1. Multiply out.

$3d(d - 2)$

..... **[2]**

2. Solve.

$6x - 9 = 27 - 4x$

x = ... **[3]**

3. Find all the possible integer values that satisfy the inequality $4 \leq 2x < 10$.

..... **[3]**

4. Find the value of $4x + 5y$ when $x = 3$ and $y = {}^{-}2$.

..... **[2]**

5(a). Rearrange this formula to make d the subject.

$f = 5d + 4$

..... **[2]**

(b). Use the formula

$v = u + at$

to find the final velocity, when

- the initial velocity is 5 m/s
- the acceleration is 7.5 m/s^2
- the time is 6 seconds.

..... m/s **[2]**

6. A theatre has an adult price and a child price for their shows.

A group of 4 adults and 5 children paid a total of £136.
A group of 3 adults and 2 children paid a total of £81.

Work out the price for one adult and the price for one child.
You must show your working.

Price for one adult £ .....
Price for one child £ ..... **[5]**

7(a). Simplify.

i. $5r - 7t - 3r + 2t$

..... **[2]**

ii. $a \times a \times a \times a \times a$

..... **[1]**

iii. $7b^5 \div b$

..... **[1]**

(b). Factorise.

$4a - 12b$

..... **[1]**

8(a). Here are the first four terms of a sequence.

7 15 23 31

Write down the next term of the sequence.

..... **[1]**

(b). Explain how you worked out your answer.

_____ **[1]**

(c). Explain why 80 is **not** a term in this sequence.

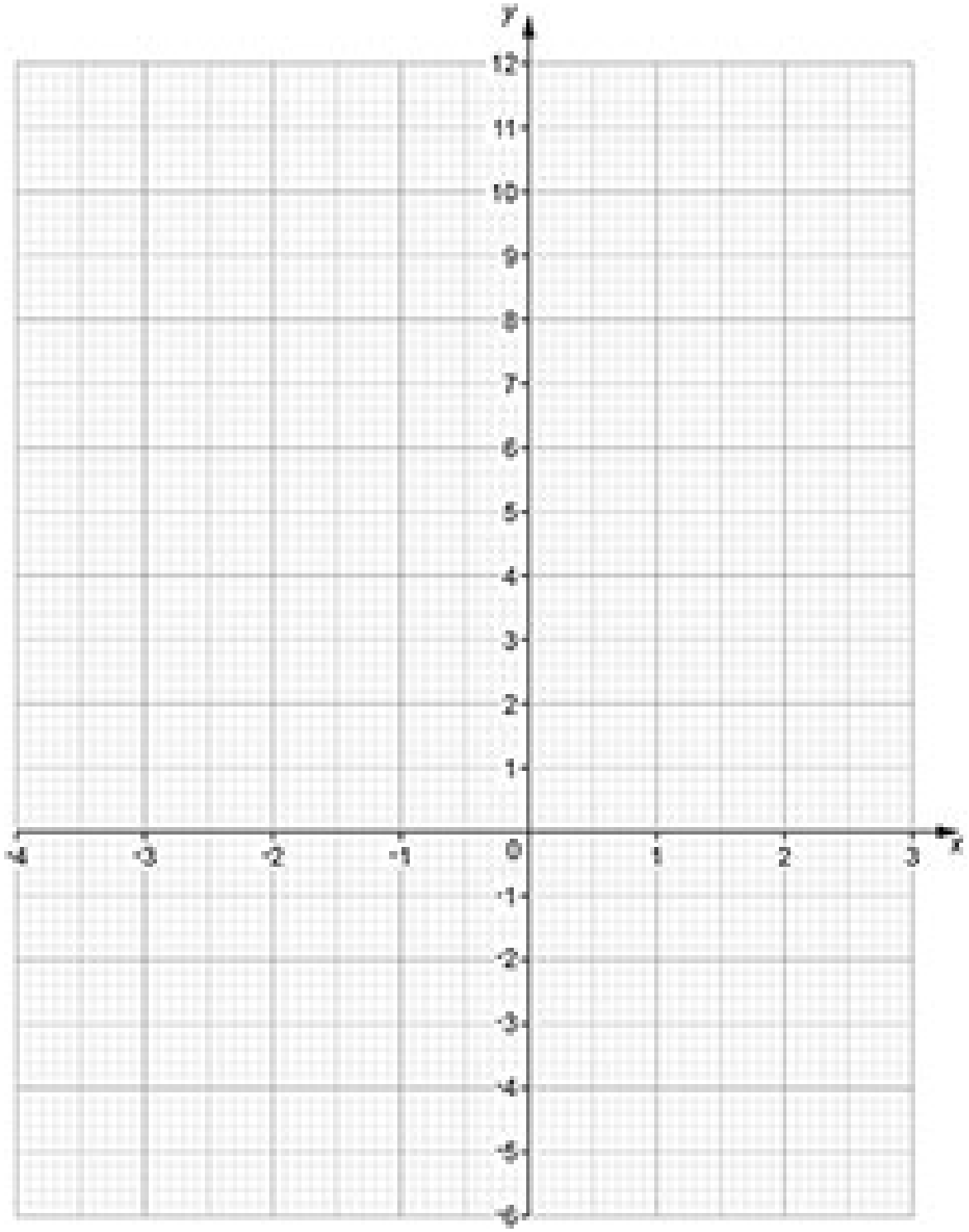
_____ **[1]**

9(a). Complete this table for $y = x^2 - 5$.

x	$^-4$	$^-3$	$^-2$	$^-1$	0	1	2	3
y		4	$^-1$	$^-4$		$^-4$	$^-1$	4

[2]

(b). Draw the graph of $y = x^2 - 5$ for the values of x from $^-4$ to 3.



[3]

(c). Use the graph to solve the equation $x^2 - 5 = 0$.
Give your answers to **1** decimal place.

x = ... or x = ... **[2]**

10(a). Here is a rule to work out the time, in minutes, needed to cook a turkey.

Ling's turkey takes 150 minutes to cook.

Use the rule to work out the weight of Ling's turkey.

..... kg **[2]**

(b). James cooks a turkey.
His turkey weighs 6 kg.
James wants to take his turkey out of the oven at 1:15 pm.

Use the rule to work out at what time James should put his turkey in the oven.
You must show your working.

..... **[5]**

11. Solve $2x + 5 \geq 11$.
Show your solution on the number line.

[4]

12. This list represents four numbers.

127 x $x + 1$ $2x$

The **mean** of the four numbers is 180.

Work out the numbers.
You must show your working.

127 .... **[5]**

13(a).

Simplify.

$t + 5t - 4t$

..... **[1]**

(b). Factorise.

$x^2 + 2x$

..... **[1]**

14. In a dance competition, four judges award marks to each dancer.
Each judge can award 1, 2, 3, 4 or 5 marks.

The four judges' median mark, m, is put into the formula

$S = 10m - 5$

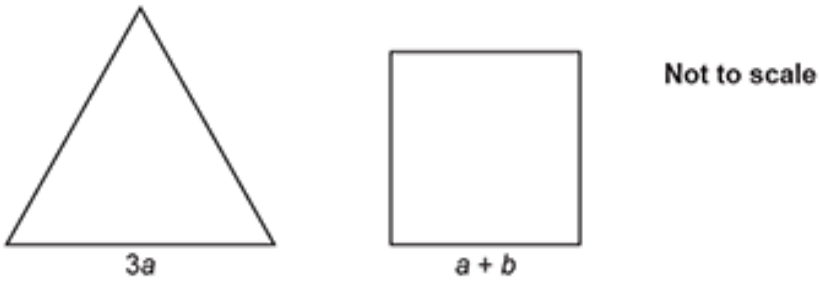
to get the dancer's score, S.

Sam is awarded marks of 4, 3, 1 and 4.
Work out Sam's score.

..... **[3]**

15. In this question, all lengths are in centimetres.

The diagram shows an equilateral triangle and a square.



The perimeter of each shape is 36 cm.

Find the value of b.

b = ... **[4]**

16. Solve the simultaneous equations.

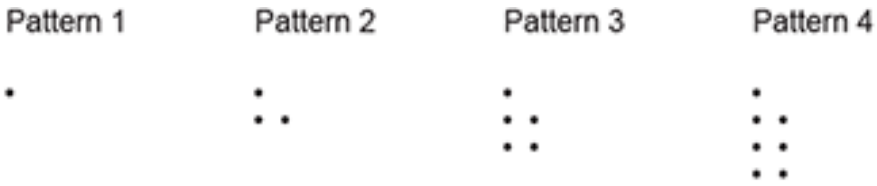
$3x + y = 11$

$x + y = 3$

$x =$ .....

$y =$ ..... **[3]**

17(a). Here are the first four dot patterns in a sequence.



Draw Pattern 5 in the sequence. **[1]**

(b). Without drawing, work out how many dots are in Pattern 8 of the sequence.
Explain how you worked out your answer.

_____ because _____

_____ **[2]**

18(a).

Simplify.

$2 \times 3a$

..... **[1]**

(b). Simplify.

$$\frac{2x^5}{4x}$$

..... **[2]**

19(a).

$$(x+4)(x+3) = x^2 + 7x + 12$$

Darcy says that the statement in the box is an equation.
Ellis says that the statement in the box is an identity.
One of them is correct.

Explain which one of Darcy or Ellis is correct.

_____ is correct because _____

_____

_____

[2]

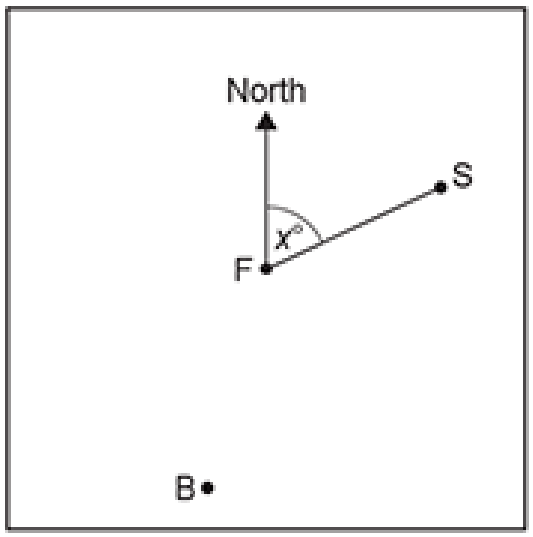
(b). Solve by factorising.

$x^2 + 4x - 12 = 0$

x = ... or x = ... **[3]**

20(a). A town square has a fountain (F) at the centre.
There is also a bell tower (B) and a statue (S).

The bearing of the statue from the fountain is $x°$.



Not to scale

The bearing of the bell tower from the fountain is 140° more than the bearing of the statue from the fountain.

Write down, in terms of x, the bearing of the bell tower from the fountain.

..... ° **[1]**

(b). The bearing of the bell tower from the fountain is also three times the bearing of the statue from the fountain.

Work out the bearing of the bell tower from the fountain.

..... ° **[4]**

21(a).

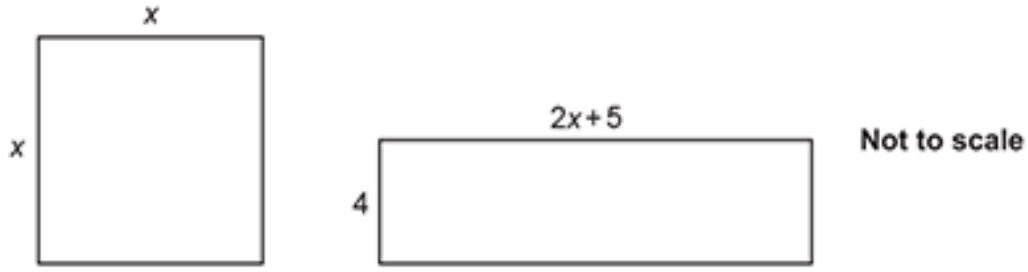
Multiply out.
$5(x + 2)$

..... **[1]**

(b). Rearrange this formula to make r the subject.
$p = 3r - 5$

..... **[2]**

22(a). In this question, all measurements are in centimetres.



The square and the rectangle have the same area.

Show that $x^2 - 8x - 20 = 0$.

[3]

(b). Solve $x^2 - 8x - 20 = 0$.

x = ... or x = ... **[3]**

(c). Explain why one of the answers in part above is not possible in the context of the question.

---

[1]

(d). Write down the following.

i. The area of the square.

(i) ..... cm^2 **[1]**

ii. The length of the rectangle.

(ii) ..... cm **[1]**

23. A bag of sweets contains jellies, mints and toffees.

The ratio of jellies to mints is n : 2.
The ratio of mints to toffees is 5 : 3n.

Work out the ratio of jellies to toffees.
Give your answer in its simplest form.

..... : ..... **[4]**

24. Simplify.

$5t - 3u - t + 5u$

..... **[2]**

25(a). Here are some algebraic statements.

$v = u + at$ $a + 2b$ $3(x + 2) = 3x + 6$ $2y < x$ $2x = 5$

From the list above, write down an example of the following.

An expression.

..... **[1]**

(b). An inequality.

..... **[1]**

(c). An equation.

..... **[1]**

26. Rearrange this formula to make w the subject.

$P = 2w + 2h$

..... **[2]**

27(a). Here are the first four terms of a sequence.

8 15 22 29

i. Write down the next term in the sequence.

(i) ..... **[1]**

ii. Explain how you worked out your answer.

[1]

(b). The nth term of a sequence is given by $4n + 2$.

Explain why 32 is **not** a term in the sequence.

[2]

28. Kai buys 5 drinks and 3 cakes for £16.35.
Azmi buys 2 drinks and 6 cakes for £14.70.

Assume that each drink costs the same and that each cake costs the same.

Calculate the cost of one drink and the cost of one cake.
You must show your working.

Cost of one drink £ .....
Cost of one cake £ .....**[5]**

29(a). Solve.

$x - 14 = 30$

x = ... **[1]**

(b). $6y + 7 = 28$

$y =$ ..... **[2]**

30(a). Simplify.

$3c^2 d \times 2d$

..... **[2]**

(b). Factorise. $35x + 7x^2$

..... **[2]**

31. Force is measured in newtons (N).
A force of 198.5 N is applied to a rectangular surface of length 4.9 cm and width 4.1 cm.

Work out an estimate of the pressure, in N / cm^2, applied to this rectangular surface.

[The formula for pressure is: $\text{Pressure} = \frac{\text{Force}}{\text{Area}}$]

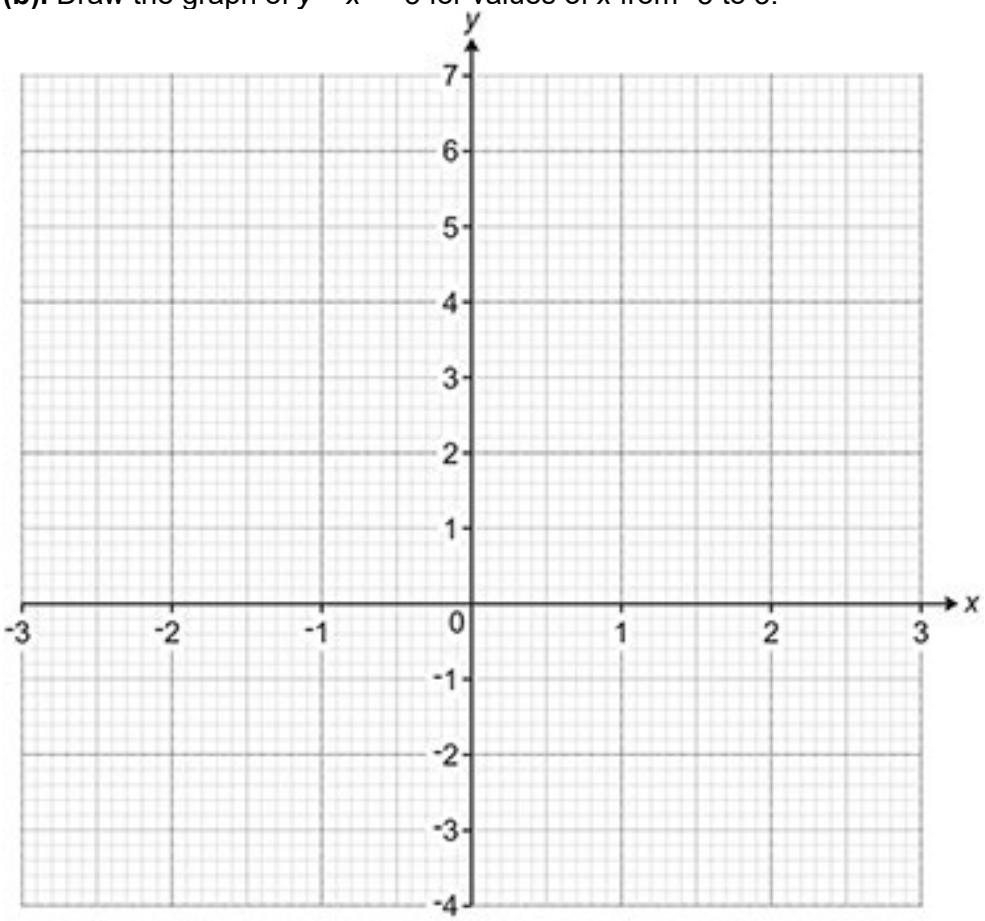
..... N / cm^2 **[4]**

32(a). Complete this table for $y = x^2 - 3$.

x	$^-3$	$^-2$	$^-1$	0	1	2	3
y		1	$^-2$		$^-2$	1	6

[2]

(b). Draw the graph of $y = x^2 - 3$ for values of x from $^-3$ to 3.

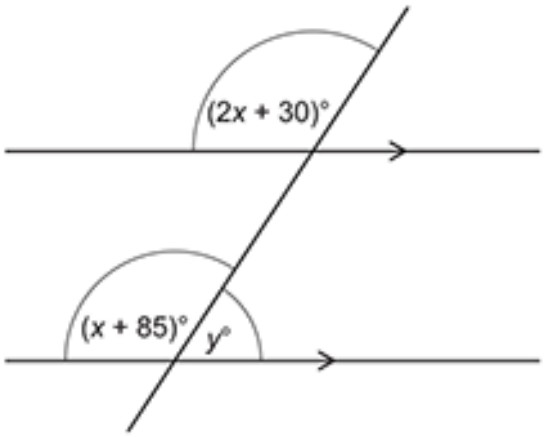


[3]

(c). Use your graph to solve $x^2 - 3 = 2$.

x = ... or x = ... **[2]**

33. The diagram shows a straight line crossing two parallel lines.



Not to scale

Find the value of y.
You must show your working.

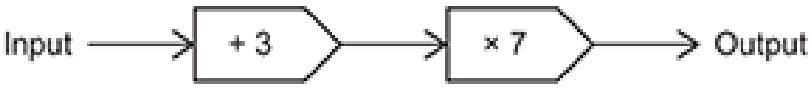
y = ... **[6]**

34. Solve the inequality.

$2(x + 5) < 16$

..... **[3]**

35(a). Here is a function.



Find the output when the input is 2.

..... **[1]**

(b). Find the input when the output is 63.

..... **[2]**

END OF QUESTION PAPER