National 4

Relationships

Preparation Booklet

Baldragon Academy

Formulae list

Circumference of a circle: $C = \pi d$

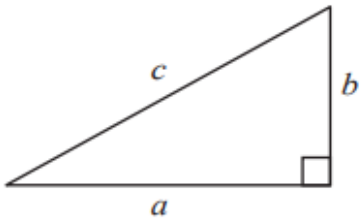
Area of a circle: $A = \pi r^2$

Curved surface area of a cylinder: $A = 2\pi rh$

Volume of a cylinder: $V = \pi r^2 h$

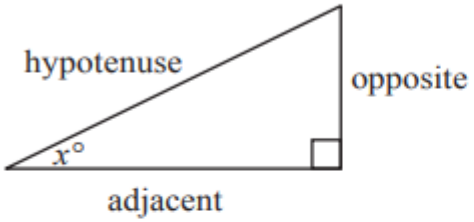
Volume of a prism: $V = Ah$

Theorem of Pythagoras:



$a^2 + b^2 = c^2$

Trigonometric ratios in a right angled triangle:

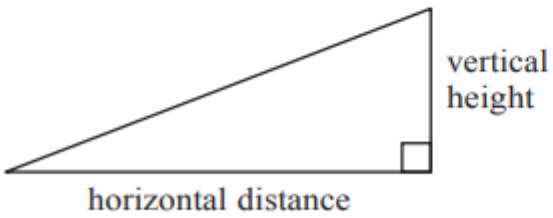


$$\tan x^\circ = \frac{\text{opposite}}{\text{adjacent}}$$

$$\sin x^\circ = \frac{\text{opposite}}{\text{hypotenuse}}$$

$$\cos x^\circ = \frac{\text{adjacent}}{\text{hypotenuse}}$$

Gradient:



$$\text{Gradient} = \frac{\text{vertical height}}{\text{horizontal distance}}$$

Exercise 1

1. Copy and complete the table below for $y = 3x$. Plot the points and draw the straight line on an $x - y$ axis.

x	1	2	3
y			

2. Copy and complete the table below for $y = 2x + 1$. Plot the points and draw the straight line on an $x - y$ axis.

x	1	2	3
y			

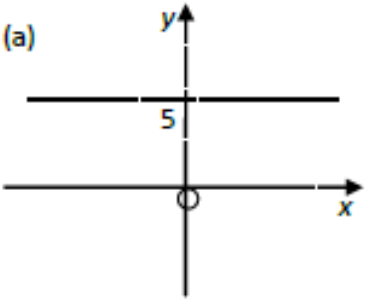
3. Copy and complete the table below for $y = 3x - 2$. Plot the points and draw the straight line on an $x - y$ axis.

x	1	2	3
y			

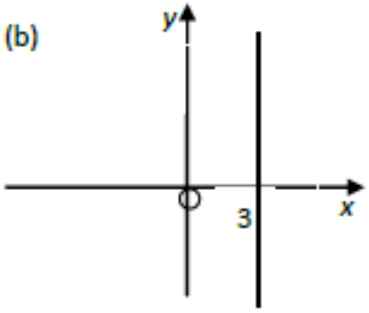
Exercise 2

Write down the equation of each line in the diagrams below.

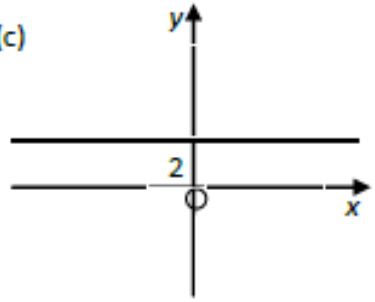
(a)



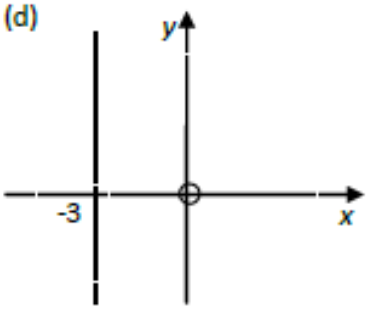
(b)



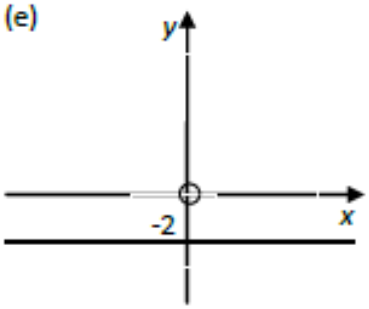
(c)



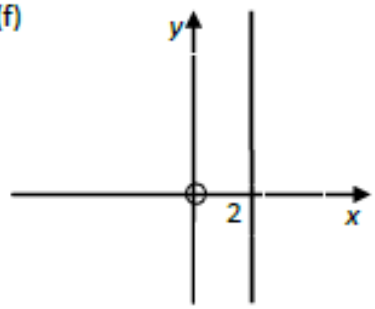
(d)



(e)



(f)



Exercise 3

Solve the following equations;

(a) $3y+7=-2$ (b) $2x+5=9$ (c) $4z-3=9$ (d) $6x-8=-2$

(e) $2y+5=-1$ (f) $8x+7=31$ (g) $5z-2=8$ (h) $3x-7=-1$

Exercise 4

Change the subject of the formula to the given letter in the bracket

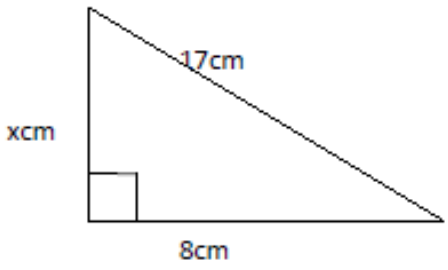
(a) $c=\frac{d}{x}$ (x) (b) $2t+5=y$ (t) (c) $c=\frac{2}{P}$ (P) (d) $x=4+yz$ (z)

(e) $2x+5=k$ (x) (f) $\frac{R}{t}=x$ (t) (g) $5P-2=8q$ (P) (h) $a=1-6z$ (z)

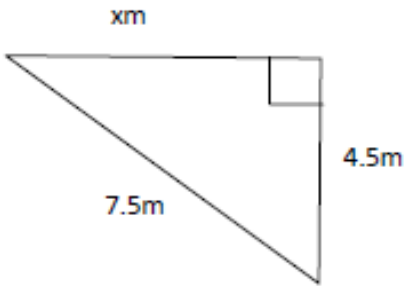
Exercise 5

1.Calculate the length x in these triangles

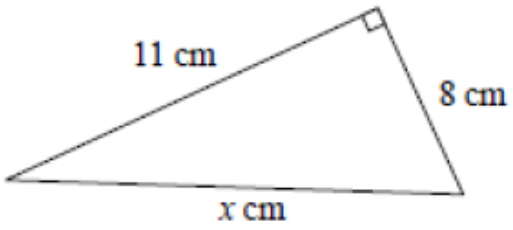
(a)



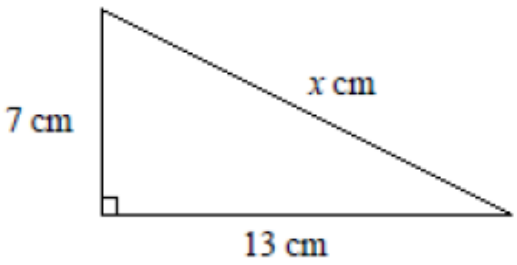
(b)



(c)



(d)

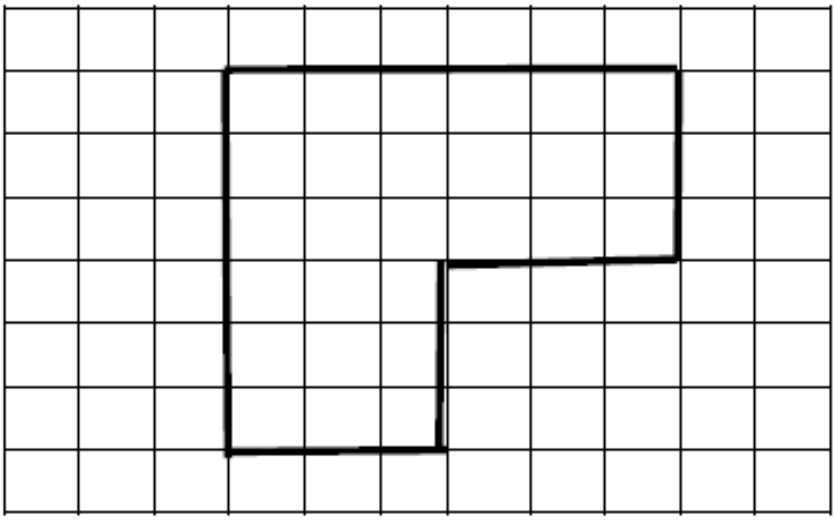


Exercise 6

1. On squared paper draw

(i) a reduction of the given shape using a scale factor of $\frac{2}{3}$

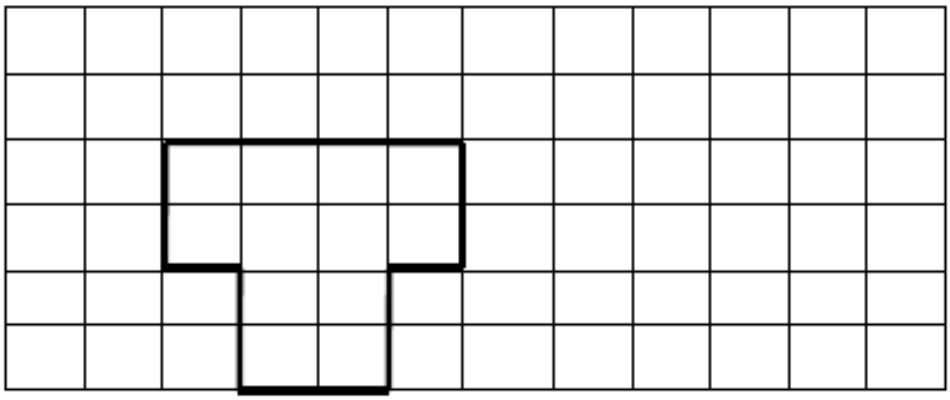
(ii) an enlargement of the given shape using a scale factor of 2



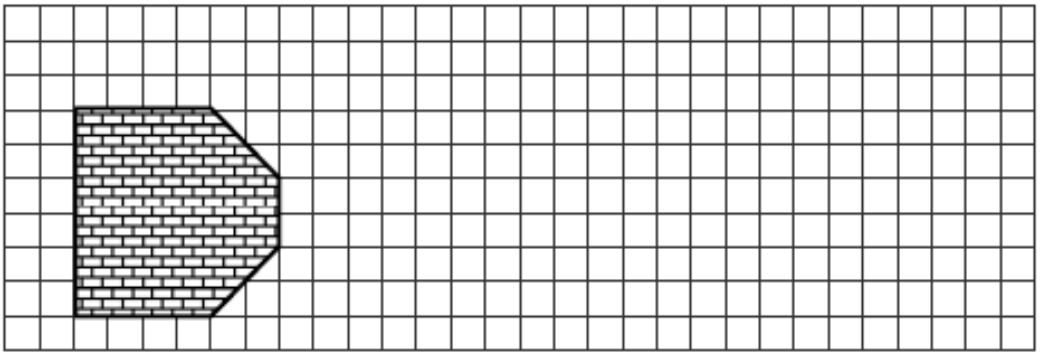
2. On squared paper draw

(i) an enlargement of the given shape using a scale factor of $\frac{3}{2}$

(ii) a reduction of the given shape using a scale factor of $\frac{1}{2}$

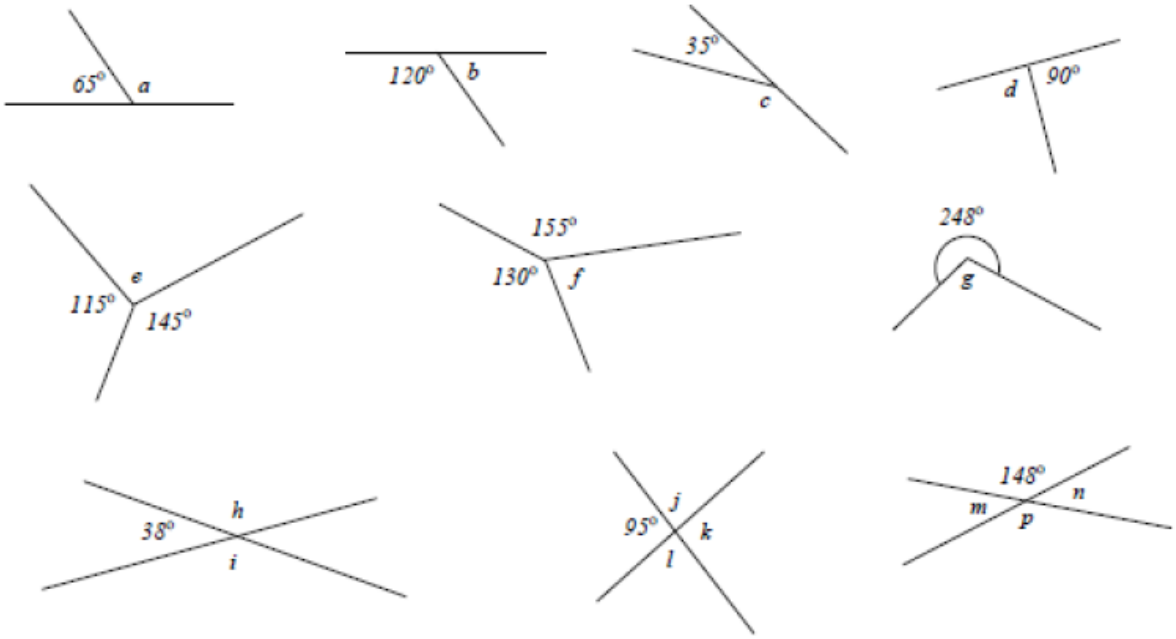


3. On squared paper draw an enlargement of this shape using a Scale Factor of 1·5.

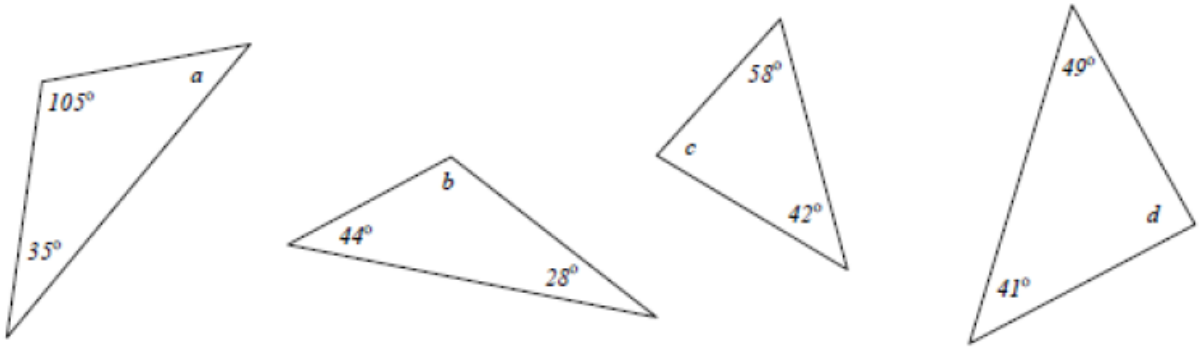


Exercise 7

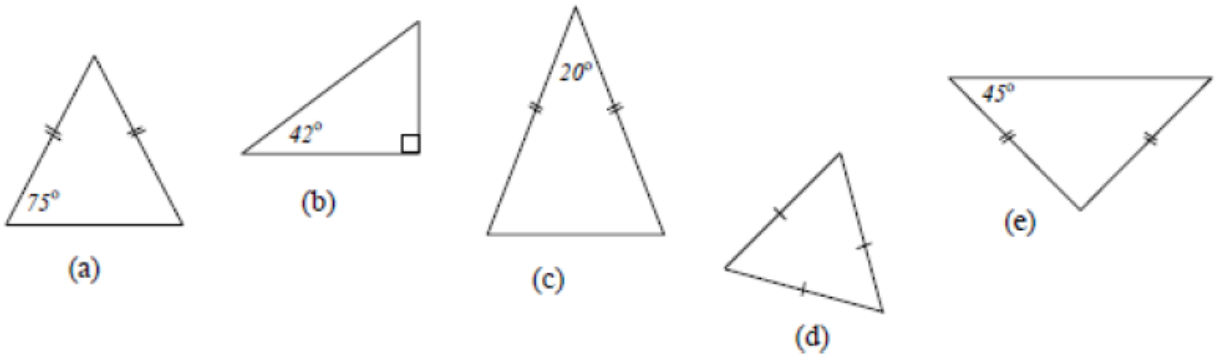
1. Calculate the size of each lettered angle below:



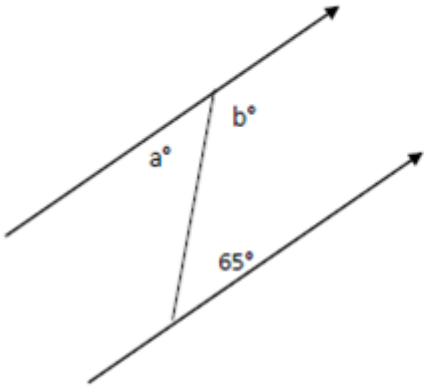
2. Calculate the size of each of the missing angles in the triangles below:

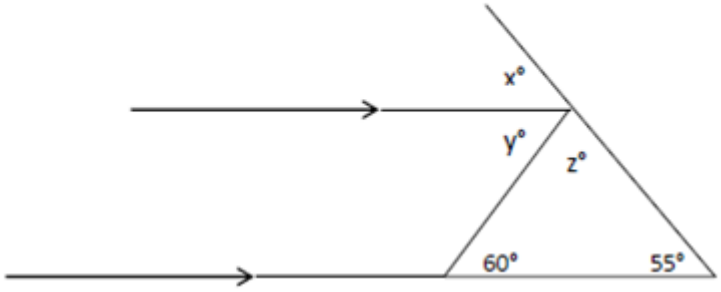


3. Copy each triangle and fill in all the missing angles



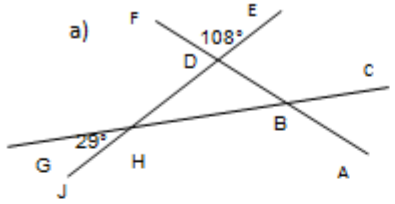
4. Calculate the missing angles a, b, x, y and z in the diagrams.



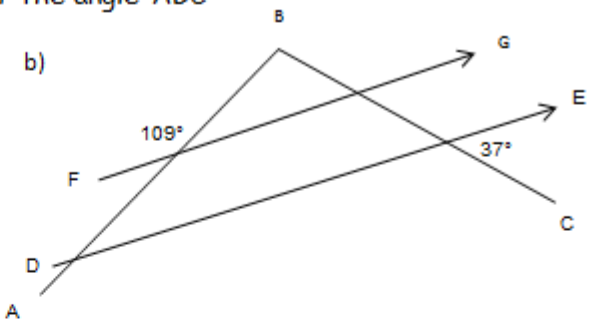


5. For each diagram find the value of the angle ABC

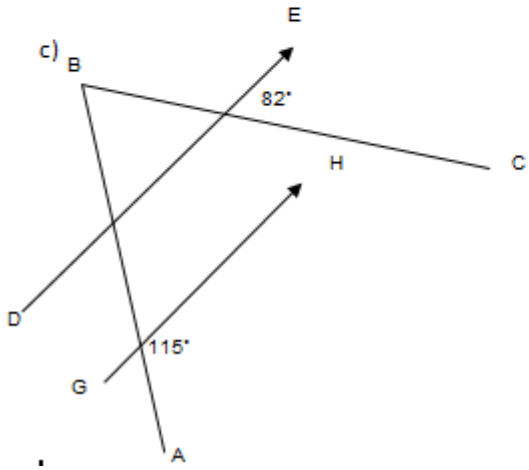
a)



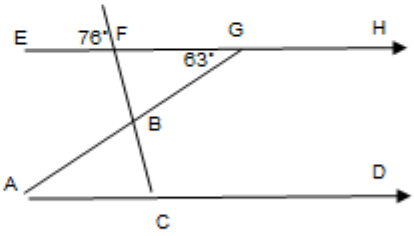
b)



c)

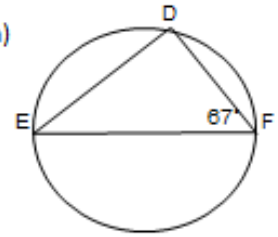


d)

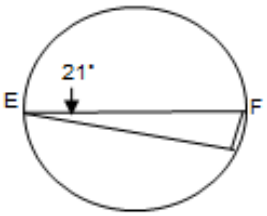


6. Find the size of the angle DEF in each of the following:

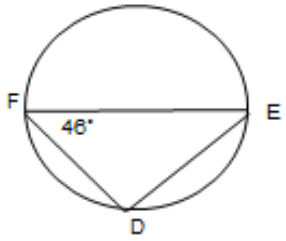
a)



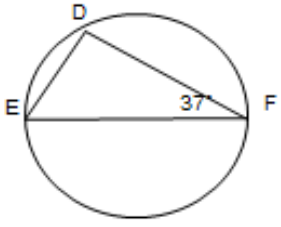
b)



c)



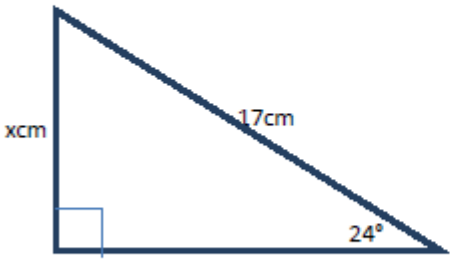
d)



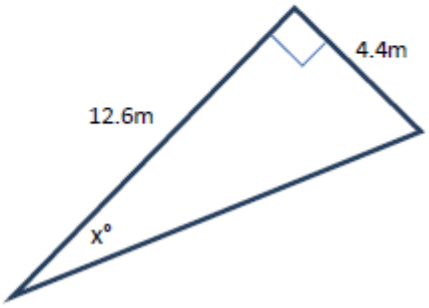
EXERCISE 8

1. Find x in the following triangles.

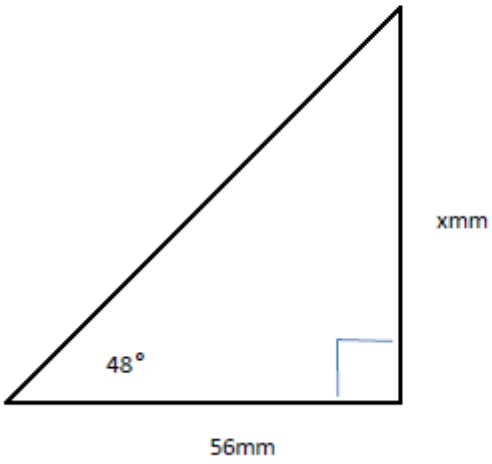
a)



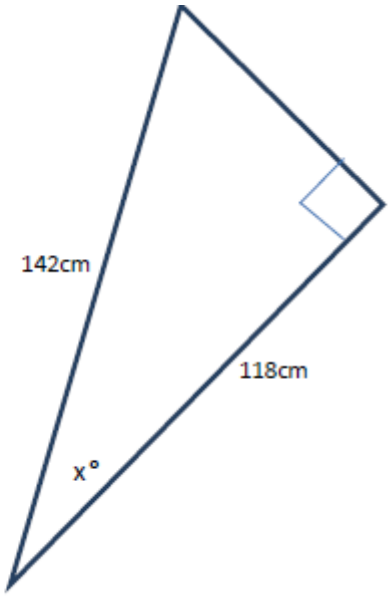
b)



c)



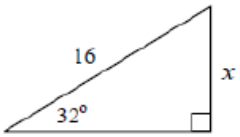
d)



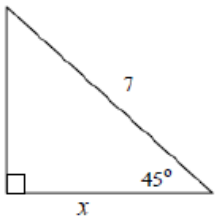
EXERCISE 9

1. Calculate the length of each side marked ***x*** in each triangle below:

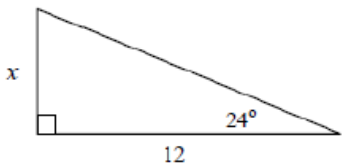
(a)



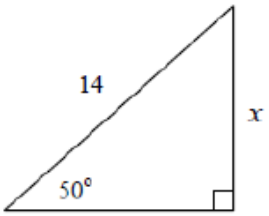
(b)



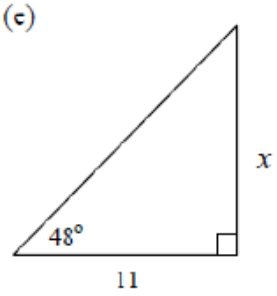
(c)



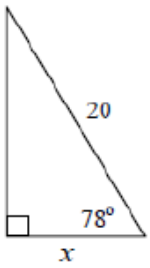
(d)



(e)

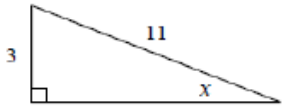


(f)

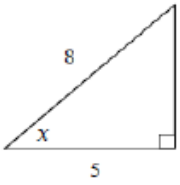


2. Calculate the angle marked ***x°*** in each triangle below

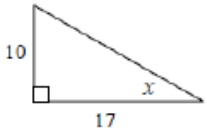
(a)



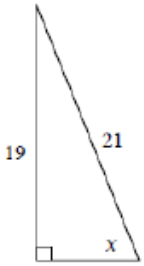
(b)



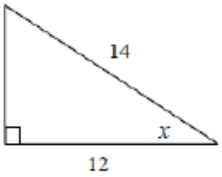
(c)



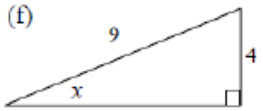
(d)



(e)



(f)



EXERCISE 10

1. Plot each of the following sets of points on a separate coordinate diagram and draw a line of best fit where possible

SET 1

x	y
3	3
4	3
1	1
7	9
9	7
3	5
2	2
7	2
6	6
5	5
9	8
8	7
3	2
7	6

SET 2

x	y
3	7
4	6
10	4
11	5
7	5
12	3
13	3
2	6
9	5
5	5
8	4
11	4
10	3
6	7
11	3
1	8
3	1
14	2

SET 3

x	y
2	2
7	3
5	8
10	2
9	5
9	7
1	9
3	6
4	4
6	11
6	5
7	8