

Algebra – GCSE Mathematics Paper 3

1. No.4

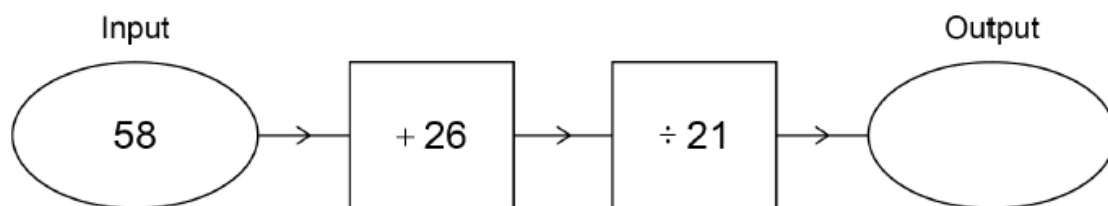
Simplify $4 \times 2c$

Circle your answer.

[1 mark] $42c$ $16c$ $8c$ $6c$

2. No.11

(a) Here is a number machine.

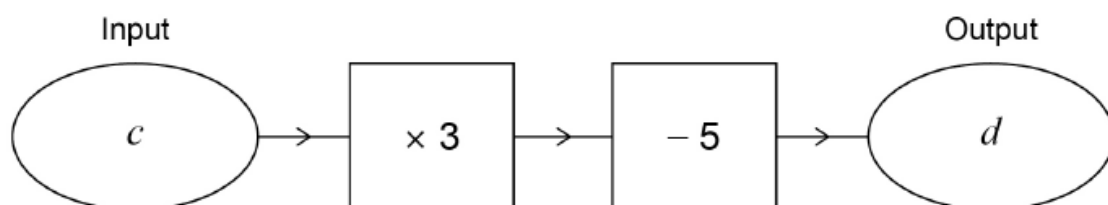


Work out the output.

[1 mark]

Answer _____

(b) Here is a different number machine.

Work out a formula for d in terms of c .

[2 marks]

Answer _____

3. No.12

(a) Simplify fully $9x + y - 6x + y$

[2 marks]

Answer

(b) Here are two expressions.

$8a$

$a^2 - b$

When $a = 25$ the expressions have the same value.Work out the value of b .

[3 marks]

 $b =$

(c) Simplify $\frac{6w + 10}{2}$

Circle your answer.

[1 mark]

$6w + 8$

$3w + 10$

$6w + 5$

$3w + 5$

4. No.13

Simplify $\sqrt{5}a + \sqrt{5}a$

Circle your answer.

[1 mark]

$5a$

$5a^2$

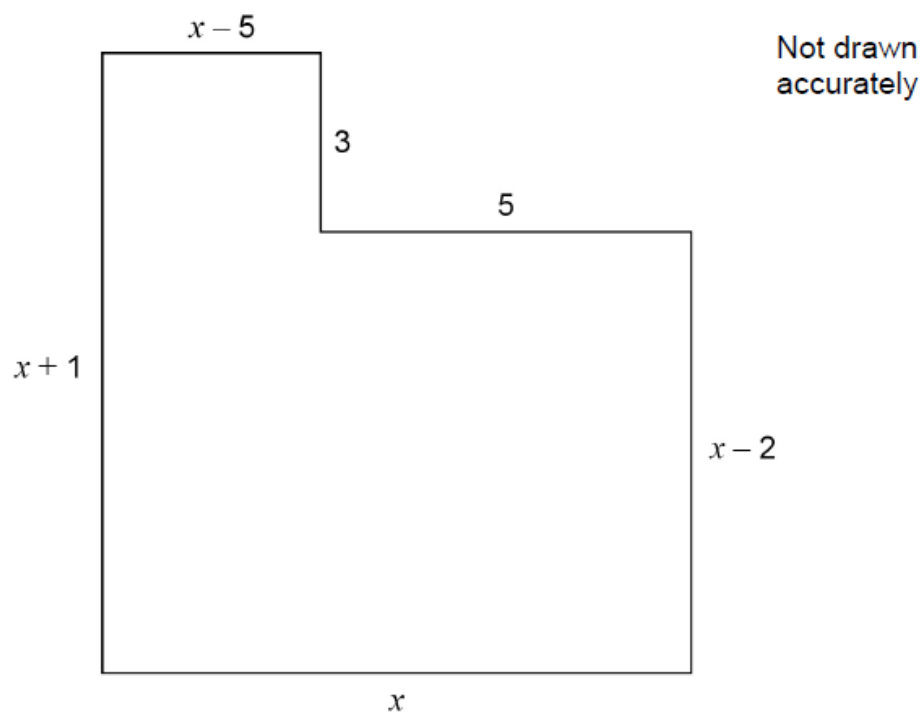
$2\sqrt{5}a$

$\sqrt{10}a$

5. No.19

Here is the plan of the floor of an L-shaped room.

All lengths are in metres.



- (a) The area of the floor is 75 m^2

Show that $x^2 + x - 90 = 0$

[3 marks]

- (b) By factorising $x^2 + x - 90$ work out the value of x .

You **must** show your working

[2 marks]

$$x = \underline{\hspace{10em}}$$

6. No.22

$$f(x) = 3x \quad \text{and} \quad g(x) = x^2$$

Circle the expression for $fg(x)$

[1 mark]

$$3x^2$$

$$9x^2$$

$$3x^3$$

$$9x^4$$

7. No.23

Here are two simultaneous equations.

$$y = x^2 + 7x - c$$

and

$$y = 3x + d$$

There is a solution when $x = 5$

Work out the value of $c + d$

[3 marks]

Answer _____

8. No.27

Expand and simplify fully $(x - 3)(x - 4)(x + 8)$

[3 marks]

Answer _____

9. No.3

Circle the expression that means half the value of x

[1 mark]

$$\frac{x}{2}$$

$$\frac{2}{x}$$

$$\frac{1}{2} - x$$

$$x - \frac{1}{2}$$

10. No.11

In a game, the player going first uses crosses and the player going second uses circles.
To win the game, a player must get three crosses or three circles together in a line.
The line must be horizontal, vertical or diagonal.

(a) Here is the position in a game.

	A	B	C	D	E	F
1					O	
2				O		
3			X	X		
4				X		
5		O			O	
6		X				

It is Amy's turn to put a cross on the grid.

She wins if she puts a cross in B3

Write down **all** the other squares where she could put a cross to win the game.

[2 marks]

Answer _____

Amy goes first in the next game.

	A	B	C	D	E	F
1						
2						
3						
4						
5						
6						

- (b) Assume that she will choose a square at random.

Write down the probability that she will put her first cross in square F6

[1 mark]

Answer _____

- (c) In fact, Amy decides to put her first cross into a corner square.

What does this mean about the probability that she will put her first cross in square F6?

Tick a box.

☐

It is smaller than the answer to part (b)

☐

It is greater than the answer to part (b)

☐

It is the same as the answer to part (b)

Give a reason for your answer.

[1 mark]

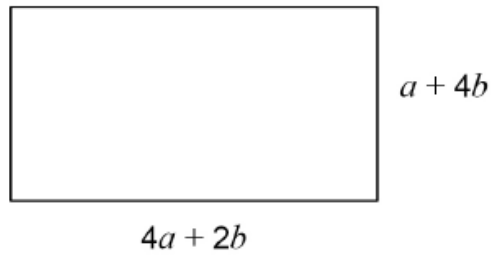
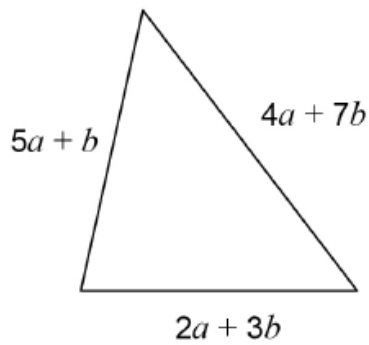
11. No.17

Multiply out $5x(3x - 2)$ **[2 marks]**

Answer

12. No.19

Here are a triangle and a rectangle.

Not drawn
accurately a and b are positive numbers.Which shape has the **larger** perimeter?You **must** work out expressions for both perimeters.**[3 marks]**

Tick a box.

☐

triangle

☐

rectangle

☐

cannot tell

13. No.25

The equation of a straight line is $2y = 6x + 8$

Circle the gradient of the line.

[1 mark]

6

8

3

4

14. No.1

 b is 3 more than the square root of a .

Circle the correct equation.

[1 mark]

$b = \sqrt{a} + 3$

$b = \sqrt{a} - 3$

$b = \sqrt{a+3}$

$b = \sqrt{a-3}$

15. No.3

A line has equation $3y = 3x - 2$ Circle the coordinates of the intercept of the line with the y -axis.

[1 mark]

$(0, 1)$

$(0, -1)$

$\left(0, \frac{2}{3}\right)$

$\left(0, -\frac{2}{3}\right)$

16. No.4

Factorise $x^2 - 64$

Circle your answer.

[1 mark]

$(x + 8)^2$

$(x - 8)^2$

$(x + 8)(x - 8)$

$x(x - 64)$

R is the point $(2, 5)$

[3 marks]

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18. No.18

Circle your answer.

[1 mark]

 w^2

19. No.19

The equation of a circle is $x^2 + y^2 = 11$

Work out the length of the **diameter**.

Circle your answer.

[1 mark]

$\sqrt{11}$

$2\sqrt{11}$

$\sqrt{22}$

22

20. No.23

The equation of a curve is $y = 16^x$

(a) Circle the point that lies on the curve.

[1 mark]

$(2, 32)$

$(32, 2)$

$(2, 256)$

$(256, 2)$

(b) A different point on the curve has y -coordinate $\frac{1}{16}$

Work out the x -coordinate.

[1 mark]

Answer _____

21. No.24

$a^b = 3$ where a is an integer and b is a proper fraction.

Work out **one** possible pair of values of a and b .

[1 mark]

$a =$ _____ $b =$ _____

[3 marks]

This image shows a blank sheet of white paper with horizontal ruling lines. The lines are evenly spaced and extend across the width of the page. There are no margins, text, or other markings on the paper.

Answer _____

23. No.30A sphere has radius r cmAn approximate value of r can be found using the iterative formula

$$r_{n+1} = \sqrt{\frac{239}{r_n}}$$

The starting value is $r_1 = 7$ **(a)** Work out the values of r_2 and r_3 **[2 marks]**

$$r_2 = \underline{\hspace{10cm}}$$

$$r_3 = \underline{\hspace{10cm}}$$

(b) Continue the iteration to work out the radius to 1 decimal place.**[1 mark]**

Answer cm