Name: _____

GCSE (1 – 9)

Direct and Inverse Proportion

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 A machine fills 1000 bottles in 5 hours.

Work out how many hours it would take the machine to fill 1200 bottles.

1000 bottles in 5 hours $\downarrow$

$\div 5$ $\downarrow$

200 bottles in 1 hour $\downarrow$

$\downarrow$ $\times 6$

1200 bottles in 6 hours $\downarrow$

6

(Total for question 1 is 2 marks)

2 It costs £0.75 to buy 5 bananas.

Work out how much it would cost to buy 7 bananas.

£0.75 for 5 bananas

$\downarrow \div 5$

£0.15 for 1 banana $\downarrow$

$\downarrow \times 7$

£1.05 for 7 bananas $\downarrow$

£1.05

(Total for question 2 is 2 marks)

3 3 tins of beans and 4 tins of tomatoes costs £2.73.

5 tins of beans costs £1.55.

Work out how much one tin of tomatoes costs.

5 tins of beans costs £1.55

1 tin of beans costs £0.31   ↓ ÷5

3 tins of beans costs £0.93   ↓ ×3

2.73 − 0.93 = £1.80

£1.80 for 4 tins of tomatoes

£1.80 ÷ 4 = £0.45

£0.45

(Total for question 3 is 2 marks)

4 There are 500 sheets in a pack of paper. 500 sheets of paper weigh 2.5kg.

Work out the weight of 50 sheets of paper.

500 sheets weigh 2.5kg

↓ ÷10

↓

50 sheets weigh 0.25kg

0.25kg

(Total for question 4 is 2 marks)

5 It takes 2 painters 4 days to complete a job.

Work out how many days it would take 1 painter to complete the same job.

Inverse proportion.
More painters = Less time.

2 painters take 4 days

$2 \times 4 = 8$ 8 days of work needed.

8

(Total for question 5 is 2 marks)

6 It takes 3 machines 2 days to produce a batch of products

Work out how long it would take 1 machine to produce the same batch of products.

$3 \times 2 = 6$

6 days of machine work needed

6

(Total for question 6 is 2 marks)

7 It takes 3 painters 6 days to complete a job.

Work out how many days it would take 2 painters to complete the same job.

$3 \times 6 = 18$

18 days of work needed

2 painters $\quad \frac{18}{2} = 9$ days

9

8 It takes 5 machines 6 hours to produce 1000 DVDs

Work out how long it would take 4 machines to produce 1000 DVDs.

$5 \times 6 = 30$ Machine ~~days~~ hours needed

$\frac{30}{4} = 7.5$ hours

7.5 hours

9 x is inversely proportional to y.

x is given by the formula: $\qquad x = \dfrac{1000}{y}$

Find the value of x when $y = 50$

$$x = \frac{1000}{y}$$

$$x = \frac{1000}{50} = 20$$

$x = \underline{\quad 20 \quad}$

(Total for question 9 is 2 marks)

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10 y is directly proportional to x.

y is given by the formula: $\qquad y = 0.4x$

Find the value of y when $x = 6$

$$y = 0.4x$$
$$y = 0.4(6)$$
$$y = 2.4$$

$y = \underline{\quad 2.4 \quad}$

(Total for question 10 is 2 marks)

11 The weight of a piece of wire (w grams) is directly proportional to its length (l cm).

w is given by the formula: $w = 30l$

Find the length of a wire weighing 75 grams.

$$w = 30l$$
$$75 = 30l$$
$$\frac{75}{30} = l$$
$$l = 2.5$$

$l = \underline{\quad 2.5 \quad}$ cm

(Total for question 11 is 2 marks)

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12 The force, F, between two magnets is inversely proportional to the square of the distance, x cm, between them.
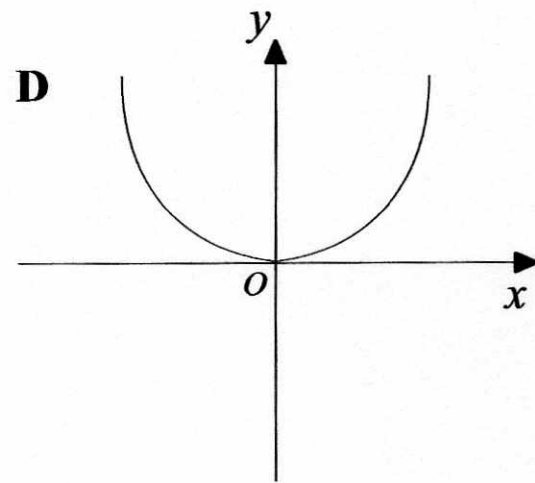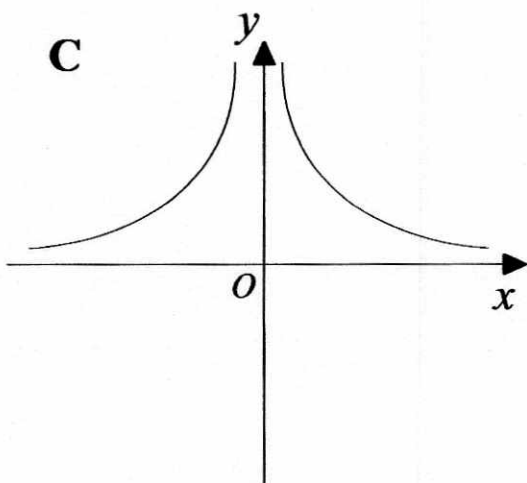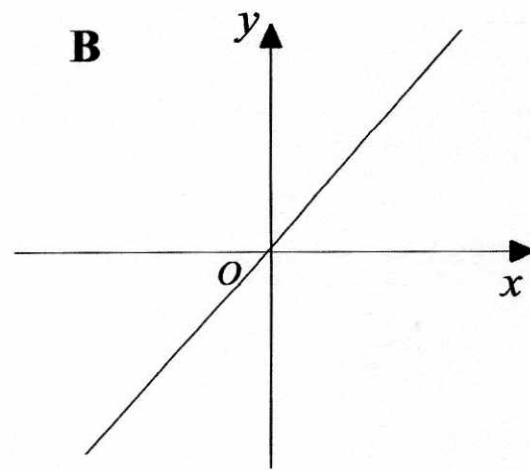
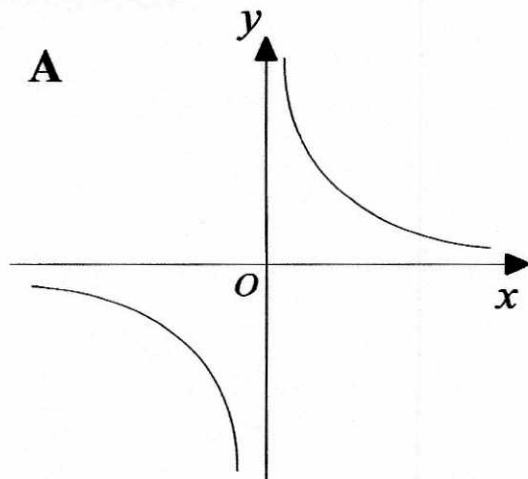F is given by the formula: $F = \dfrac{36}{x^2}$

Find the Force when two magnets are 3 cm apart.

$$F = \frac{36}{x^2}$$
$$= \frac{36}{3^2}$$
$$= \frac{36}{9}$$
$$= 4$$

$F = \underline{\quad 4 \quad}$ N

(Total for question 12 is 2 marks)

13 Here are four graphs.

A

B

C

D

Match each graph with a statement in the table below.

Proportionality relationship	Graph letter
y is directly proportional to x	B
y is inversely proportional to x	A
y is directly proportional to x^2	D
y is inversely proportional to x^2	C