

**GCSE**  
**MATHEMATICS (8300)**  
**FOUNDATION**  
Algebra

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Total number of marks: 34 per optional item

**Q5a**

(a) Solve  $x - 3 = 14$

$x = \underline{17}$

(Total 1 mark)

**Q5b**

(b) Solve  $5y = 45$

$y = \underline{9}$

(Total 1 mark)

**Q5c**

(c) Solve  $8 + w = 6 \Rightarrow 8 + w - 8 = 6 - 8 \Rightarrow w = -2$

$w = \underline{-2}$

(Total 1 mark)

**Q7a**

Here is a number machine.



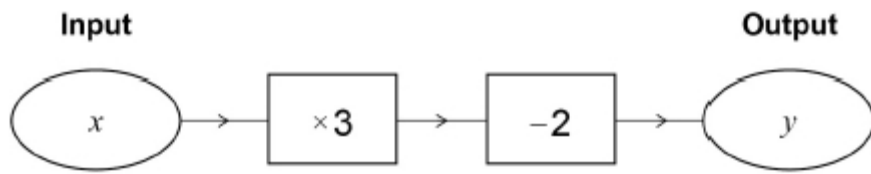
(a) Work out the output when the input is 4

$y = 10$

(Total 1 mark)

## Q7b

Here is a number machine.



(b) Work out the output when the input is  $-4$

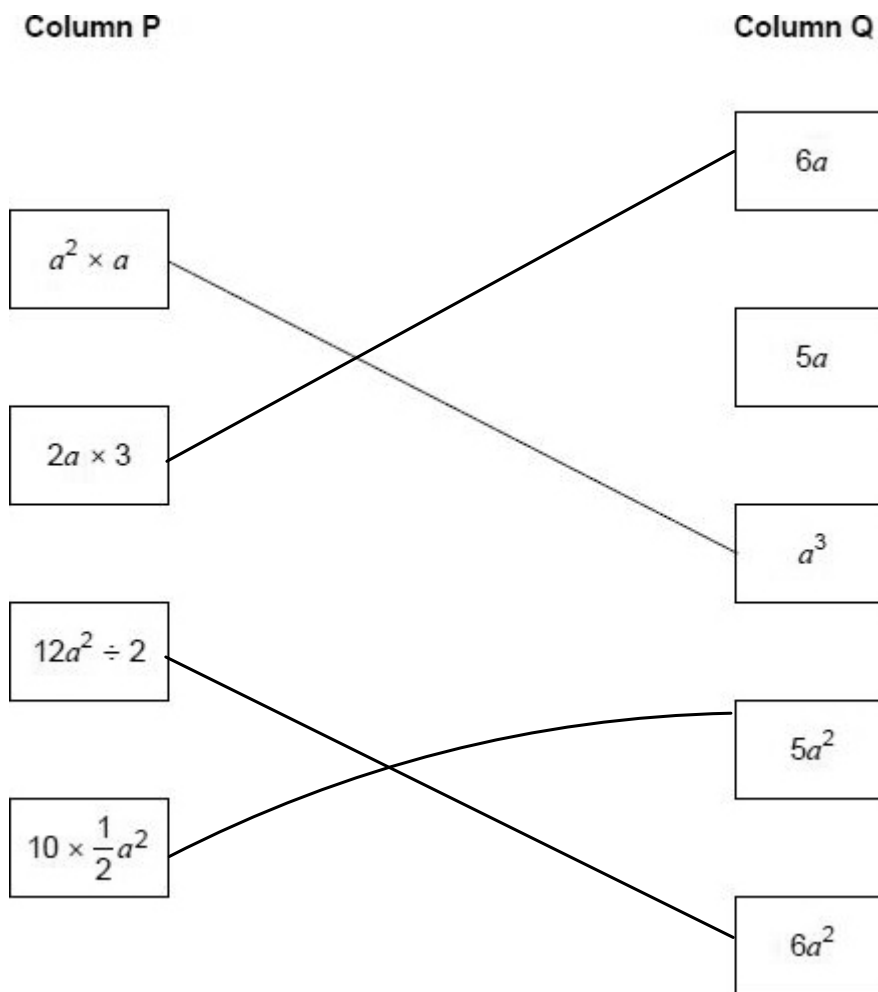
$$y = -14$$

(Total 1 mark)

## Q17

Match each expression in Column P with the equivalent expression in Column Q.

One has been done for you.



(Total 3 marks)

## Q7

Choose **one** of the following to make a correct statement each time.

is less than

is equal to

is greater than

When  $a = 3$        $4a$  is greater than  $a + 7$

When  $b = 8$        $2b - 6$  is equal to  $18 - b$

When  $c = 0.5$        $3c$  is equal to  $c + 1$

When  $d = -1$        $d$  is less than  $d^2$

(Total 4 marks)

## Q5b

(b) Simplify  $5(x + 3) - x + 2$   
 $5x + 15 - x + 2$   
 $\Rightarrow 4x + 17$

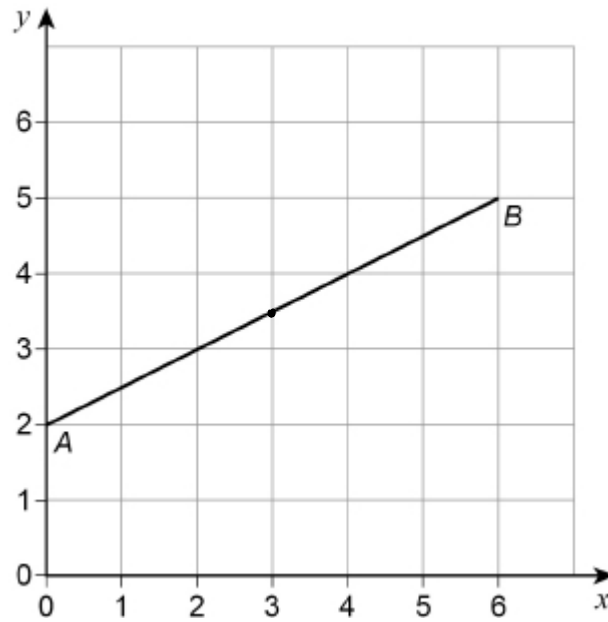
(Total 3 marks)

**Q7a**

Line  $AB$  is shown on the grid.

$A$  is the point  $(0, 2)$

$B$  is the point  $(6, 5)$



- (a) Work out the coordinates of the midpoint of the line  $AB$ .

Answer ( 3 , 3.5 )

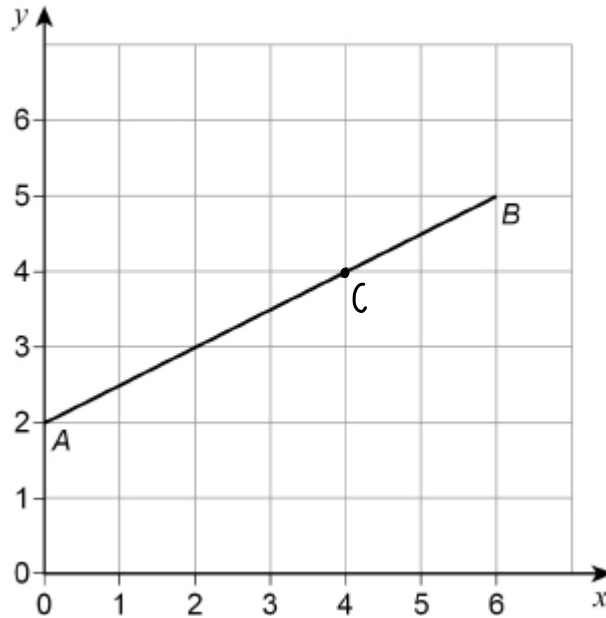
(Total 1 mark)

**Q7b**

Line  $AB$  is shown on the grid.

$A$  is the point  $(0, 2)$

$B$  is the point  $(6, 5)$



(b)  $C$  is another point on  $AB$ .

$C$  is closer to  $B$  than to  $A$ .

The coordinates of  $C$  are whole numbers.

Work out the coordinates of  $C$ .

Answer  $(\underline{4}, \underline{4})$

(Total 1 mark)

**Q14**

The  $n$ th term of a sequence is  $5n - 2$

$$\begin{aligned} 5(3) - 2 &= 15 - 2 \\ &= 13 \end{aligned}$$

Work out the 3rd term.

Circle your answer.

51

5

123

13

(Total 1 mark)

## Q13a

Here is a formula for the amount of water needed to cook rice.

$$w = 1.5r + 0.5$$

$w$  is the number of cups of water needed

$r$  is the number of cups of rice to be cooked

- (a) How many cups of water are needed to cook 7 cups of rice?

(Total 2 marks)

$$\begin{aligned} W &= 1.5(7) + 0.5 \\ &= 11 \text{ cups of water needed} \end{aligned}$$

## Q22a

Here is a rule for a sequence.

After the first two terms, each term is half the sum of the previous two terms

- (a) Here is a sequence that follows this rule.

2    10    6    ...8...    ...7...    ...7.5...

Show that the 6th term is the first one that is **not** a whole number.

(Total 3 marks)

6th term: 4th term + 5th term  $\Rightarrow 8 + 7 = 15 \div 2 = 7.5$   $\rightarrow$  not a whole number

## Q15a

A company uses this formula to work out the cost, £ $A$ , of a taxi ride.

$$A = 4 + 1.8m + b$$

£4 is a fixed charge

$m$  is the number of miles travelled

£ $b$  is a charge for booking online

- (a) Clare books a taxi online and travels 8 miles.  
She pays £20 altogether.

$$\begin{aligned} A &= 4 + 1.8m + b \\ \Rightarrow b &= A - 4 - 1.8m \\ b &= 20 - 4 - 1.8(8) \\ b &= 1.6 \end{aligned}$$

How much is the charge for booking online?  $\rightarrow$  £1.60

(Total 3 marks)

**Q15b**

A company uses this formula to work out the cost, £ $A$ , of a taxi ride.

$$A = 4 + 1.8m + b$$

£4 is a fixed charge

$m$  is the number of miles travelled

£ $b$  is a charge for booking online)

- (b) A different company  
 has a fixed charge of £3  
 charges £1.90 per mile  
 has no charge for booking online.

Write a formula for the cost, £ $C$ , of a taxi ride with this company.

(Total 1 mark)

$$\underline{\underline{C = 3 + 1.9m}}$$

**Q22a**

Here is a formula.

$$T = n^2 - \frac{12}{n}$$

- (a) Work out  $T$  when  $n = 5$

(Total 1 mark)

$$\begin{aligned} T &= 5^2 - \frac{12}{5} \\ T &= 25 - 2.4 \\ T &= 22.6 \end{aligned}$$

**Q28**

Solve  $5(x + 3) < 60$

(Total 2 marks)

$$\begin{aligned} 5x + 15 &< 60 \\ 5x &< 45 \\ x &< \frac{45}{5} \rightarrow x < 9 \end{aligned}$$



## Q26a

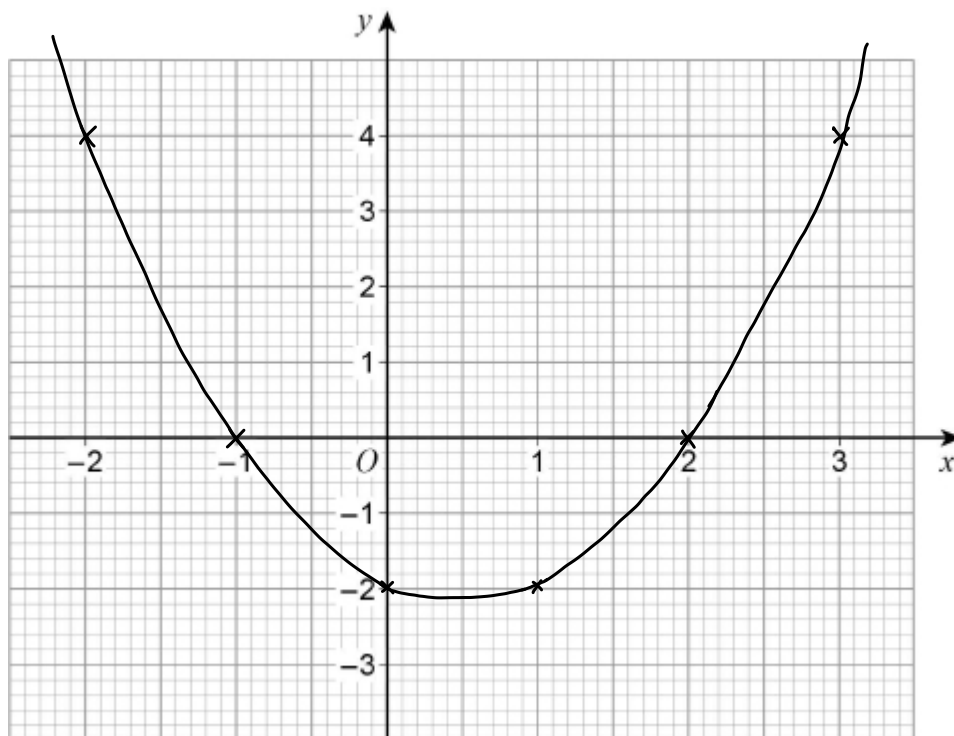
- (a) Complete the table of values for
- $y = x^2 - x - 2$

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

(Total 2 marks)

## Q26b

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



(Total 2 marks)