

1 Work out $\frac{1}{10} + \frac{3}{5}$

$$\frac{1}{10} + \frac{6}{10}$$

$$\frac{7}{10}$$

(Total for question 1 is 2 marks)

2 (a) Work out $\frac{2}{3} - \frac{1}{4}$

$$\begin{array}{r} 4 \times \frac{2}{3} - \frac{1}{4} \times 3 \\ 4 \times \frac{2}{3} - \frac{3}{4} \times 3 \end{array}$$

$$\frac{8}{12} - \frac{3}{12}$$

$$\frac{5}{12}$$

(2)

(b) Work out $\frac{3}{4} \times \frac{4}{9}$

Give your answer as a fraction in its simplest form.

$$\frac{12}{36} = \frac{1}{3}$$

$$\frac{1}{3}$$

(2)

(Total for question 2 is 4 marks)

3

Work out $\frac{3}{4} \times \frac{5}{6}$

$$\frac{15}{24} = \frac{5}{8}$$

$$\frac{5}{8}$$

(Total for question 3 is 2 marks)

4

(a) Work out $\frac{1}{5} + \frac{3}{4}$

$$4 \times \frac{1}{5} + \frac{3 \times 5}{4 \times 5}$$

$$\frac{4}{20} + \frac{15}{20}$$

$$\frac{19}{20}$$

(2)

(b) Work out $\frac{4}{5} - \frac{1}{3}$

$$3 \times \frac{4}{5} - \frac{1 \times 5}{3 \times 5}$$

$$\frac{12}{15} - \frac{5}{15}$$

$$\frac{7}{15}$$

(2)

(Total for question 4 is 4 marks)

5

Work out $\frac{3}{4} + \frac{1}{12}$

$$\begin{array}{l} \times 3 \\ \times 3 \end{array} \frac{3}{4} + \frac{1}{12}$$

$$\frac{9}{12} + \frac{1}{12} = \frac{10}{12} = \frac{5}{6}$$

$$\frac{5}{6}$$

(Total for question 5 is 2 marks)

6

(a) Work out $\frac{4}{9} + \frac{3}{5}$

$$\begin{array}{l} 5 \times \\ 5 \times \end{array} \frac{4}{9} + \frac{3}{5} \begin{array}{l} \times 9 \\ \times 9 \end{array}$$

$$\frac{20}{45} + \frac{27}{45} = \frac{47}{45} \quad \text{or} \quad 1 \frac{2}{45}$$

$$\frac{47}{45}$$

(2)

(b) Work out $\frac{3}{5} \div \frac{3}{8}$

Give your answer as a mixed number in its simplest form.

$$\frac{3}{5} \times \frac{8}{3} = \frac{24}{15} = \frac{8}{5} = 1 \frac{3}{5}$$

$$1 \frac{3}{5}$$

(2)

(Total for question 6 is 4 marks)

7

Work out $\frac{1}{7} \div \frac{3}{4}$

$$\frac{1}{7} \times \frac{4}{3} = \frac{4}{21}$$

$$\frac{4}{21}$$

(Total for question 7 is 2 marks)

8

(a) Work out $\frac{5}{6} - \frac{1}{7}$

$$\begin{array}{r} 7 \times \frac{5}{6} - \frac{1 \times 6}{7 \times 6} \end{array}$$

$$\frac{35}{42} - \frac{6}{42} = \frac{29}{42}$$

$$\frac{29}{42}$$

(2)

(b) Work out $1\frac{3}{4} \times 1\frac{1}{2}$

Give your answer as a mixed number in its simplest form.

$$\frac{7}{4} \times \frac{3}{2} = \frac{21}{8} = 2\frac{5}{8}$$

$$2\frac{5}{8}$$

(2)

(Total for question 8 is 4 marks)

9 Work out $\frac{1}{5} + \frac{2}{7}$

$$\frac{7 \times 1}{7 \times 5} + \frac{2 \times 5}{7 \times 5}$$

$$\frac{7}{35} + \frac{10}{35} = \frac{17}{35}$$

$$\frac{17}{35}$$

(Total for question 9 is 2 marks)

10 (a) Work out $\frac{3}{4} - \frac{7}{10}$

$$5 \times \frac{3}{4} - \frac{7}{10} \times 2$$

$$\frac{15}{20} - \frac{14}{20} = \frac{1}{20}$$

$$\frac{1}{20}$$

(2)

(b) Work out $2\frac{1}{3} \times \frac{3}{5}$

Give your answer as a mixed number in its simplest form.

$$\frac{7}{3} \times \frac{3}{5} = \frac{7}{5} = 1\frac{2}{5}$$

$$1\frac{2}{5}$$

(2)

(Total for question 10 is 4 marks)

11 Work out $\frac{5}{6} - \frac{2}{5}$

$$5 \times \frac{5}{6} - \frac{2 \times 6}{5 \times 6}$$

$$\frac{25}{30} - \frac{12}{30} = \frac{13}{30}$$

$$\frac{13}{30}$$

(Total for question 11 is 2 marks)

12 (a) Work out $\frac{7}{8} \div \frac{3}{4}$

Give your answer as a mixed number in its simplest form.

$$\frac{7}{\cancel{2} \cancel{8}} \times \frac{\cancel{4}^1}{3} = \frac{7}{6} = 1 \frac{1}{6}$$

$$1 \frac{1}{6}$$

(2)

(b) Work out $1\frac{5}{6} \times \frac{2}{9}$

$$\frac{11}{6} \times \frac{2}{9} = \frac{22}{54} = \frac{11}{27}$$

$$\frac{11}{27}$$

(2)

(Total for question 12 is 4 marks)

13 Work out $1\frac{3}{5} \div \frac{3}{4}$

$$\frac{8}{5} \div \frac{3}{4}$$

$$\frac{8}{5} \times \frac{4}{3} = \frac{32}{15} \quad \text{or} \quad 2\frac{2}{15}$$

$$\frac{32}{15}$$

(Total for question 13 is 2 marks)

14 (a) Work out $2\frac{1}{5} + 1\frac{1}{7}$

$$7 \times \frac{11}{5} + \frac{8}{7} \times 5$$

$$7 \times \frac{11}{5} + \frac{8}{7} \times 5$$

$$\frac{77}{35} + \frac{40}{35} = \frac{117}{35} \quad \text{or} \quad 3\frac{12}{35}$$

$$\frac{117}{35}$$

(2)

(b) Work out $1\frac{1}{6} \div \frac{2}{3}$

Give your answer as a mixed number in its simplest form.

$$\frac{7}{6} \div \frac{2}{3}$$

$$\frac{7}{6} \times \frac{3}{2} = \frac{7}{4} = 1\frac{3}{4}$$

$$1\frac{3}{4}$$

(2)

(Total for question 14 is 4 marks)

- 1 Write $\frac{12}{60}$ as a fraction in its simplest form.

$$\frac{12}{60} = \frac{2}{10} = \frac{1}{5}$$

$$\frac{1}{5}$$

(Total for Question 1 is 1 mark)

- 2 Write $\frac{18}{40}$ as a fraction in its simplest form.

$$\frac{18}{40} = \frac{9}{20}$$

$$\frac{9}{20}$$

(Total for Question 2 is 1 mark)

- 3 Write $\frac{28}{36}$ as a fraction in its simplest form.

$$\frac{28}{36} = \frac{14}{18} = \frac{7}{9}$$

$$\frac{7}{9}$$

(Total for Question 3 is 1 mark)

- 4 Write $\frac{6}{30}$ as a fraction in its simplest form.

$$\frac{6}{30} = \frac{3}{15} = \frac{1}{5}$$

$$\frac{1}{5}$$

(Total for Question 4 is 1 mark)

- 5 Write $\frac{72}{90}$ as a fraction in its simplest form.

$$\frac{72}{90} = \frac{8}{10} = \frac{4}{5}$$

$$\frac{4}{5}$$

(Total for Question 5 is 1 mark)

- 6 Write $\frac{28}{35}$ as a fraction in its simplest form.

$$\frac{28}{35} = \frac{4}{5}$$

$$\frac{4}{5}$$

(Total for Question 6 is 1 mark)

7 Here is a list of fractions.

$\frac{15}{20}$

$\frac{33}{44}$

$\frac{12}{16}$

$\frac{26}{32}$

$\frac{21}{28}$

One of these fractions is not equivalent to $\frac{3}{4}$

Write down this fraction.

$$\frac{26}{32}$$

(Total for Question 7 is 1 mark)

8 Here is a list of fractions.

$\frac{18}{45}$

$\frac{14}{30}$

$\frac{10}{25}$

$\frac{8}{20}$

$\frac{16}{40}$

One of these fractions is not equivalent to $\frac{2}{5}$

Write down this fraction.

$$\frac{14}{30}$$

(Total for Question 8 is 1 mark)

9 Here is a list of fractions.

$\frac{3}{9}$

$\frac{4}{12}$

$\frac{7}{21}$

$\frac{9}{27}$

$\frac{8}{26}$

One of these fractions is not equivalent to $\frac{1}{3}$

Write down this fraction.

$$\frac{8}{26}$$

(Total for Question 9 is 1 mark)

- 10 There are 26 sweets in a bag.

15 of the sweets are red.

The rest of the sweets are white.

What fraction of the sweets are red?

$$\frac{15}{26}$$

(Total for Question 10 is 1 mark)

- 11 There are 17 counters in a bag.

The table shows the number of counters of each colour.

Colour	Red	Blue	Yellow	Green
Number of Counters	7	2	5	3

What fraction of the counters are blue?

$$\frac{2}{17}$$

(Total for Question 11 is 1 mark)

- 12 There are 9 pens in a box.

5 pens are red.

The rest of the pens are green.

$$9 - 5 = 4$$

What fraction of the pens are green?

$$\frac{4}{9}$$

(Total for Question 12 is 2 marks)

- 13 Last year the cost of Tom's train ticket was £42
This year the cost of Tom's train ticket increased to £50

Write down the increase in the cost of Tom's ticket as a fraction of last year's cost.

$$50 - 42 = 8$$

$$\frac{8}{42} \quad \text{or} \quad \frac{4}{21}$$

$$\frac{8}{42}$$

(Total for Question 13 is 2 marks)

- 14 Write the following fractions in order of size.
Start with the smallest fraction.

$$\frac{1}{6} \quad \frac{4}{15} \quad \frac{1}{5} \quad \frac{1}{3} \quad \frac{7}{30}$$

$$\frac{5}{30} \quad \frac{8}{30} \quad \frac{6}{30} \quad \frac{10}{30} \quad \frac{7}{30}$$

$$\frac{1}{6} \quad \frac{1}{5} \quad \frac{7}{30} \quad \frac{4}{15} \quad \frac{1}{3}$$

(Total for Question 14 is 2 marks)

- 15 Write the following fractions in order of size.
Start with the smallest fraction.

$$\frac{19}{30} \quad \frac{5}{6} \quad \frac{2}{3} \quad \frac{11}{15} \quad \frac{3}{5}$$

$$\frac{25}{30} \quad \frac{20}{30} \quad \frac{22}{30} \quad \frac{18}{30}$$

$$\frac{3}{5} \quad \frac{19}{30} \quad \frac{2}{3} \quad \frac{11}{15} \quad \frac{5}{6}$$

(Total for Question 15 is 2 marks)

- 16 Write the following fractions in order of size.
Start with the smallest fraction.

$$\frac{11}{20} \quad \frac{5}{8} \quad \frac{3}{4} \quad \frac{3}{5} \quad \frac{7}{10}$$

$$\frac{22}{40} \quad \frac{25}{40} \quad \frac{30}{40} \quad \frac{24}{40} \quad \frac{28}{40}$$

$$\frac{11}{20} \quad \frac{3}{5} \quad \frac{5}{8} \quad \frac{7}{10} \quad \frac{3}{4}$$

(Total for Question 16 is 2 marks)

- 17 Write the following fractions in order of size.
Start with the smallest fraction.

$$\frac{1}{3} \quad \frac{2}{9} \quad \frac{1}{4} \quad \frac{3}{16} \quad \frac{3}{10}$$

$$0.\dot{3} \quad 0.2 \quad 0.25 \quad 0.1875 \quad 0.3$$

$$\frac{3}{16} \quad \frac{2}{9} \quad \frac{1}{4} \quad \frac{3}{10} \quad \frac{1}{3}$$

(Total for Question 17 is 2 marks)

- 18 Here are two fractions.

$$\frac{7 \times 7}{6 \times 7}$$

$$\frac{6 \times 6}{7 \times 6}$$

Work out which of the fractions is closer to 1
You must show your working.

$$\frac{49}{42}$$

$$\frac{36}{42}$$

$$1 = \frac{42}{42}$$

$$\frac{49}{42} - \frac{42}{42} = \frac{7}{42}$$

$$\frac{42}{42} - \frac{36}{42} = \frac{6}{42}$$

$\frac{6}{7}$ is closer to 1

(Total for Question 18 is 3 marks)

- 19 Here are two fractions.

$$\frac{3 \times 7}{10 \times 7}$$

$$\frac{5 \times 10}{7 \times 10}$$

Work out which of the fractions is closer to $\frac{1}{2}$
You must show your working.

$$\frac{21}{70}$$

$$\frac{50}{70}$$

$$\frac{1}{2} = \frac{35}{70}$$

$$\frac{35}{70} - \frac{21}{70} = \frac{14}{70}$$

$$\frac{50}{70} - \frac{35}{70} = \frac{15}{70}$$

$\frac{3}{10}$ is closer to $\frac{1}{2}$

(Total for Question 19 is 3 marks)

- 1 Write down a multiple of 7 that is between 20 and 30

21 [or 28]

(Total for question 1 is 1 mark)

- 2 Write down the first even multiple of 9

18

(Total for question 2 is 1 mark)

- 3 Write down a multiple of 9 that is between 30 and 50

36, 45

36 [or 45]

(Total for question 3 is 1 mark)

- 4 Write down a prime number between 25 and 35

29 [or 31]

(Total for question 4 is 1 mark)

- 5 Write down two factors of 18

1, 18

2, 9

3, 6

(Any 2)

3 and 9

(Total for question 5 is 2 marks)

6 Write down all the prime numbers between 20 and 30

23 and 29
(Total for question 6 is 2 marks)

7 Write down two multiples of 10

10, 20, 30, 40, 50...

10 , 20
(Total for question 7 is 2 marks)

8 Here is a list of numbers.

15 19 25 31 35 39 40

From the numbers on the list,

(a) write down an even number

40
(1)

(b) write down a multiple of 7

35
(1)

(Total for question 8 is 2 marks)

9 Write down two multiples of 8

8, 16, 24, 32, 40...

8 , 16
(Total for question 9 is 2 marks)

10 Write down all the factors of 14

1, 14
2, 7

1, 2, 7 and 14
(Total for question 10 is 2 marks)

11 Write down all the factors of 20

1, 20
2, 10
4, 5

1, 2, 4, 5, 10 and 20
(Total for question 11 is 2 marks)

12 Here is a list of numbers.

30 31 32 33 34 35 36 37 38 39

From the numbers on the list,

(a) write down a ~~an~~ square number

36
(1)

(b) write down a multiple of 8

32
(1)

(c) write down all of the prime numbers on the list.

31 and 37
(1)

(Total for question 12 is 3 marks)

13 Here is a list of numbers.

2 9 11 15 18 31 32

From the numbers on the list,

(a) write down a factor of 8

2

(1)

(b) write down a multiple of 6

18

(1)

(c) write down all of the prime numbers on the list.

2, 11 and 31

(1)

(Total for question 13 is 3 marks)

14 Write down all of the prime numbers between between 10 and 20

11, 13, 17 and 19

(Total for question 14 is 2 marks)

15 Write down two multiples of 20

20, 40, 60, 80, 100...

20, 40

(Total for question 15 is 2 marks)

16 Write down all the factors of 16

1, 16

2, 8

4

1, 2, 4, 8 and 16

(Total for question 16 is 2 marks)

17 Ian says: "21 is a prime number"

Is Ian correct?

You must give a reason for your answer.

1, 21
3, 7

No 21 has four factors - prime numbers have only two factors

(Total for question 17 is 1 mark)

18 Here is a list of numbers.

3 5 9 16 19 27 28

From the numbers on the list,

(a) write down a factor of 12

3

(1)

(b) write down a multiple of 7

28

(1)

(c) write down all of the prime numbers on the list.

3, 5 and 19

(1)

(Total for question 18 is 3 marks)

19 Gary is thinking of a number.

He says,

"My number is prime and it is a factor of 36"

There are two possible numbers Gary can be thinking of.

Write down these two numbers.

1, 36

2, 18

3, 12

4, 9

6

2

3

(Total for question 19 is 2 marks)

20 Write down two prime numbers that have a sum of 30

Prime numbers : 2, 3, 5, 7, 11, 13, 17, 19
23, 29

7 and 23
11 and 19

13 and 17

7 , 23

(Total for question 20 is 2 marks)

21 Write down two prime numbers that have a sum of 19

2 , 17

(Total for question 21 is 2 marks)

22 Here is a list of numbers.

8 12 15 17 23 27 32

From the numbers on the list,

(a) write down a factor of 16

8

(1)

(b) write down a multiple of 9

27

(1)

(c) write down all of the prime numbers on the list.

17 and 23

(1)

(Total for question 22 is 3 marks)

- 23 Barry is thinking of a number.
He says,

"My number is even. It is a factor of 30 and a multiple of 5"

There are two possible numbers Barry can be thinking of.

Write down these two numbers.

1, 30
2, 15
3, 10
5, 6

10 30

(Total for question 23 is 3 marks)

- 24 Paul is thinking of a number.
He says,

"My number is odd. It is a factor of 18 and a multiple of 3"

There are two possible numbers Paul can be thinking of.

Write down these two numbers.

1, 18
2, 9
3, 6

3 9

(Total for question 24 is 3 marks)

- 1 Write 6.47 correct to 1 decimal place.

6.5

(Total for question 1 is 1 mark)

- 2 Write 376 to the nearest hundred.

400

(Total for question 2 is 1 mark)

- 3 Write 5829 to the nearest thousand.

6000

(Total for question 3 is 1 mark)

- 4 Write 7518 to the nearest hundred.

7500

(Total for question 4 is 1 mark)

- 5 Write 1485 to the nearest thousand.

1000

(Total for question 5 is 1 mark)

- 6 Write 2.79 correct to 1 decimal place.

2.8

(Total for question 6 is 1 mark)

- 7 Write 2437 to the nearest hundred.

2400

(Total for question 7 is 1 mark)

8 Write 3.84761 correct to 3 decimal places.

3.848

(Total for question 8 is 1 mark)

9 Write 37.62 correct to one significant figure.

40

(Total for question 9 is 1 mark)

10 Write 58.165 correct to one significant figure.

60

(Total for question 10 is 1 mark)

11 Write 18.1693 correct to 2 decimal places.

18.17

(Total for question 11 is 1 mark)

12 Write 0.4726 correct to two significant figures.

0.47

(Total for question 12 is 1 mark)

13 Write 67480 correct to one significant figure.

70000

(Total for question 13 is 1 mark)

14 Write 9325.822 correct to two significant figures.

9300

(Total for question 14 is 1 mark)

- 15 Write 384761 to the nearest thousand

385000

(Total for question 15 is 1 mark)

- 16 Write 8732 correct to one significant figure.

9000

(Total for question 16 is 1 mark)

- 17 Write 72.173 correct to two significant figures.

72

(Total for question 17 is 1 mark)

- 18 Write 5.4096 correct to 3 decimal places.

5.410

(Total for question 18 is 1 mark)

- 19 Write 4726.7 correct to three significant figures.

4730

(Total for question 19 is 1 mark)

- 20 Write 193.28 correct to one significant figure.

200

(Total for question 20 is 1 mark)

- 21 Write 90437 correct to two significant figures.

90000

(Total for question 21 is 1 mark)

Name: _____

GCSE (1 – 9)

Error Intervals

Instructions

- Use **black** ink or ball-point pen.
- Answer all questions.
- Answer the questions in the spaces provided
– *there may be more space than you need.*
- Diagrams are **NOT** accurately drawn, unless otherwise indicated.
- You must **show all your working out.**

Information

- The marks for each question are shown in brackets
– *use this as a guide as to how much time to spend on each question.*

Advice

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end

1 The weight of a bag of potatoes is 15 kg, correct to the nearest kg.

(a) Write down the smallest possible weight of the bag of potatoes.

14.5 kg
(1)

(b) Write down the largest possible weight of the bag of potatoes.

15.5 kg
(1)

(Total for question 1 is 2 marks)

2 The length of a line is 81 centimetres, correct to the nearest centimetre.

(a) Write down the least possible length of the line.

80.5 cm
(1)

(b) Write down the greatest possible length of the line.

81.5 cm
(1)

(Total for question 2 is 2 marks)

3 The height of a building is measured as 11 metres, correct to the nearest metre.

(a) Write down the least possible height of the building.

10.5 m
(1)

(b) Write down the greatest possible height of the building.

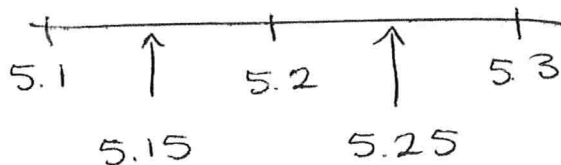
11.5 m
(1)

(Total for question 3 is 2 marks)

- 4 A number y is rounded to 1 decimal place.

The result is 5.2

Write down the error interval for y .



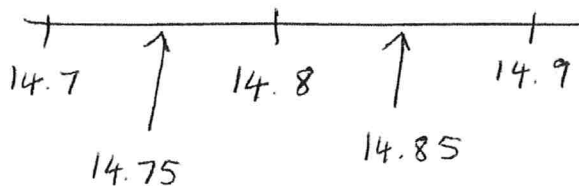
$$5.15 \leq y < 5.25$$

(Total for question 4 is 2 marks)

- 5 A number y is rounded to 1 decimal place.

The result is 14.8

Write down the error interval for y .



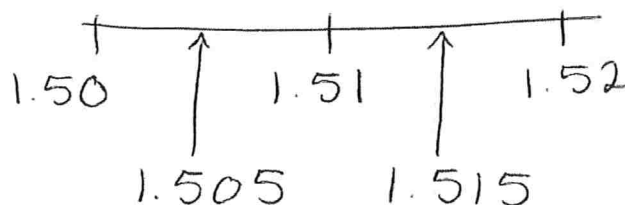
$$14.75 \leq y < 14.85$$

(Total for question 5 is 2 marks)

- 6 A number y is rounded to 2 decimal places.

The result is 1.51

Write down the error interval for y .



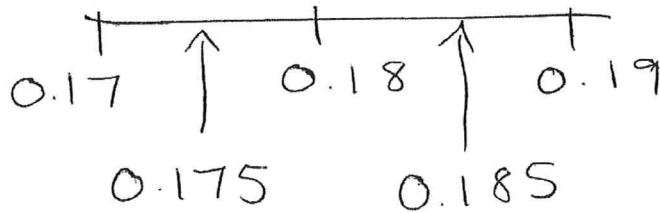
$$1.505 \leq y < 1.515$$

(Total for question 6 is 2 marks)

- 7 A number x is rounded to 2 decimal places.

The result is 0.18

Write down the error interval for x .



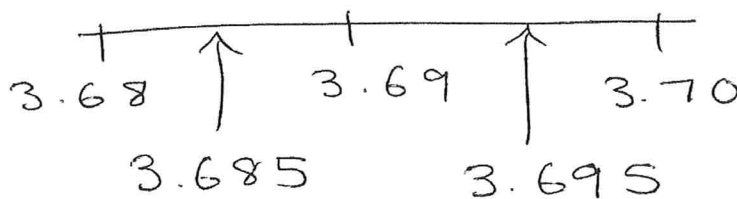
$$0.175 \leq x < 0.185$$

(Total for question 7 is 2 marks)

- 8 A number x is rounded to 3 significant figures.

The result is 3.69

Write down the error interval for x .



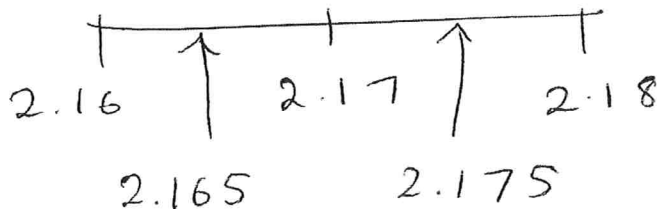
$$3.685 \leq x < 3.695$$

(Total for question 8 is 2 marks)

- 9 A number x is rounded to 3 significant figures.

The result is 2.17

Write down the error interval for x .



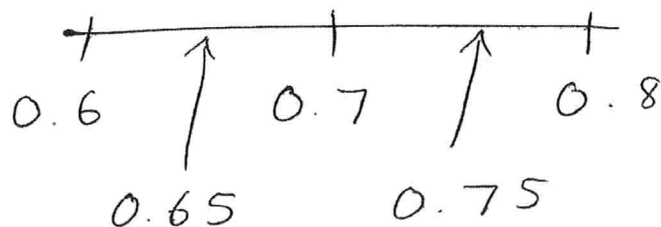
$$2.165 \leq x < 2.175$$

(Total for question 9 is 2 marks)

- 10 A number y is rounded to 1 decimal place.

The result is 0.7

Write down the error interval for y .



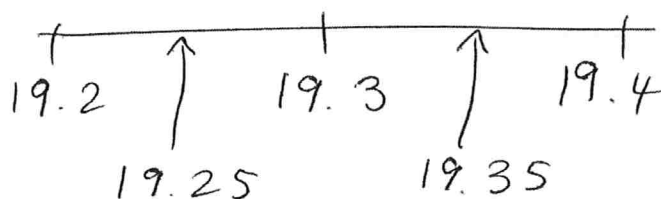
$$0.65 \leq y < 0.75$$

(Total for question 10 is 2 marks)

- 11 A number y is rounded to 1 decimal place.

The result is 19.3

Write down the error interval for y .



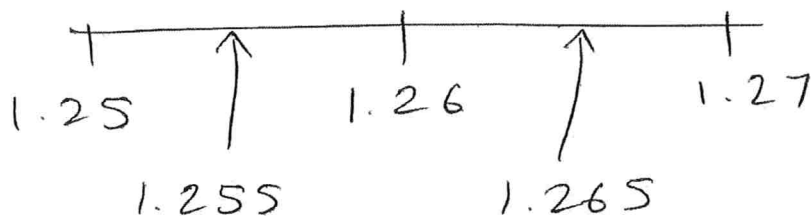
$$19.25 \leq y < 19.35$$

(Total for question 11 is 2 marks)

- 12 A number y is rounded to 2 decimal places.

The result is 1.26

Write down the error interval for y .



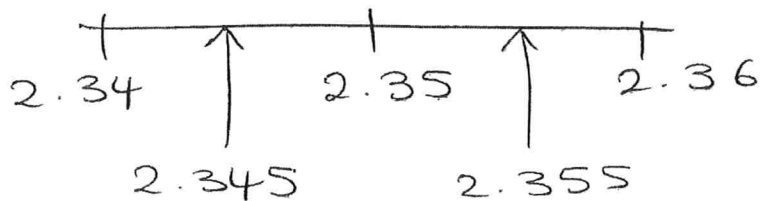
$$1.255 \leq y < 1.265$$

(Total for question 12 is 2 marks)

- 13 A number x is rounded to 2 decimal places.

The result is 2.35

Write down the error interval for x .



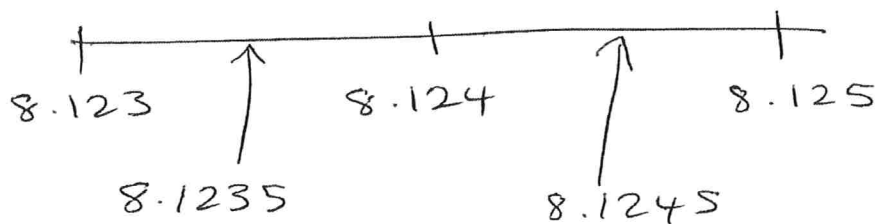
$$2.345 \leq x < 2.355$$

(Total for question 13 is 2 marks)

- 14 A number x is rounded to 3 decimal places.

The result is 8.124

Write down the error interval for x .



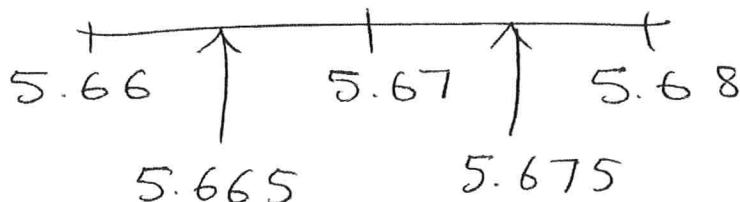
$$8.1235 \leq x < 8.1245$$

(Total for question 14 is 2 marks)

- 15 A number x is rounded to 3 significant figures.

The result is 5.67

Write down the error interval for x .



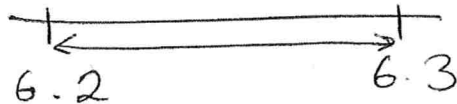
$$5.665 \leq x < 5.675$$

(Total for question 15 is 2 marks)

- 16 A number x is **truncated** to 1 decimal place.

The result is 6.2

Write down the error interval for x .



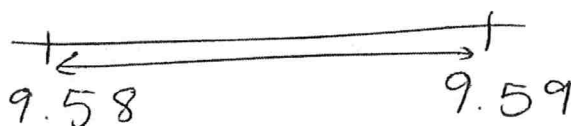
$$6.2 \leq x < 6.3$$

(Total for question 16 is 2 marks)

- 17 A number x is **truncated** to 2 decimal places.

The result is 9.58

Write down the error interval for x .



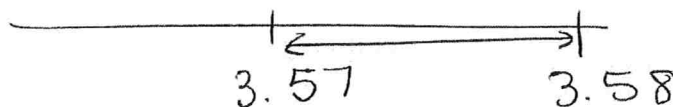
$$9.58 \leq x < 9.59$$

(Total for question 17 is 2 marks)

- 18 A number x is **truncated** to 2 decimal places.

The result is 3.57

Write down the error interval for x .



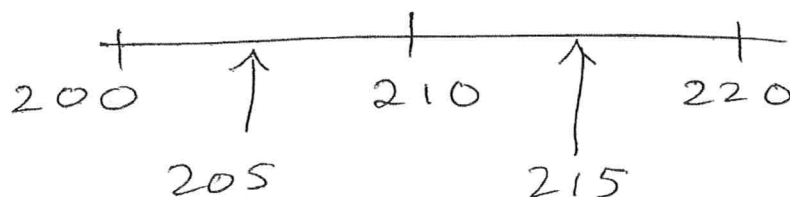
$$3.57 \leq x < 3.58$$

(Total for question 18 is 2 marks)

- 19 A number x is rounded to 2 significant figures.

The result is 210

Write down the error interval for x .



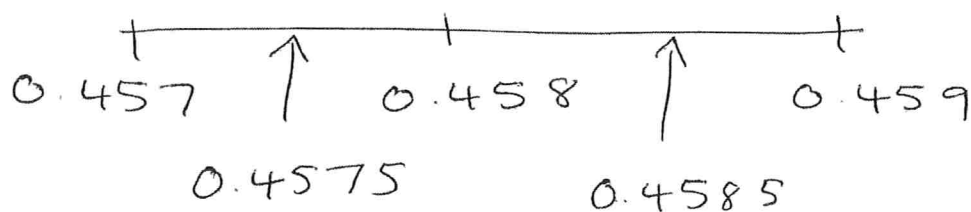
$$205 \leq x < 215$$

(Total for question 19 is 2 marks)

- 20 A number x is rounded to 3 significant figures.

The result is 0.458

Write down the error interval for x .



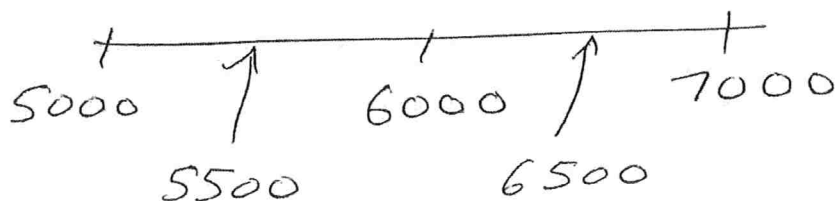
$$0.4575 \leq x < 0.4585$$

(Total for question 20 is 2 marks)

- 21 A number x is rounded to 1 significant figure.

The result is 6000

Write down the error interval for x .



$$5500 \leq x < 6500$$

(Total for question 21 is 2 marks)

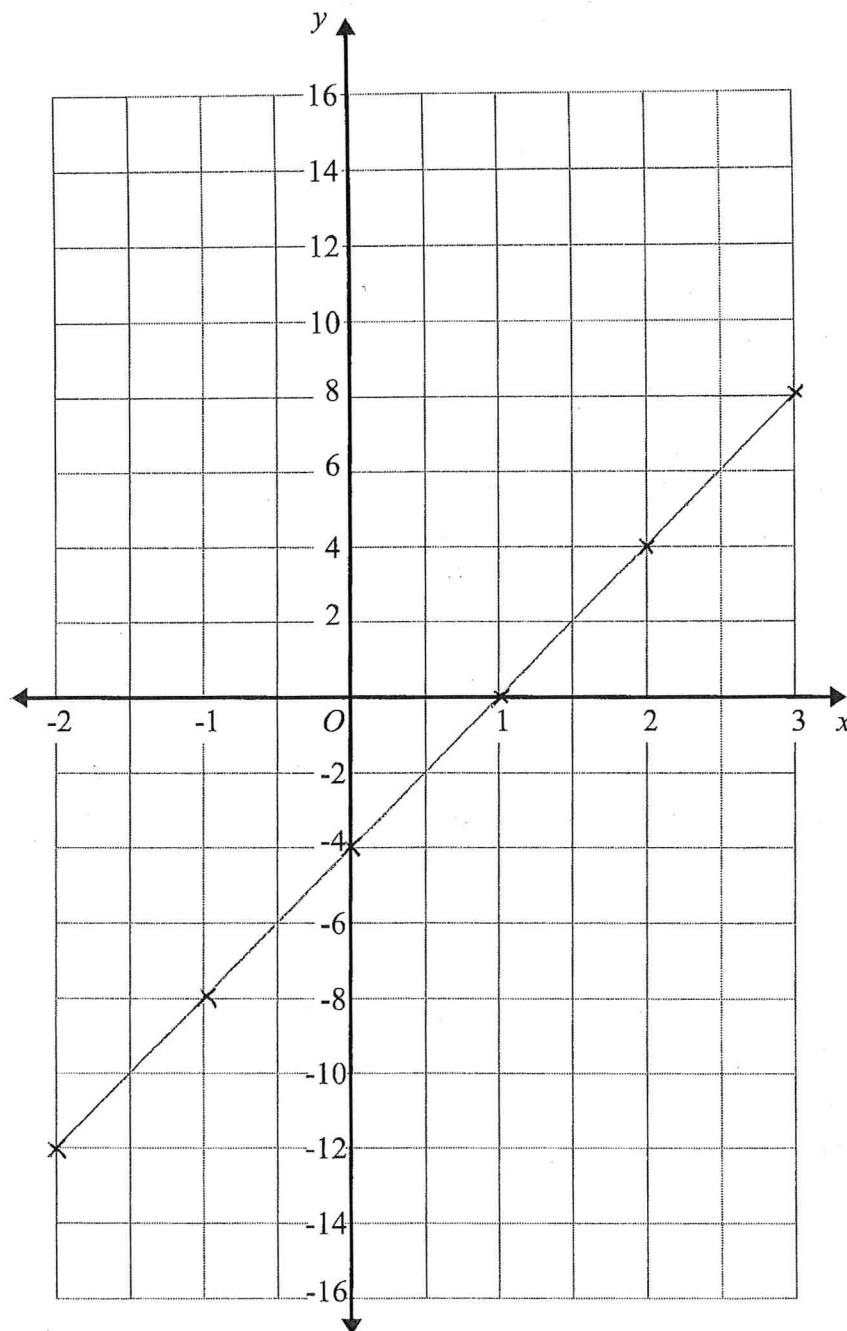
1

(a) Complete the table of values for $y = 4x - 4$

x	-2	-1	0	1	2	3
y	-12	-8	-4	0	4	8

(2)

(b) On the grid, draw the graph of $y = 4x - 4$ for values of x from -2 to 3

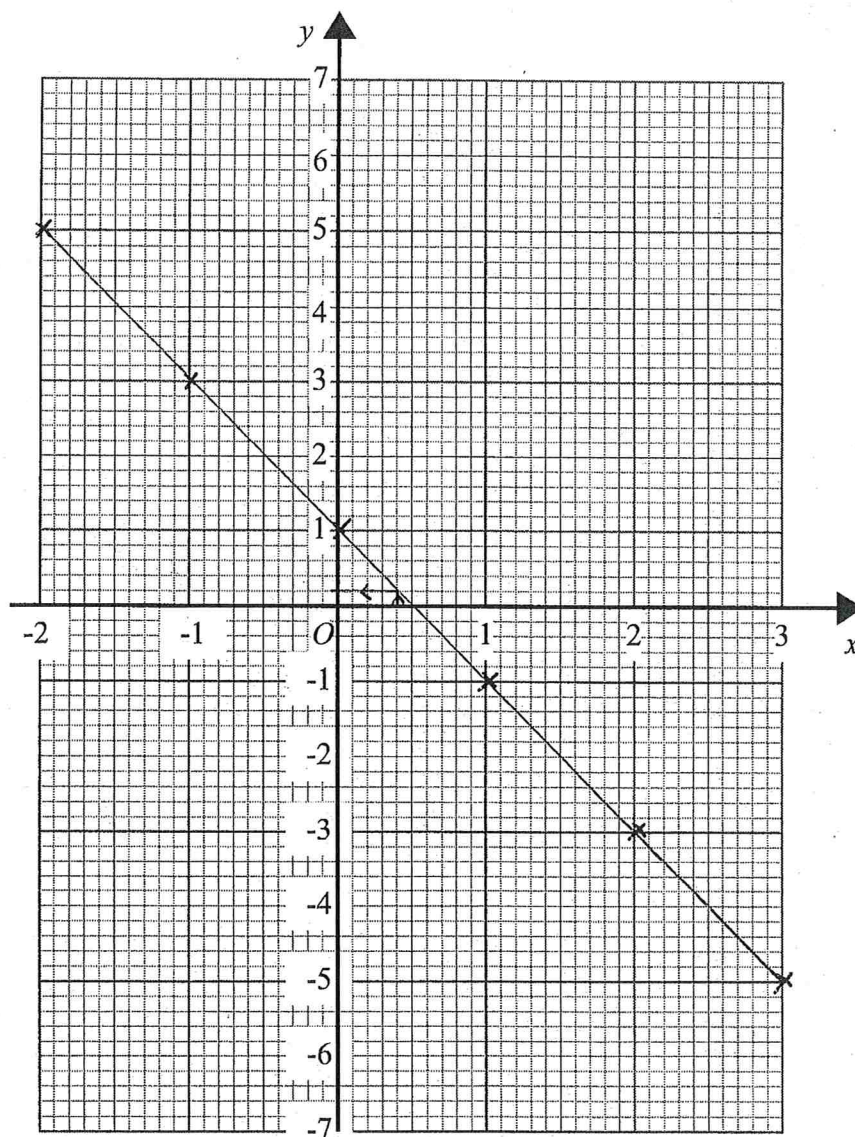


(2)

(Total for question 1 is 4 marks)

- 2 (a) Complete the table of values for $y = 1 - 2x$

x	-2	-1	0	1	2	3
y	5	3	1	-1	-3	-5



(2)

- (b) On the grid draw the graph of $y = 1 - 2x$ for values of x from -2 to 3

(2)

- (c) Use your graph to find the value of y when $x = 0.4$

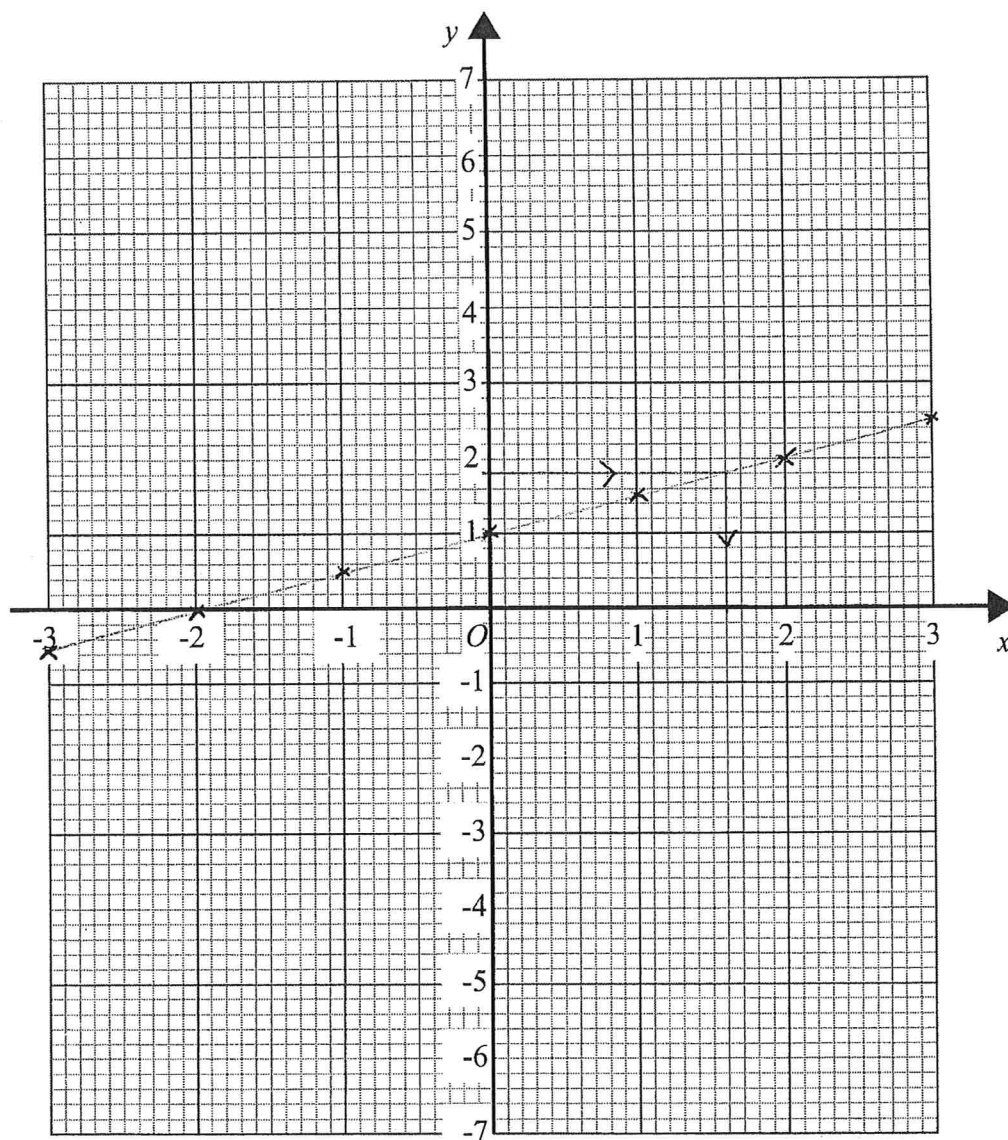
0.2

(1)

(Total for question 2 is 5 marks)

- 3 (a) On the grid, draw the graph of $y = \frac{1}{2}x + 1$ for x values from -3 to 3

x	-3	-2	-1	0	1	2	3
y	-0.5	0	0.5	1	1.5	2	2.5



(3)

- (b) Use your graph to find the value of x when $y = 1.8$

1.6

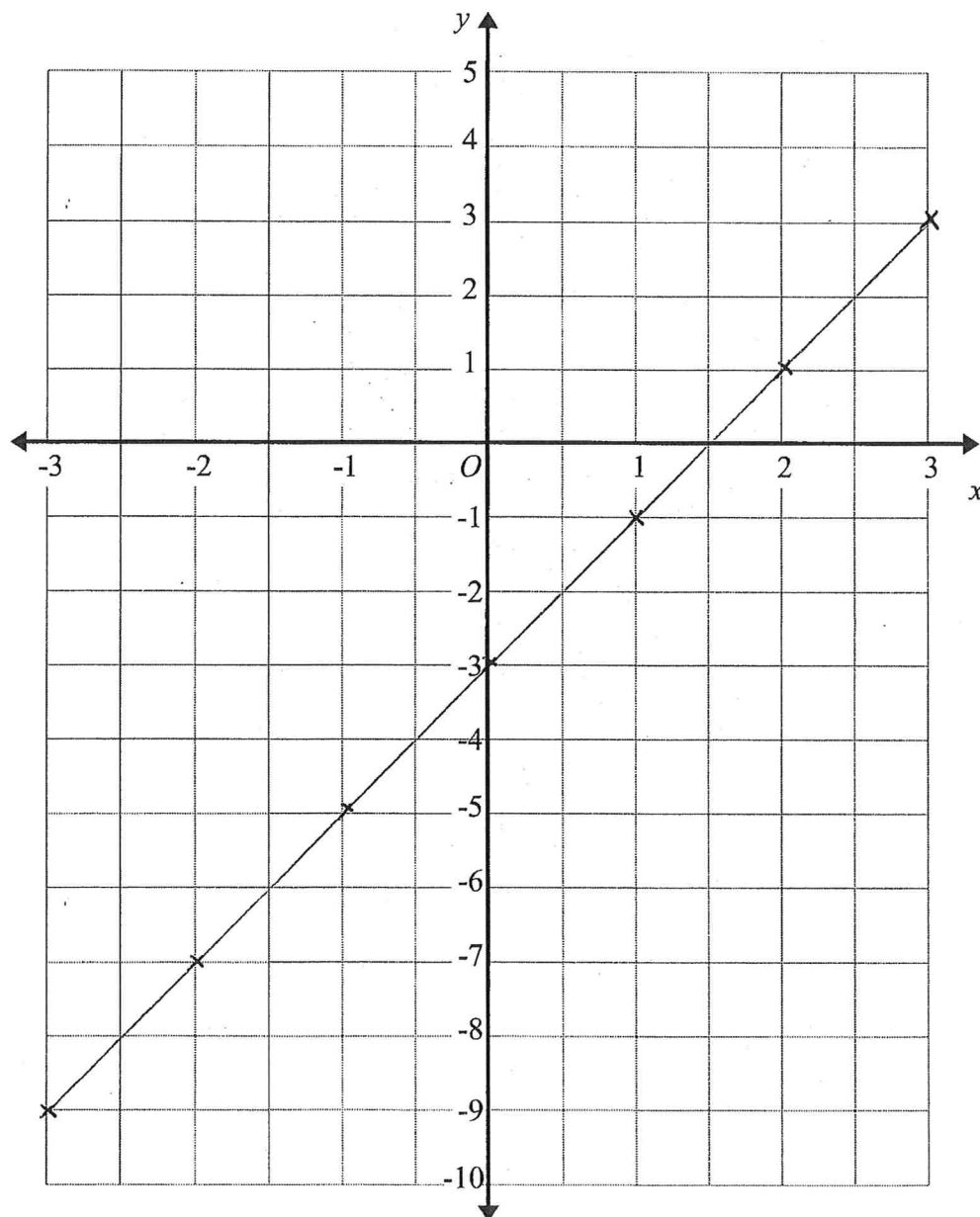
(1)

(Total for question 3 is 4 marks)

4

On the grid, draw the graph of $y = 2x - 3$ for values of x from -3 to 3

x	-3	-2	-1	0	1	2	3
y	-9	-7	-5	-3	-1	1	3

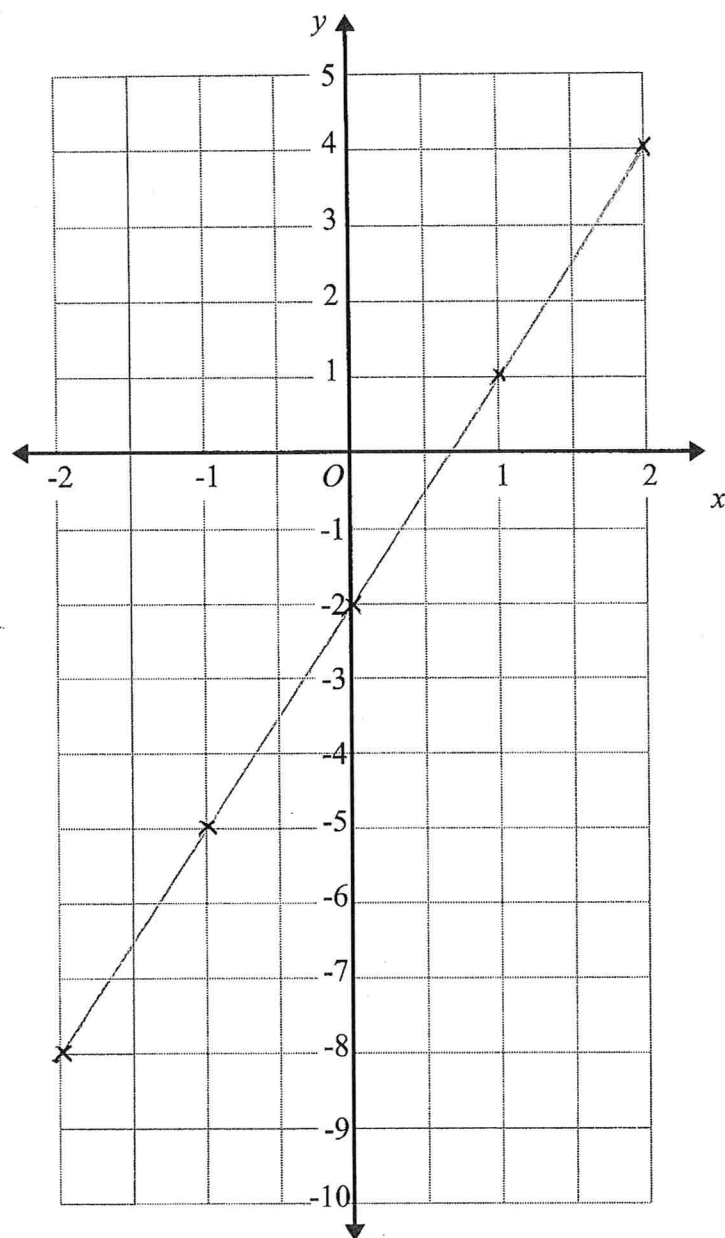


(Total for question 4 is 3 marks)

5

On the grid, draw the graph of $y = 3x - 2$ for values of x from -2 to 2

x	-2	-1	0	1	2
y	-8	-5	-2	1	4

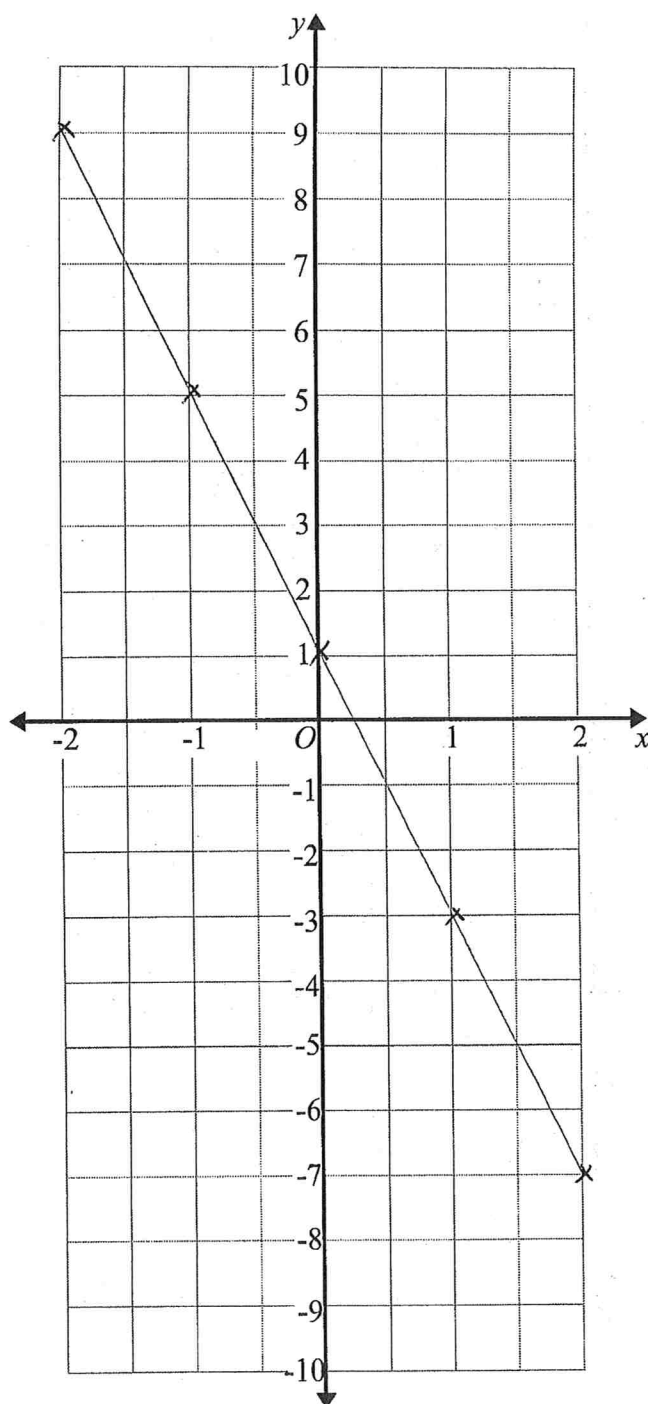


(Total for question 5 is 3 marks)

6

On the grid, draw the graph of $y = 1 - 4x$ for values of x from -2 to 2

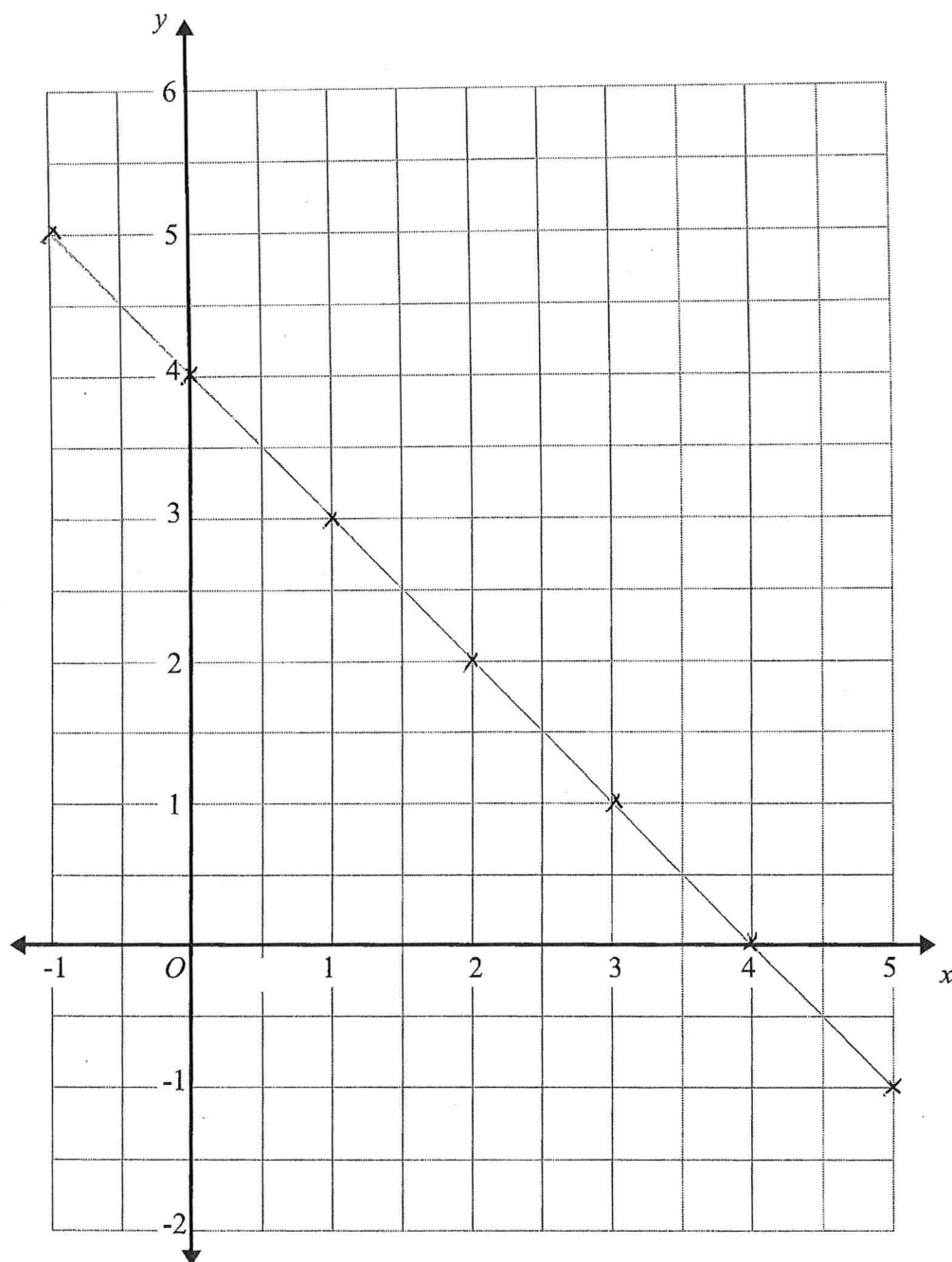
x	-2	-1	0	1	2
y	9	5	1	-3	-7



(Total for question 6 is 3 marks)

7 On the grid, draw the graph of $x + y = 4$ for x values from -1 to 5

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



(Total for question 7 is 3 marks)

Name: _____

GCSE (1 – 9)

Simplifying Algebra

Instructions

- Use **black** ink or ball-point pen.
- Answer all questions.
- Answer the questions in the spaces provided
– *there may be more space than you need.*
- Diagrams are **NOT** accurately drawn, unless otherwise indicated.
- You must **show all your working out.**

Information

- The marks for each question are shown in brackets
– *use this as a guide as to how much time to spend on each question.*

Advice

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end

1 Simplify $3x + 4x - 2x$

$$7x - 2x$$

$$5x$$

(Total for question 1 is 1 mark)

2 Simplify $3m + 3m$

$$6m$$

(Total for question 2 is 1 mark)

3 Simplify $n + n + n$

$$3n$$

(Total for question 3 is 1 mark)

4 (a) Simplify $a \times b \times c$

$$abc$$

(1)

(b) Simplify $5p - 2p$

$$3p$$

(1)

(c) Simplify $\frac{6h}{3}$

$$2h$$

(1)

(Total for question 4 is 3 marks)

5 Simplify $k + k + 8$

$$2k + 8$$

(Total for question 5 is 1 mark)

6 (a) Simplify $4 \times 3x$

$$12x$$

(1)

(b) Simplify $7a - 3a + 6a$

$$4a + 6a$$

$$10a$$

(1)

(Total for question 6 is 2 marks)

7 Simplify $(8g) + 6h - (3g) + h$

$$5g + 7h$$

(Total for question 7 is 2 marks)

8 (a) Simplify $3 \times b \times 9$

$$27b$$

(1)

(b) Simplify $(2x) - 3y - (6x) - 4y$

$$-4x - 7y$$

(2)

(Total for question 8 is 3 marks)

9 Simplify $(8c) + 3d - c + 2d$

$$7c + 5d$$

(Total for question 9 is 2 marks)

10 (a) Simplify $f + f + f + f + f$

$$5f$$

(1)

(b) Simplify $(5a) + 3b + (2a) + 2b$

$$7a + 5b$$

(2)

(Total for question 10 is 3 marks)

11 (a) Simplify $2a \times 3b$

$$6ab$$

(1)

(b) Simplify $2p \times 2p$

$$4p^2$$

(1)

(c) Simplify $\frac{7x + 5x}{4}$

$$\frac{12x}{4}$$

$$3x$$

(1)

(Total for question 11 is 3 marks)

12 Simplify $(11c - 8d + 5c) - d$

$$16c - 9d$$

(Total for question 12 is 2 marks)

13 (a) Simplify $3a \times 4b$

$$12ab$$

(1)

(b) Simplify $(3x + 2y + 6x) - y$

$$9x + y$$

(2)

(Total for question 13 is 3 marks)

14 (a) Simplify $a \times b \times 3$

$$3ab$$

(1)

(b) Simplify $y \times y \times y$

$$y^3$$

(1)

(c) Simplify $\frac{10d}{d}$

$$10$$

(1)

(Total for question 14 is 3 marks)

15 (a) Simplify $a \times 2 \times 5$

$$\frac{10a}{(1)}$$

(b) Simplify $b \times b$

$$\frac{b^2}{(1)}$$

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

$$\frac{8y}{2}$$

$$\frac{4y}{(1)}$$

(Total for question 15 is 3 marks)

16 (a) Simplify $2t \times 7s$

$$\frac{14st}{(1)}$$

(b) Simplify $(7a) + 4b(-3a) - 5b$

$$\frac{4a - b}{(2)}$$

(Total for question 16 is 3 marks)

17 (a) Simplify $6f - f$

$$\frac{5f}{(1)}$$

(b) Simplify $(7x^2) - 3x(3x^2) + 6x$

$$\frac{10x^2 + 3x}{(2)}$$

(Total for question 17 is 3 marks)

18 Simplify $2 \times n \times 6 \times m$

$$12mn$$

$$12mn$$

(Total for question 18 is 1 mark)

19 (a) Simplify $6j \times 5k$

$$30jk$$

(1)

(b) Simplify $(7a) - 6b + (5a) + 4b$

$$12a - 2b$$

(2)

(Total for question 19 is 3 marks)

20 (a) Simplify $4n - 3n + 5n$

$$n + 5n$$

$$6n$$

(1)

(b) Simplify $p^2 + p^2 + p^2$

$$3p^2$$

(1)

(c) Simplify $5(+2a) + 7b(-6a) + b$

$$5 - 4a + 8b$$

(2)

(Total for question 20 is 4 marks)

21 (a) Simplify $a^2 + a^2 + a^2$

$$3a^2$$

(1)

(b) Simplify $2rs - 5rs + 4rs$

$$-3rs + 4rs$$

$$rs$$

(1)

(c) Simplify $4a(+2) - 7a + a(-6)$

$$-2a - 4$$

(2)

(Total for question 21 is 4 marks)

22 (a) Simplify $n + n + n - n$

$$3n - n$$

$$2n$$

(1)

(b) Simplify $3xy + 2xy - xy$

$$5xy - xy$$

$$4xy$$

(1)

(c) Simplify $(4a) + 3b(-a) + 3b + 6$

$$3a + 6b + 6$$

(2)

(Total for question 22 is 4 marks)

1 (a) Expand $7(2x + 7)$

$$\underline{14x + 49}$$

(1)

(b) Factorise $3y + 12$

$$\underline{3(y + 4)}$$

(1)

(Total for Question 1 is 2 marks)

2 (a) Expand $5a(a - 6)$

$$\underline{5a^2 - 30a}$$

(2)

(b) Solve $4(b + 2) = 24$

$$4b + 8 = 24$$

$$4b = 16$$

$$b = 4$$

$$b = \underline{4}$$

(2)

(Total for Question 2 is 4 marks)

3 (a) Factorise fully $12m + 8m^2$

$$\underline{4m(3 + 2m)}$$

(2)

(b) Solve $3(n - 5) = 27$

$$3n - 15 = 27$$

$$3n = 42$$

$$n = 14$$

$$n = \underline{14}$$

(2)

(Total for Question 3 is 4 marks)

4 (a) Expand $8(3s - 2)$

$$\underline{24s - 16}$$

(1)

(b) Factorise $4t + 20$

$$\underline{4(t + 5)}$$

(1)

(Total for Question 4 is 2 marks)

5 (a) Factorise fully $5a^2b + 15ab^2$

$$\underline{5ab(a + 3b)}$$

(2)

(b) Solve $6(c - 8) = 42$

$$6c - 48 = 42$$

$$6c = 90$$

$$c = 15$$

$$c = \underline{15}$$

(2)

(Total for Question 5 is 4 marks)

6 (a) Factorise $18x + 24$

$$\underline{6(3x + 4)}$$

(1)

(b) Expand $3(2y - 4)$

$$\underline{6y - 12}$$

(1)

(Total for Question 6 is 2 marks)

7 (a) Expand $p(p-3)$

$$\underline{p^2 - 3p} \quad (1)$$

(b) Factorise $16q+8$

$$\underline{8(2q+1)} \quad (1)$$

(Total for Question 7 is 2 marks)

8 (a) Factorise fully $6x^2 - 4xy$

$$\underline{2x(3x-2y)} \quad (2)$$

(b) Solve $2(w-4)=13$

$$2w - 8 = 13$$

$$2w = 21$$

$$w = \frac{21}{2}$$

$$w = \underline{\frac{21}{2}} \text{ or } 10.5 \quad (2)$$

(Total for Question 8 is 4 marks)

9 (a) Factorise $x^2 - 9x$

$$\underline{x(x-9)} \quad (1)$$

(b) Expand $6(5y+1)$

$$\underline{30y + 6} \quad (1)$$

(Total for Question 9 is 2 marks)

10 (a) Expand $3(5x - 8)$

$$\underline{15x - 24}$$

(1)

(b) Factorise $18y + 15$

$$\underline{3(6y + 5)}$$

(1)

(Total for Question 10 is 2 marks)

11 (a) Expand $7(2h - 3)$

$$\underline{14h - 21}$$

(1)

(b) Expand and Simplify $4(g + 5) + 3(g - 2)$

$$4g + 20 + 3g - 6$$

$$\underline{7g + 14}$$

(2)

(Total for Question 11 is 3 marks)

12 (a) Factorise fully $7xy + 21x$

$$\underline{7x(y + 3)}$$

(2)

(b) Solve $6(p + 3) = 42$

$$6p + 18 = 42$$

$$6p = 24$$

$$p = 4$$

$$p = \underline{4}$$

(2)

(Total for Question 12 is 4 marks)

13 (a) Expand $a(a + b)$

$$\underline{a^2 + ab}$$

(1)

(b) Factorise $15y - 6$

$$\underline{3(5y - 2)}$$

(1)

(Total for Question 13 is 2 marks)

14 (a) Expand $9x(3y - 8)$

$$\underline{27xy - 72x}$$

(2)

(b) Expand and Simplify $7(t - 4) + 5(t - 2)$

$$\cancel{7t - 28} + 5t - 10$$

$$7t - 28 + 5t - 10$$

$$\underline{12t - 38}$$

(2)

(Total for Question 14 is 4 marks)

15 (a) Factorise fully $30x^3 + 12x$

$$\underline{6x(5x^2 + 2)}$$

(2)

(b) Solve $5(f - 2) = 22$

$$5f - 10 = 22$$

$$5f = 32$$

$$f = \frac{32}{5}$$

$$f = \underline{\frac{32}{5} \text{ or } 6.4}$$

(2)

(Total for Question 15 is 4 marks)

16 (a) Expand $x(8x + 1)$

$$\underline{8x^2 + x}$$

(1)

(b) Factorise $18 + 63y$

$$\underline{9(2 + 7y)}$$

(1)

(Total for Question 16 is 2 marks)

17 (a) Expand $2x^2(4x - 9)$

$$\underline{8x^3 - 18x^2}$$

(2)

(b) Expand and Simplify $6(y + 3) - 5(y - 4)$

$$6y + 18 - 5y + 20$$

$$\underline{y + 38}$$

(2)

(Total for Question 17 is 4 marks)

18 (a) Factorise fully $30a^2 + 40ab$

$$\underline{10a(3a + 4b)}$$

(2)

(b) Solve $3(g + 9) = 21$

$$3g + 27 = 21$$

$$3g = -6$$

$$g = -2$$

$$g = \underline{-2}$$

(2)

(Total for Question 18 is 4 marks)

19 (a) Expand $n(5n + 1)$

$$\underline{5n^2 + n}$$

(1)

(b) Factorise $18m + mn$

$$\underline{m(18 + n)}$$

(1)

(Total for Question 19 is 2 marks)

20 (a) Expand $3x(7x^2 - y)$

$$\underline{21x^3 - 3xy}$$

(2)

(b) Expand and Simplify $3(6y + 5) - 2(4y - 1)$

$$18y + 15 - 8y + 2$$

$$\underline{10y + 17}$$

(2)

(Total for Question 20 is 4 marks)

21 (a) Factorise fully $18a^2bc + 30abc^2$

$$\underline{6abc(3a + 5c)}$$

(2)

(b) Expand and Simplify $4(2y - 7) - 3(5y - 3)$

$$8y - 28 - 15y + 9$$

$$\underline{-7y - 19}$$

(2)

(Total for Question 21 is 4 marks)

1 (a) Simplify $x^8 \times x^3$

$$\frac{x^{11}}{(1)}$$

(b) Simplify $(5y)^3$

$$5y \times 5y \times 5y$$

$$\frac{125y^3}{(1)}$$

(c) Simplify $\frac{w^7}{w^4}$

$$\frac{w^3}{(1)}$$

(Total for question 1 is 3 marks)

2 (a) Simplify $a^9 \times a^4$

$$\frac{a^{13}}{(1)}$$

(b) Simplify $(4b^2c)^3$

$$4b^2c \times 4b^2c \times 4b^2c$$

$$\frac{64b^6c^3}{(2)}$$

(c) Simplify $d^9 \div d^4$

$$\frac{d^5}{(1)}$$

(Total for question 2 is 4 marks)

3 (a) Simplify $2m^2 \times 5n^6$

$$\frac{10m^2n^6}{(1)}$$

(b) Simplify $15p^3 \div 3p^4$

$$\frac{5p^{-1}}{(2)}$$

(Total for question 3 is 3 marks)

4 (a) Simplify $(t^3)^4$

$$t^{12}$$

(b) Simplify $12m^2n^6 \div 3mn^4$

(1)

$$4mn^2$$

(2)

(Total for question 4 is 3 marks)

5 Simplify $5m^2n^3 \times 3mn^4$

$$15m^3n^7$$

(Total for question 5 is 2 marks)

6 (a) Write down the value of 5^{-3}

$$\frac{1}{125}$$

(b) Write down the value of 5^0

(1)

$$1$$

(1)

(Total for question 6 is 2 marks)

7 Work out the value of $5^2 \times 2^3$

$$25 \times 8$$

$$200$$

(Total for question 7 is 1 mark)

8 Write down the value of 2^{-3}

$$\frac{1}{8}$$

(Total for question 8 is 1 mark)

9 $y^2 \times y^a = y^7$

(a) Find the value of a .

$$(y^4)^b = y^{12}$$

(b) Find the value of b .

5

(1)

3

(1)

(Total for question 9 is 2 marks)

10 (a) Given $\frac{x^6}{x^a} = x^8$

Find the value of a .

$$a = -2$$

(1)

(b) Simplify $(2m^2)^4$

$$16m^8$$

(2)

(Total for question 10 is 3 marks)

- 11 (a) Write $\frac{3^4 \times 3^5}{3^2}$ as a power of 3

$$\frac{3^9}{3^2} = 3^7$$

$$\frac{3^7}{\dots\dots\dots} \quad (2)$$

- (b) Write down the value of 3^{-3}

$$\frac{1}{27} \quad (1)$$

- (c) Write down the value of 3^0

$$\frac{1}{\dots\dots\dots} \quad (1)$$

(Total for question 11 is 4 marks)

- 12 Work out the value of $\frac{2^9 \times 2^{-2}}{2^4}$

$$\frac{2^7}{2^4} = 2^3 = 8$$

$$\frac{\cancel{2^3} 8}{\dots\dots\dots}$$

(Total for question 12 is 2 marks)

- 13 Work out the value of $(2^2)^3$

$$4^3 = 64$$

$$\frac{64}{\dots\dots\dots}$$

(Total for question 13 is 1 mark)

14 (a) Simplify $p^3 \times p^5$

$$\frac{p^8}{(1)}$$

(b) Simplify $(4ab^2)^3$

$$\frac{64a^3b^6}{(2)}$$

(c) Simplify $\frac{16m^7n^3}{4m^3n}$

$$\frac{4m^4n^2}{(2)}$$

(Total for question 14 is 5 marks)

15 $1000^4 = 10^x$

Find the value of x .

$$(10^3)^4 = 10^x$$
$$10^{12} = 10^x$$

$$\frac{12}{(2)}$$

(Total for question 15 is 1 mark)

16 Work out the value of $\frac{2^3 \times 2}{2^5}$

$$\frac{2^4}{2^5} = 2^{-1} = \frac{1}{2}$$

$$\frac{1}{2}$$

(Total for question 16 is 2 marks)

17 Write down the reciprocal of 8

$$\frac{1}{8}$$

(Total for question 17 is 1 mark)

18 (a) Simplify $9p^3 \times 2p^{-2}$

$$\frac{18p}{(1)}$$

(b) Simplify $(5x^3y^2)^3$

$$\frac{125x^9y^6}{(2)}$$

(c) $p^3 \times p^5 = p^{12} \times p^y$

Find the value of y

$$p^8 = p^{12} \times p^y$$

$$\frac{-4}{(2)}$$

(Total for question 18 is 5 marks)

19 $10^x = 1$

Write down the value of x .

$$\frac{0}{(1)}$$

(Total for question 19 is 1 mark)

20 Write $5^4 \times 5$ as a power of 5

$$\frac{5^5}{(1)}$$

(Total for question 20 is 1 mark)

21 Write down the reciprocal of 2

$$\frac{1}{2}$$

(Total for question 21 is 1 mark)

22 (a) Simplify $5c^2d^3 \times 2d$

$$\frac{10c^2d^4}{(1)}$$

(b) Write 64×4^5 as a power of 4

$$4^3 \times 4^5 = 4^8$$

$$\frac{4^8}{(2)}$$

(c) Simplify $p^3 \times (p^5)^2$

$$p^3 \times p^{10}$$

$$\frac{p^{13}}{(2)}$$

(Total for question 22 is 5 marks)

23 $p^9 \times p^5 = p^x$

Write down the value of x

$$\frac{14}{(1)}$$

(Total for question 23 is 1 mark)

24 Write down the reciprocal of $\frac{1}{3}$

$$\frac{3}{(1)}$$

(Total for question 24 is 1 mark)

25 Simplify $\frac{10p^3q^5r}{4p^3q^6}$

$$\frac{5 \cancel{10} p^{\cancel{3}} q^{\cancel{5}} r}{2 \cancel{4} p^{\cancel{3}} q^{\cancel{6}}} = \frac{5r}{2q}$$

$$\frac{5r}{2q}$$

$$\frac{5r}{2q}$$

(Total for question 25 is 2 marks)

or $2.5rq^{-1}$

1 Solve the simultaneous equations

$$\begin{array}{r} 4x + 3y = 18 \\ x - 3y = 7 \end{array}$$

$$5x = 25$$

$$x = 5$$

$$4(5) + 3y = 18$$

$$20 + 3y = 18$$

$$3y = -2$$

$$y = -\frac{2}{3}$$

$$\begin{array}{l} x = \dots\dots\dots 5 \\ y = \dots\dots\dots -\frac{2}{3} \end{array}$$

(Total for question 1 is 3 marks)

2 Solve the simultaneous equations

$$\begin{array}{r} x - 3y = -23 \\ 5x + 2y = 4 \end{array} \quad \times 5$$

$$\begin{array}{r} 5x - 15y = -115 \\ 5x + 2y = 4 \end{array}$$

$$\begin{array}{r} 5x - 15y = -115 \\ 5x + 2y = 4 \end{array}$$

$$-17y = -119$$

$$y = \frac{119}{17}$$

$$= 7$$

$$5x + 2(7) = 4$$

$$5x + 14 = 4$$

$$5x = -10$$

$$x = -2$$

$$\begin{array}{l} x = \dots\dots\dots -2 \\ y = \dots\dots\dots 7 \end{array}$$

(Total for question 2 is 3 marks)

3 Solve the simultaneous equations

$$2x + 5y = -10$$

$$2x - y = 8$$

$$6y = -18$$

$$y = -3$$

$$2x + 5(-3) = -10$$

$$2x - 15 = -10$$

$$2x = 5$$

$$x = \frac{5}{2}$$

$$x = \frac{5}{2}$$

$$y = -3$$

(Total for question 3 is 3 marks)

4 Solve the simultaneous equations

$$4x + 2y = 10 \quad \times 5$$

$$5x + 3y = 12 \quad \times 4$$

$$20x + 10y = 50$$

$$20x + 12y = 48$$

$$-2y = 2$$

$$y = -1$$

$$4x + 2(-1) = 10$$

$$4x - 2 = 10$$

$$4x = 12$$

$$x = 3$$

$$x = 3$$

$$y = -1$$

(Total for question 4 is 3 marks)

5 Solve the simultaneous equations

$$\begin{aligned} 2x + 5y &= 4 \\ 7x - 5y &= -1 \end{aligned}$$

$$9x = 3$$

$$x = \frac{3}{9} = \frac{1}{3}$$

$$2\left(\frac{1}{3}\right) + 5y = 4$$

$$\frac{2}{3} + 5y = 4$$

$$\frac{2}{3} + 5y = \frac{12}{3}$$

$$5y = \frac{10}{3}$$

$$y = \frac{2}{3}$$

$$x = \frac{1}{3}$$

$$y = \frac{2}{3}$$

(Total for question 5 is 3 marks)

6 Solve the simultaneous equations

$$\begin{aligned} 3x - 2y &= 7 \\ 7x + 2y &= 13 \end{aligned}$$

$$10x = 20$$

$$x = 2$$

$$7(2) + 2y = 13$$

$$14 + 2y = 13$$

$$2y = -1$$

$$y = -\frac{1}{2}$$

$$x = 2 \quad y = -\frac{1}{2}$$

(Total for question 6 is 3 marks)

7 Solve the simultaneous equations

$$2x - 3y = 4 \quad \times 2$$

$$4x - y = 13$$

$$\begin{array}{r} 4x - 6y = 8 \\ 4x - y = 13 \\ \hline \end{array}$$

$$-5y = -5$$

$$y = 1$$

$$4x - 1 = 13$$

$$4x = 14$$

$$x = \frac{14}{4} = \frac{7}{2}$$

$$x = \frac{7}{2}$$

$$y = 1$$

(Total for question 8 is 3 marks)

8 Solve the simultaneous equations

$$3x + y = 15 \quad \times 2$$

$$5x + 2y = 24$$

$$\begin{array}{r} 6x + 2y = 30 \\ 5x + 2y = 24 \\ \hline \end{array}$$

$$x = 6$$

$$3(6) + y = 15$$

$$18 + y = 15$$

$$y = -3$$

$$x = 6 \quad y = -3$$

(Total for question 8 is 3 marks)

9 Solve the simultaneous equations

$$\begin{array}{rcl} 3x - y & = & -4 \quad \times 2 \\ 2x - 3y & = & 9 \quad \times 3 \end{array}$$

$$\begin{array}{rcl} 6x - 2y & = & -8 \\ 6x - 9y & = & 27 \end{array}$$

$$7y = -35$$

$$y = -5$$

$$3x - (-5) = -4$$

$$3x + 5 = -4$$

$$3x = -9$$

$$x = -3$$

$$x = \dots -3 \dots$$

$$y = \dots -5 \dots$$

(Total for question 9 is 3 marks)

10 Solve the simultaneous equations

$$\begin{array}{rcl} 6x + 5y & = & 4.5 \\ 3x - 2y & = & 9 \quad \times 2 \end{array}$$

$$\begin{array}{rcl} 6x - 4y & = & 18 \\ 6x + 5y & = & 4.5 \end{array}$$

$$-9y = 13.5$$

$$y = -\frac{13.5}{9} = \frac{-27}{18} = -\frac{3}{2}$$

$$3x - 2\left(-\frac{3}{2}\right) = 9$$

$$3x + 3 = 9$$

$$3x = 6$$

$$x = 2$$

$$x = \dots 2 \dots$$

$$y = \dots -\frac{3}{2} \dots$$

(Total for question 10 is 3 marks)

11 Solve the simultaneous equations

$$\begin{aligned} 3x &= 9 + y \\ x + 5y &= 5 \end{aligned}$$

$$3x - y = 9$$

$$x + 5y = 5 \quad \times 3$$

$$3x - y = 9$$

$$3x + 15y = 15$$

$$-16y = -6$$

$$y = \frac{6}{16} = \frac{3}{8}$$

$$x + 5\left(\frac{3}{8}\right) = 5$$

$$x = \frac{25}{8}$$

$$x + \frac{15}{8} = 5$$

$$y = \frac{3}{8}$$

$$x = \frac{40}{8} - \frac{15}{8} = \frac{25}{8}$$

(Total for question 11 is 3 marks)

12 Solve the simultaneous equations

$$\begin{aligned} 3y + 11 &= 4x \\ 10x + 2y + 1 &= 0 \end{aligned}$$

$$3y + 11 = 4x$$

$$4x - 3y = 11 \quad (1) \quad \times 5$$

$$10x + 2y = -1 \quad (2) \quad \times 2$$

$$20x - 15y = 55$$

$$20x + 4y = -2$$

$$-19y = 57$$

$$y = -3$$

$$4x - 3(-3) = 11$$

$$4x + 9 = 11$$

$$4x = 2$$

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

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

$$y = -3$$

(Total for question 12 is 3 marks)

13

In a shop 2 coffees and 3 cakes cost £9.95
 In the same shop 1 coffee and 4 cakes cost £10.35.

Work out the price for one coffee and the price for one cake.

$$2x + 3y = 9.95$$

$$x + 4y = 10.35 \quad \times 2$$

$$2x + 8y = 20.70$$

$$\begin{array}{r} 2x + 8y = 20.70 \\ - \quad \quad \quad - \\ 2x + 3y = 9.95 \end{array}$$

$$5y = 10.75$$

$$y = 2.15$$

$$x + 4(2.15) = 10.35$$

$$x + 8.60 = 10.35$$

$$x = 1.75$$

Coffee £.....1.75

Cake £.....2.15

(Total for question 13 is 3 marks)

14

Sweets are sold in small packs and in big packs.

There is a total of 175 sweets in 4 small packs and 3 big packs.

There is a total of 154 sweets in 5 small packs and 2 big packs.

Work out the number of sweets in each small pack and in each big pack.

$$4s + 3b = 175 \quad \times 2$$

$$5s + 2b = 154 \quad \times 3$$

$$8s + 6b = 350$$

$$\begin{array}{r} 8s + 6b = 350 \\ - \quad \quad \quad - \\ 5s + 6b = 462 \end{array}$$

$$-7s = -112$$

$$s = 16$$

$$5(16) + 2b = 154$$

$$80 + 2b = 154$$

$$2b = 74$$

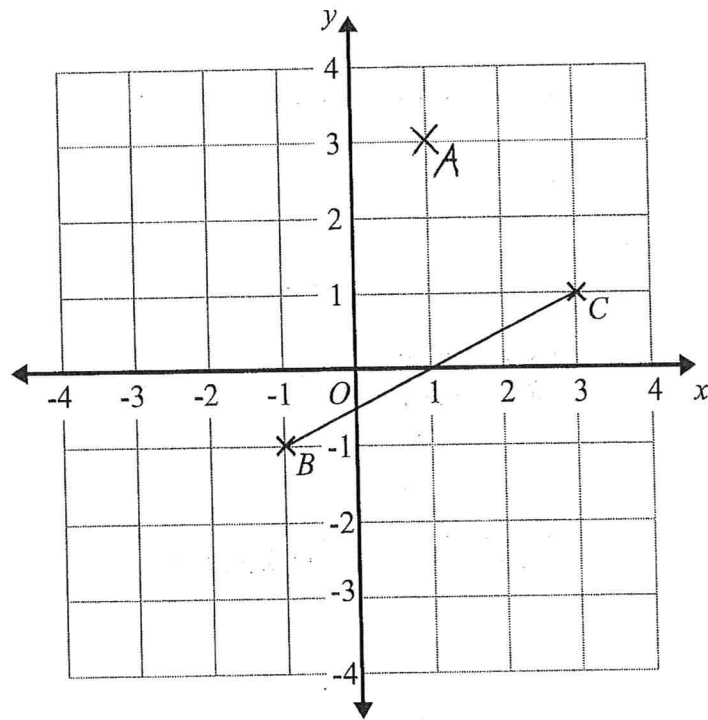
$$b = 37$$

Small Pack16

Big Pack37

(Total for question 14 is 3 marks)

1



- (a) Plot the point with coordinates (1, 3).
Label this point A.

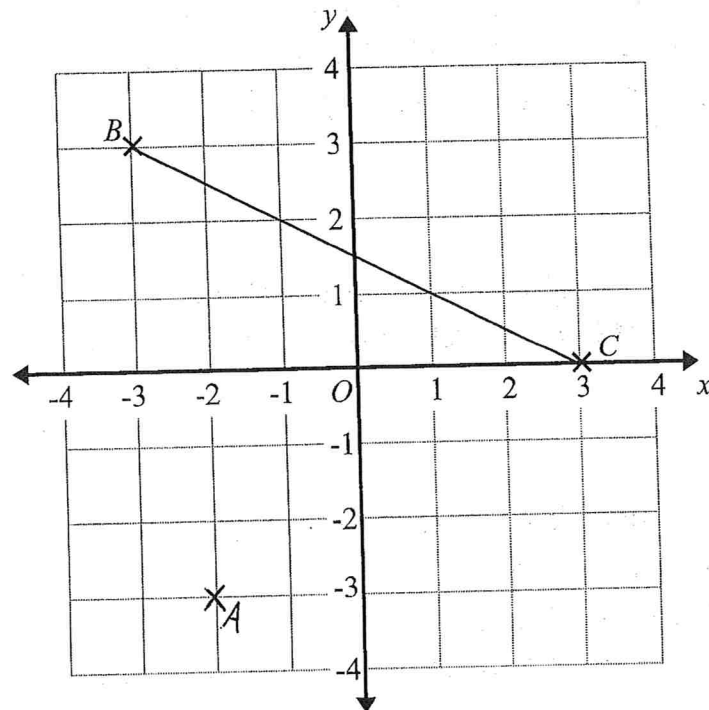
(1)

- (b) Write down the coordinates of the midpoint of BC.

(...../.....,
(1)

(Total for question 1 is 2 marks)

2



- (a) Plot the point with coordinates (-2, -3).
Label this point A.

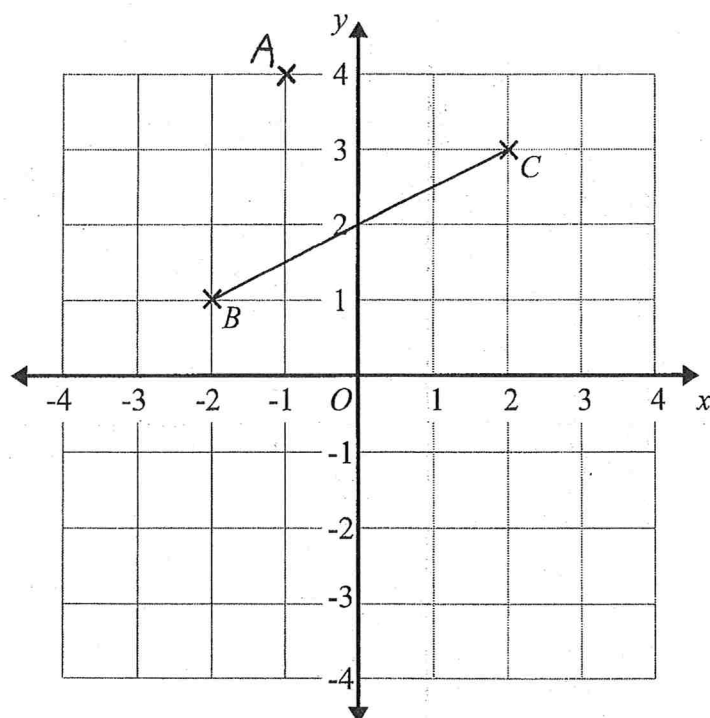
(1)

- (b) Write down the coordinates of the midpoint of BC.

(...0..., 1.5...)
(1)

(Total for question 2 is 2 marks)

3



- (a) Plot the point with coordinates $(-1, 4)$.
Label this point A .

(1)

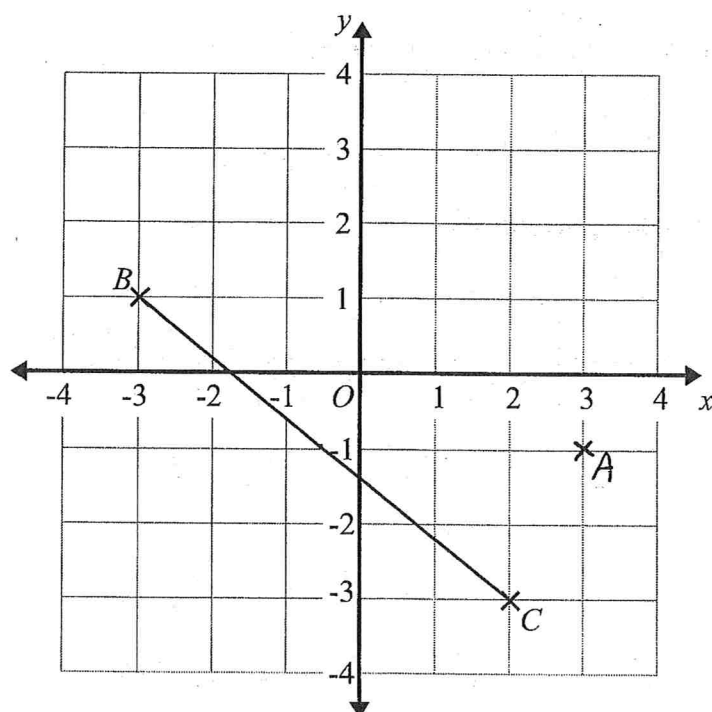
- (b) Write down the coordinates of the midpoint of BC .

(.....,)

(1)

(Total for question 3 is 2 marks)

4



- (a) Plot the point with coordinates $(3, -1)$.
Label this point A .

(1)

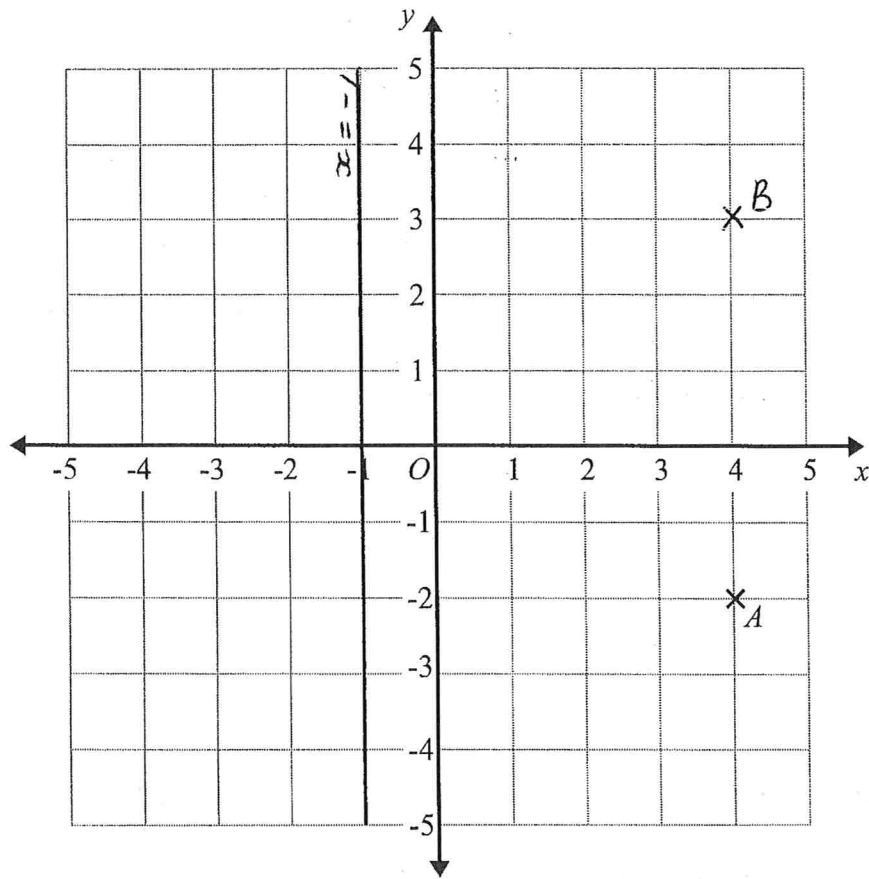
- (b) Write down the coordinates of the midpoint of BC .

(.....,)

(1)

(Total for question 4 is 2 marks)

5



(a) Write down the coordinates of point A .

(4, -2)
(1)

(b) On the grid mark with a cross (\times) the point $(4, 3)$.
Label this point B .

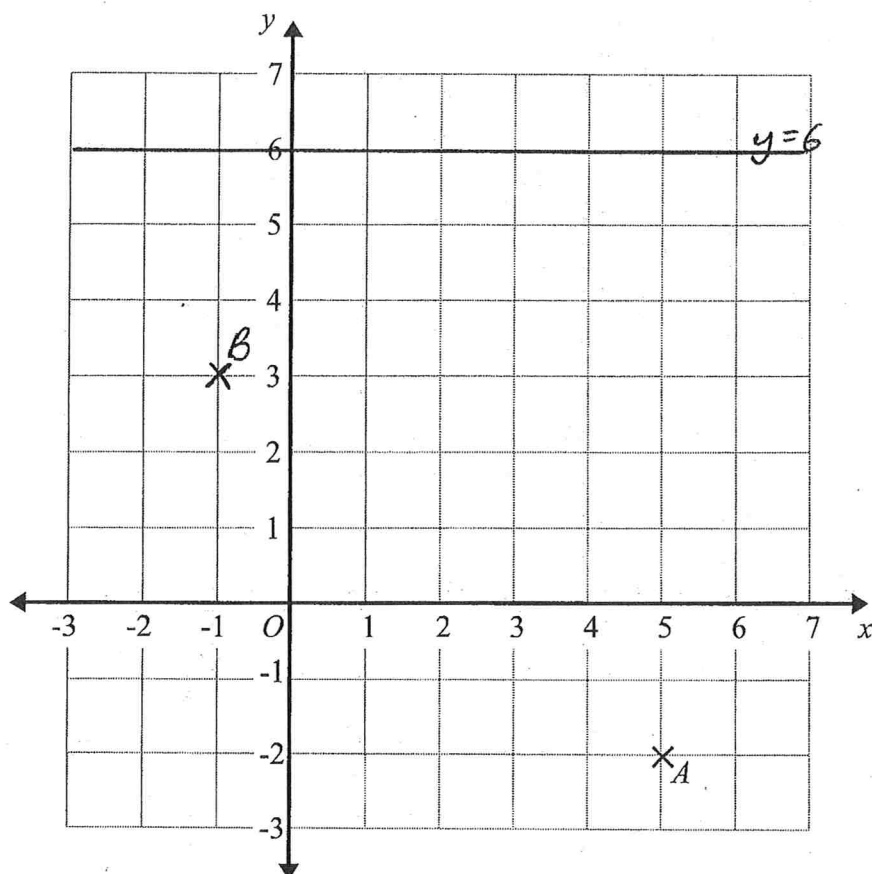
(1)

(c) On the grid, draw the line with equation $x = -1$

(1)

(Total for question 5 is 3 marks)

6



- (a) Write down the coordinates of point A .

(5, -2)
(1)

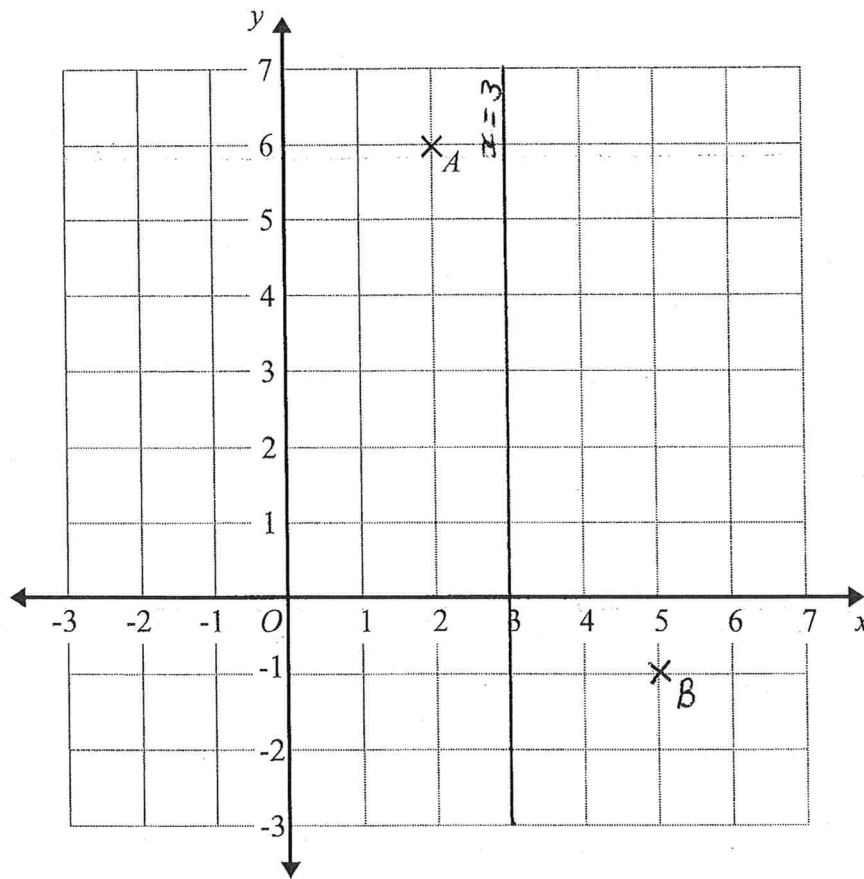
- (b) On the grid mark with a cross (\times) the point $(-1, 3)$.
Label this point B .

(1)

- (c) On the grid, draw the line with equation $y = 6$

(1)

(Total for question 6 is 3 marks)



- (a) Write down the coordinates of point A.

(2, 6)
(1)

- (b) On the grid mark with a cross (X) the point $(5, -1)$.
Label this point B.

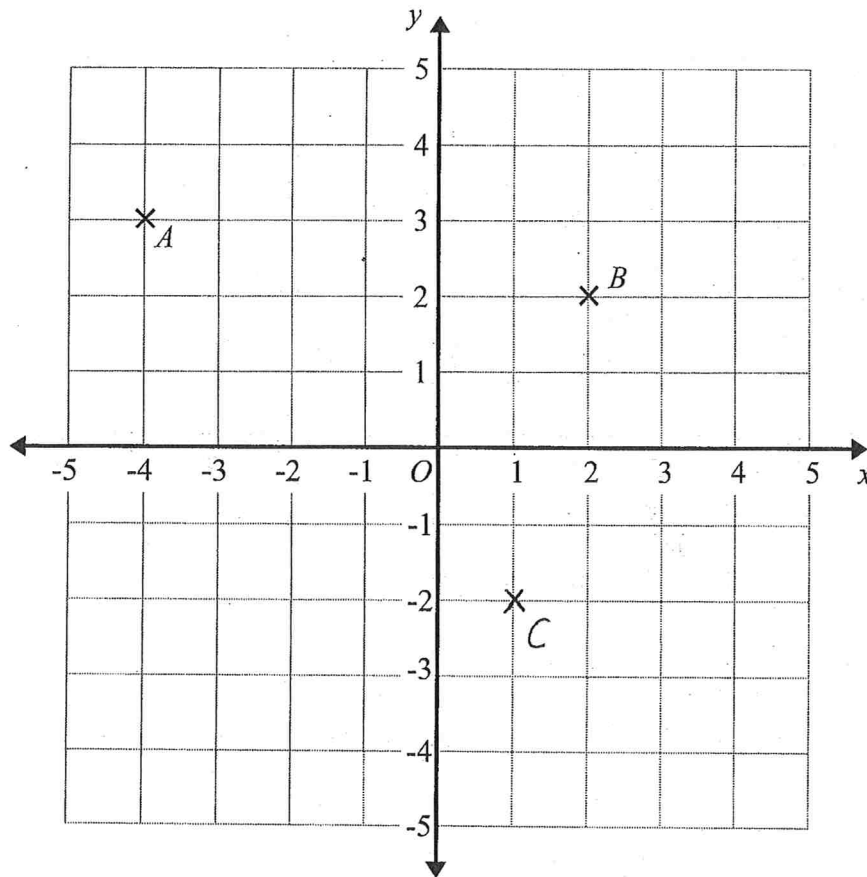
(1)

- (c) On the grid, draw the line with equation $x=3$

(1)

(Total for question 7 is 3 marks)

8



- (a) Write down the coordinates of point A .

(-4, 3)
(1)

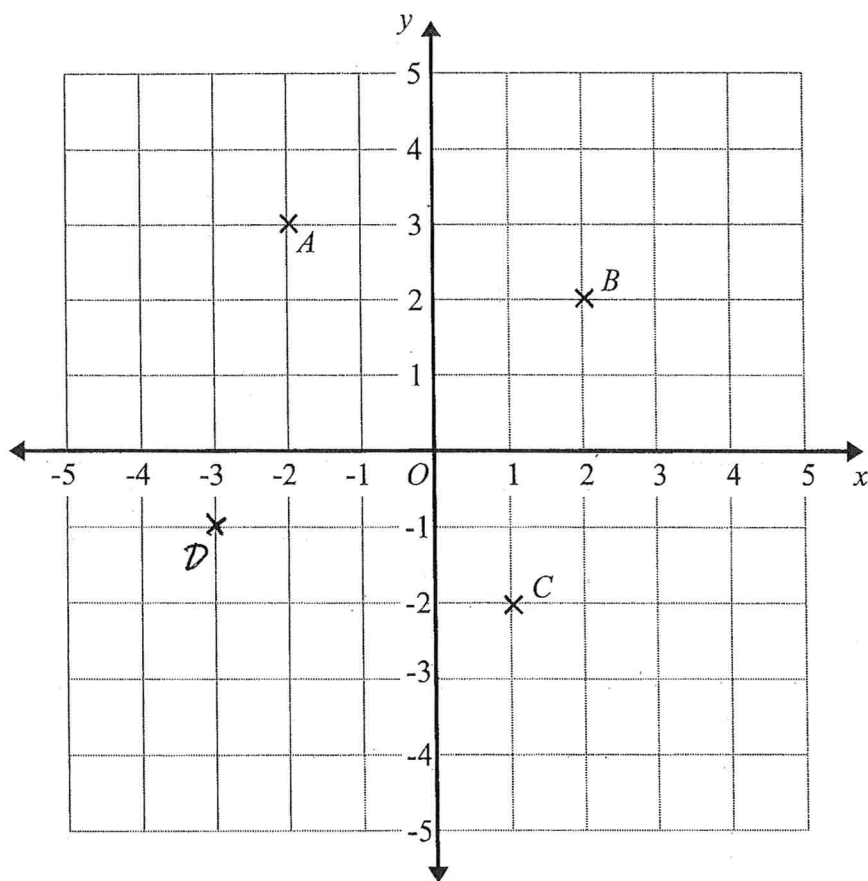
- (b) Find the coordinates of the midpoint of AB .

(-1, 2.5)
(1)

- (c) On the grid mark with a cross (\times) the point $(1, -2)$.
Label this point C .

(1)

(Total for question 8 is 3 marks)



- (a) Write down the coordinates of point C.

(.....1.....,-2.....)
(1)

- (b) Find the coordinates of the midpoint of AB .

(.....0.....,2.5.....)
(1)

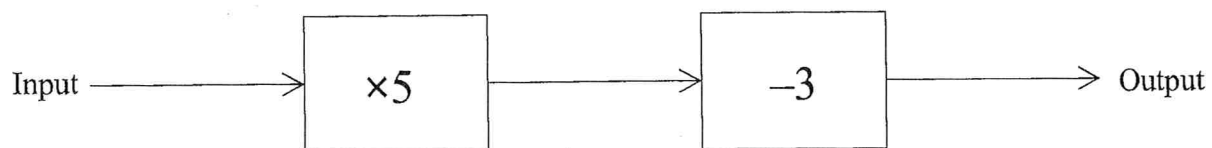
$ABCD$ is a square.

- (c) On the grid mark with a cross (\times) the point D so that $ABCD$ is a square.

(1)

(Total for question 9 is 3 marks)

1 Here is a number machine.



(a) What is the **output** when the **input** is 7?

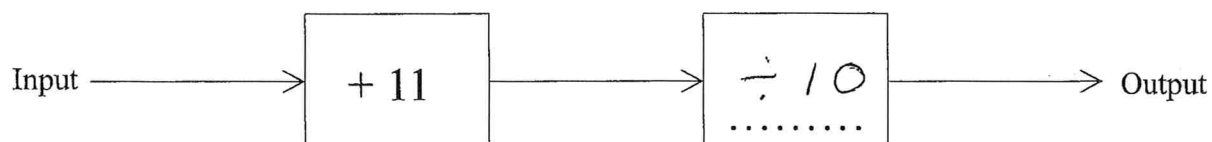
$$7 \times 5 = 35$$

$$35 - 3 = 32$$

$$\underline{\quad 32 \quad}$$

(1)

Here is a different number machine.



When the input is 9 the output is 2.

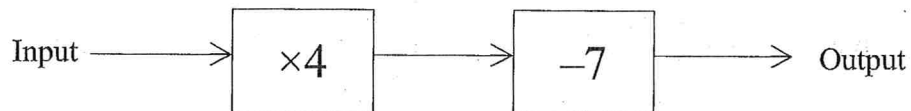
$$9 + 11 = 20$$

(b) Complete the number machine.

$$\boxed{\div 10} \text{ or } \boxed{\times 0.1} \text{ or } \boxed{-18} \quad (1)$$

(Total for question 1 is 2 marks)

2 Here is a number machine.



(a) What is the **output** when the **input** is 6?

$$6 \times 4 = 24$$
$$24 - 7 = 17$$

$$\begin{array}{r} 17 \\ \hline \end{array}$$

(1)

(b) What is the **input** when the **output** is 25?

Go backwards

$$25 + 7 = 32$$

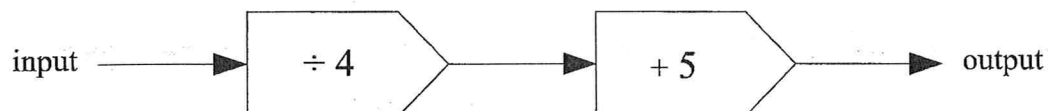
$$32 \div 4 = 8$$

$$\begin{array}{r} 8 \\ \hline \end{array}$$

(2)

(Total for question 2 is 3 marks)

3 Here is a number machine.



(a) Find the **output** when the **input** is 12

$$12 \div 4 = 3$$

$$3 + 5 = 8$$

$$\begin{array}{r} 8 \\ \hline \end{array}$$

(1)

(b) Find the **input** when the **output** is 13

$$13 - 5 = 8$$

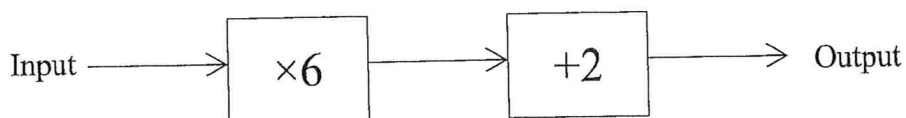
$$8 \times 4 = 32$$

$$\begin{array}{r} 32 \\ \hline \end{array}$$

(2)

(Total for question 3 is 3 marks)

4 Here is a number machine.



(a) What is the **output** when the **input** is 3?

$$3 \times 6 = 18$$

$$18 + 2 = 20$$

$$\begin{array}{r} 20 \\ \hline (1) \end{array}$$

(b) What is the **input** when the **output** is 44?

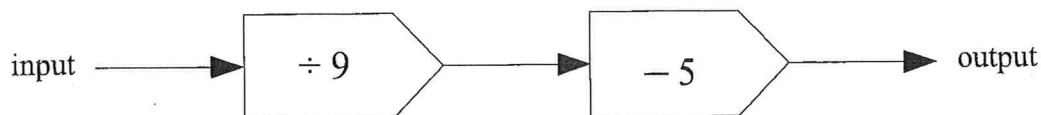
$$44 - 2 = 42$$

$$42 \div 6 = 7$$

$$\begin{array}{r} 7 \\ \hline (2) \end{array}$$

(Total for question 4 is 3 marks)

5 Here is a number machine.



(a) Find the **output** when the **input** is 81

$$81 \div 9 = 9$$

$$9 - 5 = 4$$

$$\begin{array}{r} 4 \\ \hline (1) \end{array}$$

(b) Find the **input** when the **output** is 0

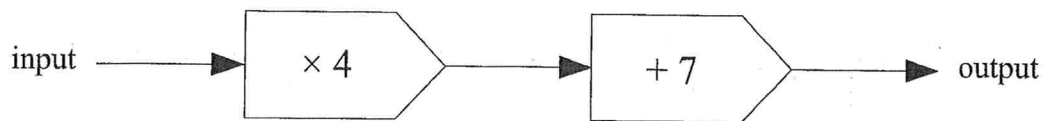
$$0 + 5 = 5$$

$$5 \times 9 = 45$$

$$\begin{array}{r} 45 \\ \hline (2) \end{array}$$

(Total for question 5 is 3 marks)

6 Here is a number machine.



(a) Find the output when the input is 5

$$5 \times 4 = 20$$

$$20 + 7 = 27$$

$$\begin{array}{r} 27 \\ \hline \end{array} \quad (1)$$

(b) Find the output when the input is -3

$$-3 \times 4 = -12$$

$$-12 + 7 = -5$$

$$\begin{array}{r} -5 \\ \hline \end{array} \quad (1)$$

(c) Find the input when the output is 71

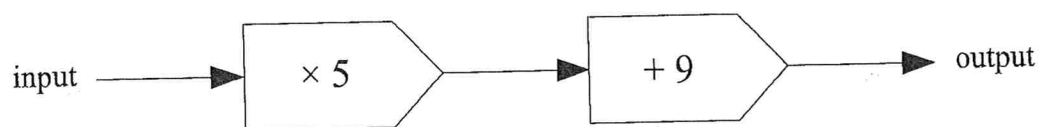
$$71 - 7 = 64$$

$$64 \div 4 = 16$$

$$\begin{array}{r} 16 \\ \hline \end{array} \quad (2)$$

(Total for question 6 is 4 marks)

7 Here is a number machine.



(a) Find the output when the input is 5

$$5 \times 5 = 25$$

$$25 + 9 = 34$$

$$\begin{array}{r} 34 \\ \hline \end{array}$$

(1)

(b) Find the output when the input is -2

$$-2 \times 5 = -10$$

$$-10 + 9 = -1$$

$$\begin{array}{r} -1 \\ \hline \end{array}$$

(1)

(c) Find the input when the output is 64

$$64 - 9 = 55$$

$$55 \div 5 = 11$$

$$\begin{array}{r} 11 \\ \hline \end{array}$$

(2)

(Total for question 7 is 4 marks)

8 Here is a number machine.



(a) What is the **output** when the **input** is 4?

$$4 \times 3 = 12$$

$$12 - 6 = 6$$

$$\begin{array}{r} 6 \\ \hline \end{array} \quad (1)$$

(b) What is the **input** when the **output** is 15?

$$15 + 6 = 21$$

$$21 \div 3 = 7$$

$$\begin{array}{r} 7 \\ \hline \end{array} \quad (1)$$

(b) Show that there is a value of the input for which the input and the output have the same value.

Input Output

2 0

3 3

$$\textcircled{3} \times 3 = 9$$

$$9 - 6 = \textcircled{3}$$

$$3 \longrightarrow \boxed{\times 3} \longrightarrow \boxed{-6} \longrightarrow 3$$

(2)

(Total for question 8 is 4 marks)

- 9 A rule to change from temperature measured in degrees Celsius ($^{\circ}\text{C}$) to degrees Fahrenheit ($^{\circ}\text{F}$) is

Multiply the temperature in degrees Celsius by 1.8 then add 32

input $\rightarrow \times 1.8 \rightarrow + 32 \rightarrow$ output
The temperature in London is 12°C .

- (a) Work out the temperature, in London, in Fahrenheit ($^{\circ}\text{F}$)

$$12 \times 1.8 = 21.6$$

$$21.6 + 32 = 53.6$$

53.6

(2)

The temperature in New York is 54°F

- (b) Work out the temperature, in New York, in Celsius ($^{\circ}\text{C}$)

$$54 - 32 = 22$$

$$22 \div 1.8 = 12.2$$

12.2

(2)

(Total for question 9 is 4 marks)

- 10 A rule to calculate a taxi fare is

£2.50 plus £2.20 per mile

Input $\rightarrow \times 2.20 \rightarrow + 2.50 \rightarrow$ output

- (a) Work out how much a 10 mile taxi journey would cost.

$$10 \times 2.2 = 22$$

$$22 + 2.50 = 24.50$$

£24.50

(1)

A taxi journey costs £20.10

- (b) Work out distance of the journey.

$$20.10 - 2.50 = 17.60$$

$$17.60 \div 2.20 = 8$$

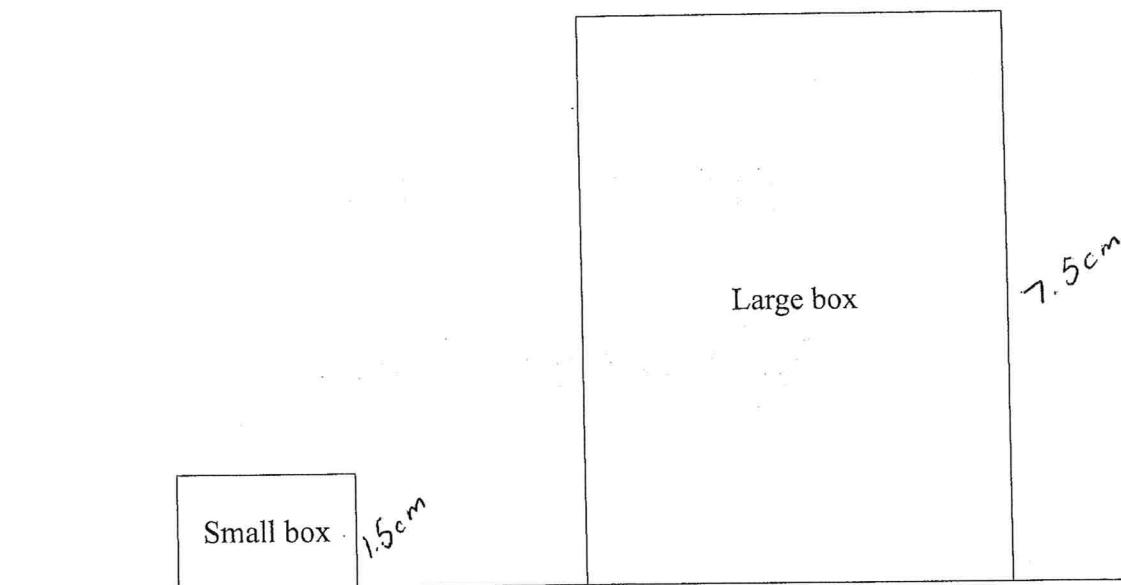
8

(2)

(Total for question 10 is 3 marks)

1

The accurate scale drawing shows a small box and a large box



The small box has a real height of 20 centimetres.

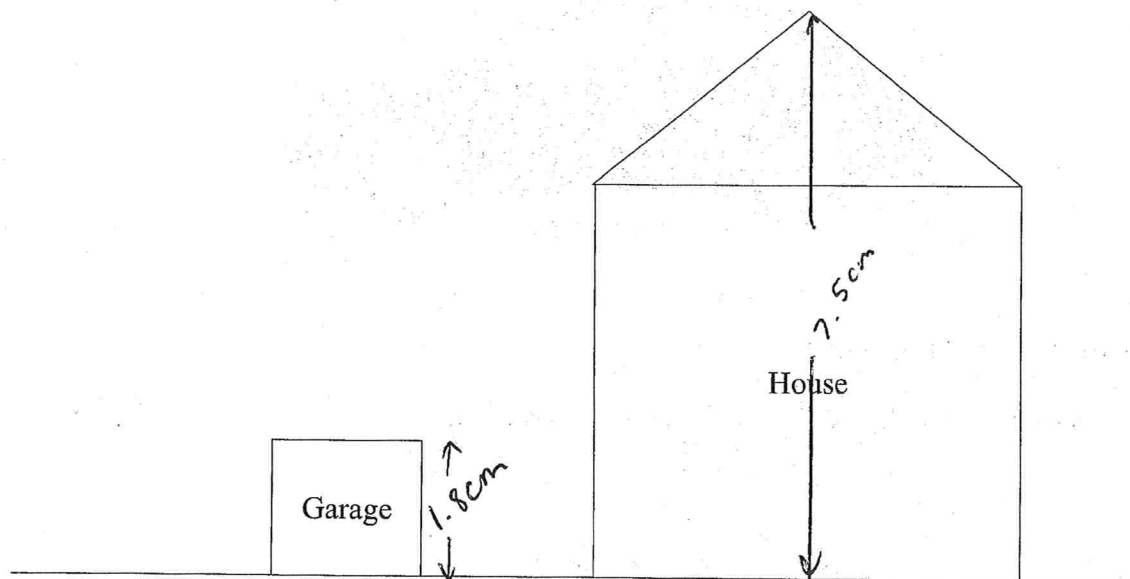
Find an estimate for the real height of the large box.

$$\begin{array}{rcl}
 1.5 \text{ cm} & = & 20 \text{ cm} \\
 \times 5 & & \times 5 \quad [5 \text{ times taller}] \\
 7.5 \text{ cm} & = & 100 \text{ cm} \\
 & & \text{OR } 1 \text{ m}
 \end{array}$$

..... 100 cm

(Total for question 1 is 2 marks)

- 2 The accurate scale drawing shows a garage and a house.



The garage has a real height of 2.4 metres.

Find an estimate for the real height, in metres, of the house.

$$1.8 \text{ cm} = 2.4 \text{ m}$$

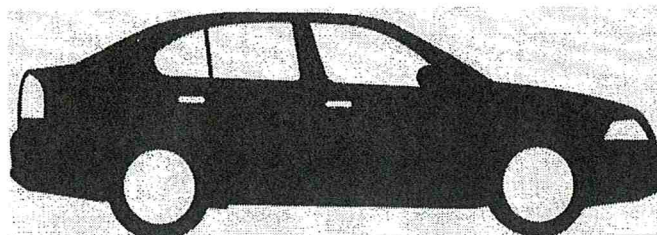
$\times \frac{4}{3}$

$$7.5 \text{ cm} = 10 \text{ m}$$

$$\left[\frac{7.5 \times 4}{3} = \frac{30}{3} = 10 \text{ m} \right]$$

.....10..... metres
 [ACCEPT 9.6 to 10.8]
 (Total for question 2 is 2 marks)

- 3 The accurate scale drawing shows a car.



The car has a real height of 1.5 metres.

Find an estimate for the real length, in metres, for the car.

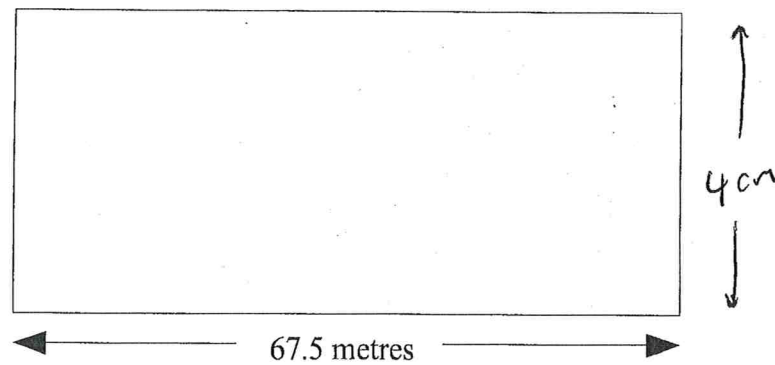
$$\begin{array}{c} \div 2 \\ \curvearrowright \\ 3 \text{ cm} = 1.5 \text{ m} \end{array}$$

$$8.8 \text{ cm} = 4.4 \text{ m}$$

..... 4.4 metres
ACCEPT 4.5
(Total for question 3 is 2 marks)

4

The accurate scale drawing shows a field.



The field has a real length of 67.5 metres

Find an estimate for the real perimeter of the field.

$$9 \text{ cm} = 67.5 \text{ m}$$

$$\div 9 \qquad \div 9$$

$$1 \text{ cm} = 7.5 \text{ m}$$

$$4 \text{ cm} = 30 \text{ m}$$

$$\begin{aligned} \text{perimeter} &= 2(67.5) + 2(30) \\ &= 195 \end{aligned}$$

.....195..... m

(Total for question 4 is 3 marks)

- 5 The accurate scale drawing shows three towns, Town A, Town B and Town C.

Town A

X

X Town B

X

Town C

The scale is 1:50000

- a) Find the real distance between Town A and Town B, in kilometres.

6.5 cm

$$\begin{aligned} 6.5 \times 50000 &= 325000 \text{ cm} \\ &= 3250 \text{ m} \\ &= 3.25 \text{ km} \end{aligned}$$

3.25 km
(3)

- b) Find the real distance between Town A and Town C, in kilometres.

5 cm

$$\begin{aligned} 5 \times 50000 &= 250000 \text{ cm} \\ &= 2.5 \text{ km} \end{aligned}$$

2.5 km
(3)

(Total for question 5 is 6 marks)

- 6 A model car has the length of 8cm.

The scale of the model is 1:50

Work out the length of the real car.
Give your answer in metres.

$$8 \times 50 = 400 \text{ cm}$$

.....⁴.....m

(Total for question 6 is 2 marks)

- 7 A map has the scale of 1:50000

The distance between two points on the map is 10 cm.

Work out the real distance between the two points. Give your answer in kilometres.

$$\begin{aligned} 10 \times 50000 &= 500000 \text{ cm} \\ &= 5000 \text{ m} \\ &= 5 \text{ km} \end{aligned}$$

.....⁵.....km

(Total for question 7 is 3 marks)

- 8 A model plane has the length of 20cm.

The scale of the model is 1:380

Work out the length of the real plane.
Give your answer in metres.

$$\begin{aligned}20 \times 380 &= 7600 \text{ cm} \\ &= 76 \text{ m}\end{aligned}$$

.....76.....m

(Total for question 8 is 2 marks)

- 9 A map has the scale of 1:75000

The distance between two points on the map is 12 cm.

Work out the real distance between the two points. Give your answer in kilometres.

$$\begin{aligned}12 \times 75000 &= 900000 \text{ cm} \\ &= 9000 \text{ m} \\ &= 9 \text{ km}\end{aligned}$$

.....9.....km

(Total for question 9 is 3 marks)

- 1 Write 0.29 as a percentage.

$$0.29 \times 100$$

29 %
(Total for Question 1 is 1 mark)

- 2 Write $\frac{5}{100}$ as a decimal.

$$5 \div 100$$

0.05
(Total for Question 2 is 1 mark)

- 3 Write 0.3 as a percentage.

$$0.3 \times 100$$

30 %
(Total for Question 3 is 1 mark)

- 4 Write 18% as a decimal.

$$18 \div 100$$

0.18
(Total for Question 4 is 1 mark)

- 5 Write 4% as a decimal.

$$4 \div 100$$

0.04
(Total for Question 5 is 1 mark)

- 6 Write 0.3 as a fraction.

$$\frac{3}{10}$$

(Total for Question 6 is 1 mark)

- 7 Write $\frac{2}{5}$ as a decimal.

$$\frac{2}{5} = \frac{4}{10} = 0.4$$

0.4

(Total for Question 7 is 1 mark)

- 8 Write 0.03 as a fraction.

$$\frac{3}{100}$$

(Total for Question 8 is 1 mark)

- 9 Write 23% as a fraction.

$$\frac{23}{100}$$

(Total for Question 9 is 1 mark)

- 10 Write 0.79 as a percentage.

$$0.79 \times 100$$

79 %

(Total for Question 10 is 1 mark)

- 11 Write 17% as a fraction.

$$\frac{17}{100}$$

$$\frac{17}{100}$$

(Total for Question 11 is 1 mark)

- 12 Write 0.25 as a fraction.

$$\frac{25}{100} \text{ or } \frac{1}{4}$$

$$\frac{1}{4}$$

(Total for Question 12 is 1 mark)