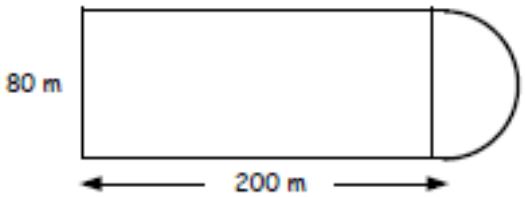


A semi-circular doorstep has a diameter of 1·5 metres.

Calculate the perimeter of the doorstep.

6. Calculate the perimeter of both shapes :-

(a)



(b)

The Circle (No Solutions)

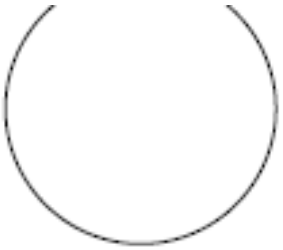
1. Find the diameter of the circle with circumference 78·5 cm.

   Copy and complete :-

$$D = \frac{C}{\pi}$$

$$\Rightarrow \quad D = \frac{78{\cdot}5}{3{\cdot}14}$$

$$\Rightarrow \quad D = \ldots\ldots \text{ cm}$$



$C = 78{\cdot}5$ cm

2. Calculate the diameter of each circle below :-
   (You **must** set down 3 lines of working)

(a)

$C = 25{\cdot}12$ cm

(b)

$C = 1{\cdot}57$ cm

(c)

$C = 59{\cdot}66$ cm

3. For a circle with circumference 69·08 cm, calculate its :-

   (a) diameter (b) radius.

4. The circumference of a tyre from a child's toy motorbike is 7·85 centimetres.

   Find the radius of the tyre.

5. This CD has an outer circumference of 40 centimetres.
   The hole has a 0·5 centimetre radius.

   Calculate :-

   (a) the radius of the CD.

   (b) the circumference of the hole.

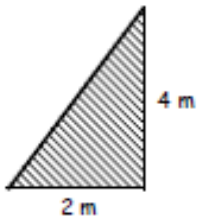
Gradient (No Solutions)

1. Copy and complete the formula -

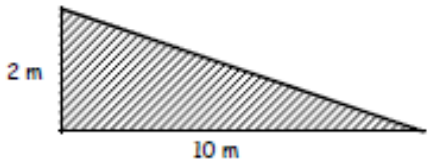
$$\text{gradient} = \frac{\text{ver..... distance}}{\text{..... distance}}$$

2. Write the gradient of each (as a fraction) and **simplify fully** :-

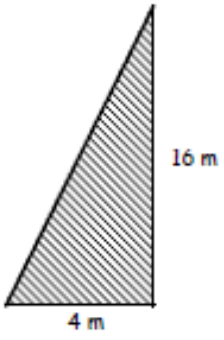
a



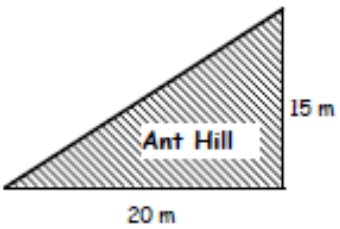
b

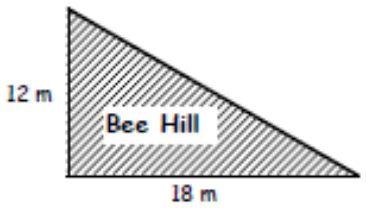


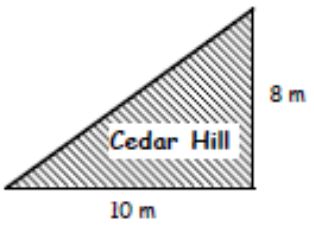
c



3. a Write the gradients of each of the following hills :-





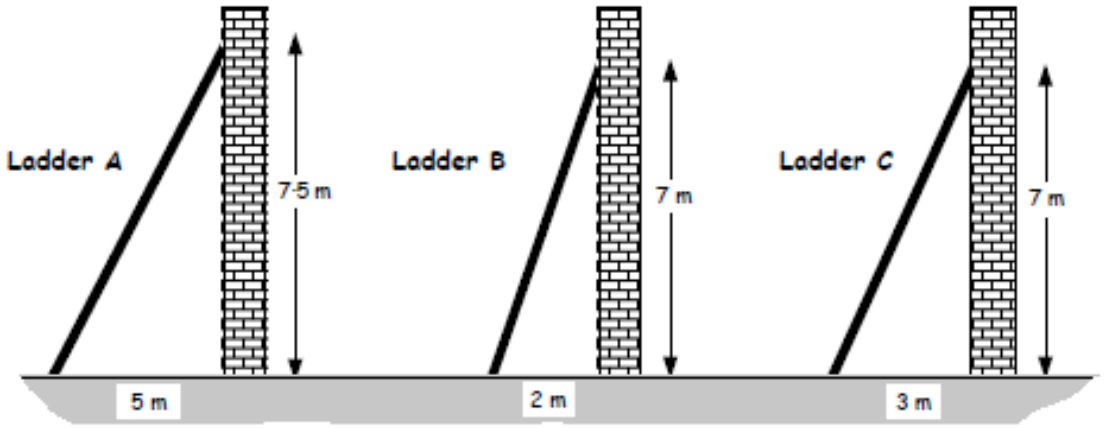


b Change each of your fractional answers in part **a** to a decimal.

c List the gradients in order (steepest first).

4. Find the gradient of each of these ladders:

a b c

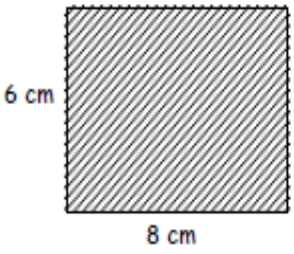


Area (No Solutions)

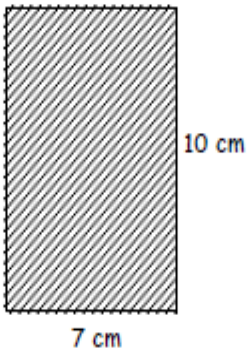
1. Calculate the area of each of the following rectangles.

(In each case, make a small "sketch" of the rectangle, write down the rule "$A = L \times B$" and calculate the area in cm^2).

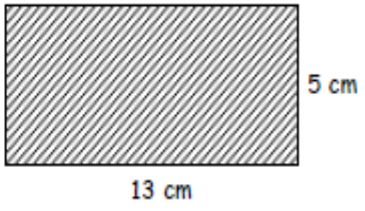
a



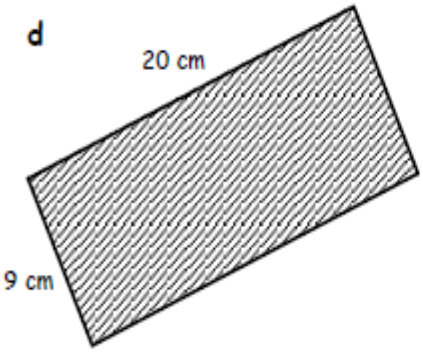
b



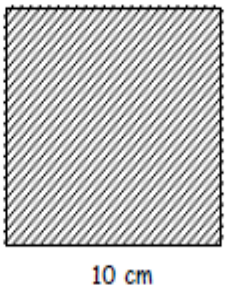
c



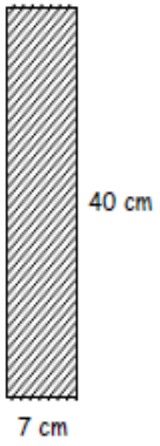
d



e

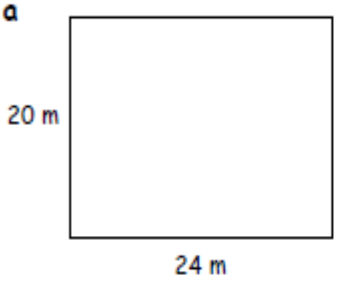


f

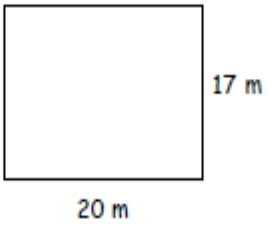


2. Calculate the area of carpet needed for each of these ballrooms :-

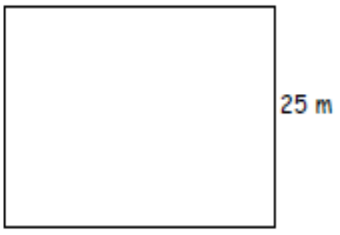
a



b



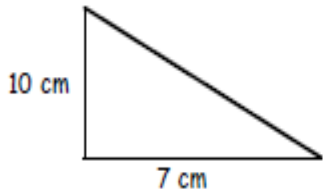
c



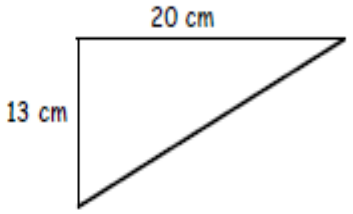
Area (No Solutions)

3. Sketch each right angled triangle (roughly, but using a ruler).
   Use the formula, $A = \frac{1}{2}(L \times B)$ to calculate the area each time.

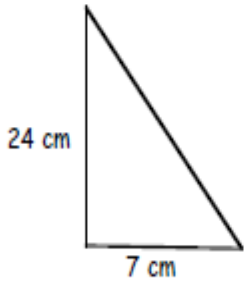
a



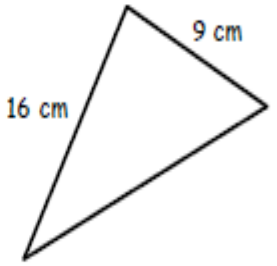
b



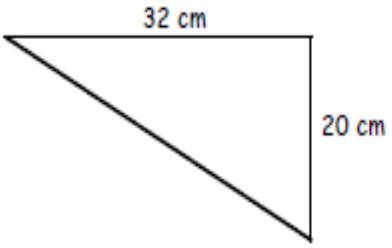
c



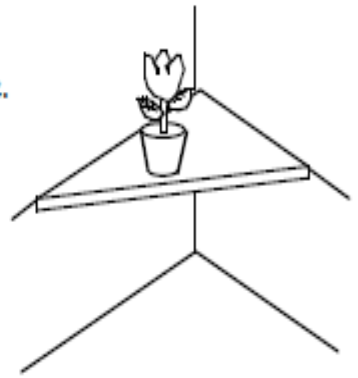
d



4. This corner shelf is in the shape of a right angled triangle.



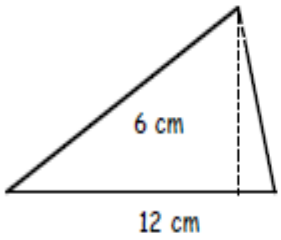
Calculate the area of the triangle.



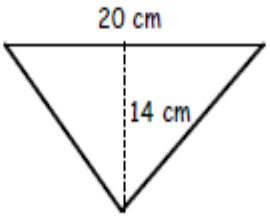
Area (No Solutions)

2. Use the formula Area = $\frac{1}{2}$ (l x b) each time to calculate the areas of the following triangles (make a neat sketch of each triangle) :-

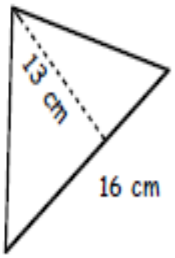
a



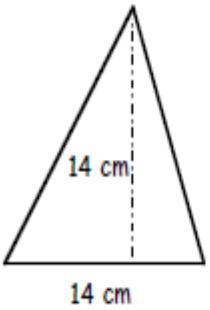
b



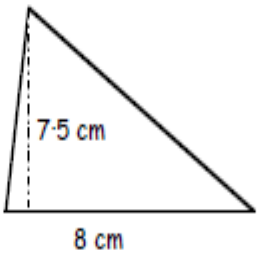
c



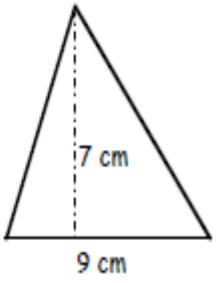
d



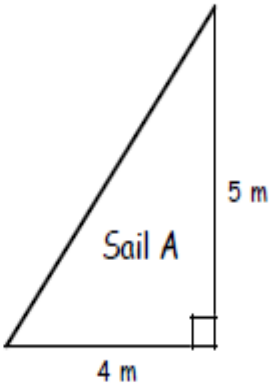
e

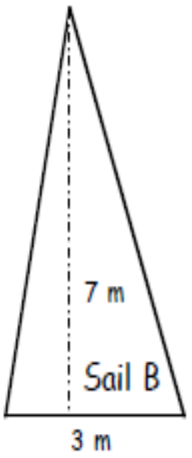


f



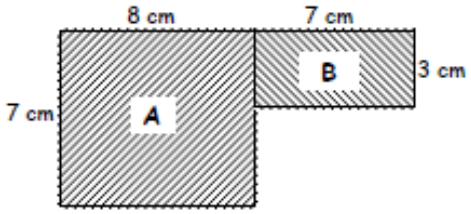
3. Which of the two sails from a yacht has the bigger area and by how much is it bigger than the other one ?





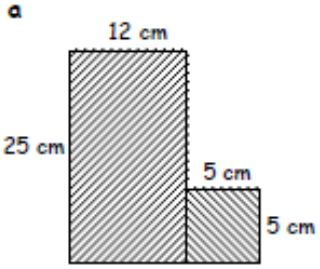
Area (No Solutions)

1. a Calculate the area of the big rectangle (A).
   b Calculate the area of the small rectangle (B).
   c Calculate the **total** area of the shape.

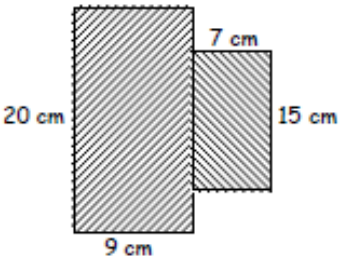


2. For each of these :-
   (i) Make a neat sketch.
   (ii) Calculate the area of each part (show working).
   (iii) Calculate the area of the whole shape.

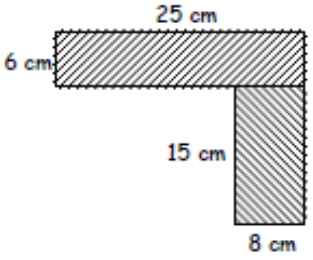
a



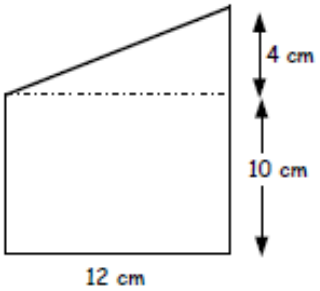
b



c



d



e