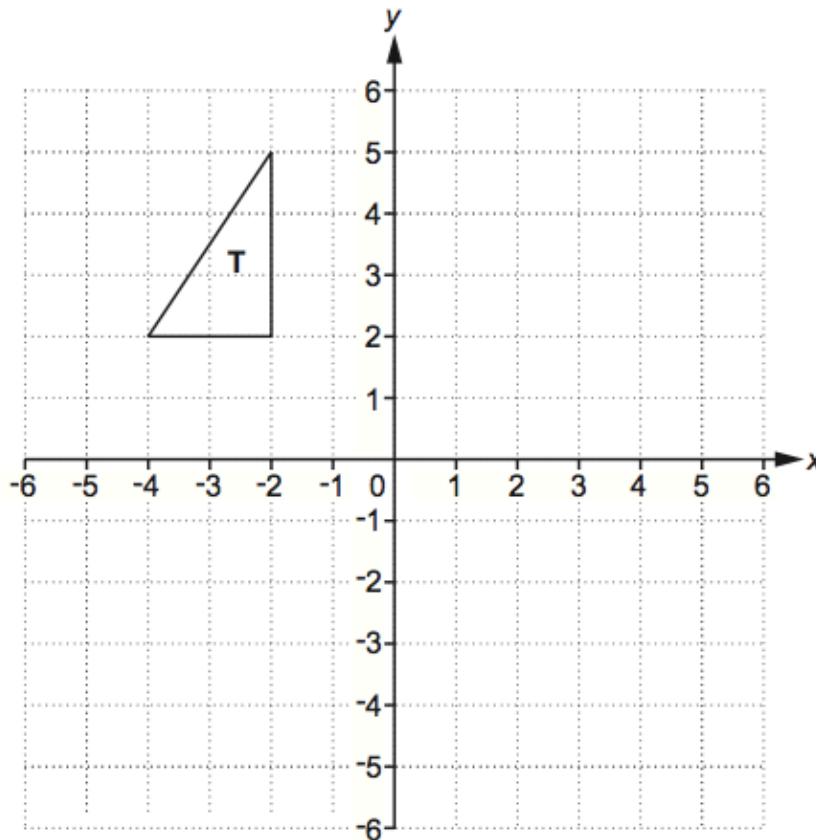


## Revision F4 (All topics) D [33]

1.

A triangle **T** is drawn on a coordinate grid.



- (a) Translate triangle **T** by the vector  $\begin{pmatrix} -2 \\ -5 \end{pmatrix}$ .

Label your answer **V**.

[2]

- (b) Describe fully the **single** transformation that is equivalent to:

- a reflection in the line  $y = x$ , followed by
- a rotation of  $90^\circ$  anti-clockwise about  $(0, 0)$ .

You may use the grid to help you.

(Total 5 marks)

2.

Some students do an experiment with a bag of 12 coloured counters.  
They take three counters from the bag at random, one at a time and without replacement.  
They record the colour of each counter and then put the three counters back in the bag.  
They repeat this experiment 1000 times.

They find that the frequency of taking 3 red counters from the bag is 16.  
Show that 4 is a good estimate of the most likely number of red counters in the bag.

(Total 4 marks)

3.

A pendulum of length  $L$  cm has time period  $T$  seconds.  
 $T$  is directly proportional to the square root of  $L$ .

The length of the pendulum is increased by 40%.

Work out the percentage increase in the time period.

(Total 5 marks)

4. **Non-calculator**

The prices of two phones are in the ratio  $x : y$ .

When the prices are both increased by £20, the ratio becomes 5 : 2.

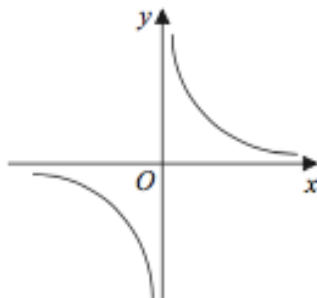
When the prices are both reduced by £5, the ratio becomes 5 : 1.

Express the ratio  $x : y$  in its lowest terms.

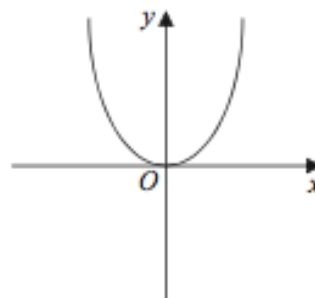
(Total 6 marks)

5. **Non-calculator**

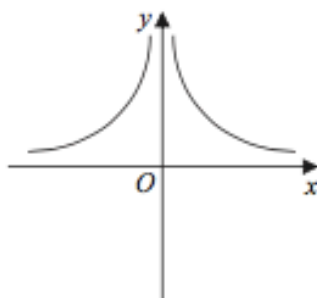
These graphs show four different proportionality relationships between  $y$  and  $x$ .



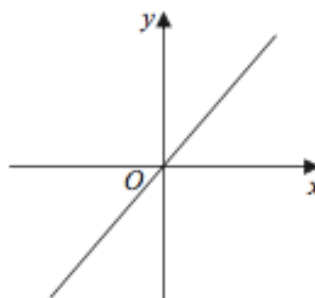
Graph A



Graph B



Graph C



Graph D

Match each graph with a statement in the table below.

Proportionality relationship	Graph letter
$y$ is directly proportional to $x$	
$y$ is inversely proportional to $x$	
$y$ is proportional to the square of $x$	
$y$ is inversely proportional to the square of $x$	

(Total 2 marks)

6.

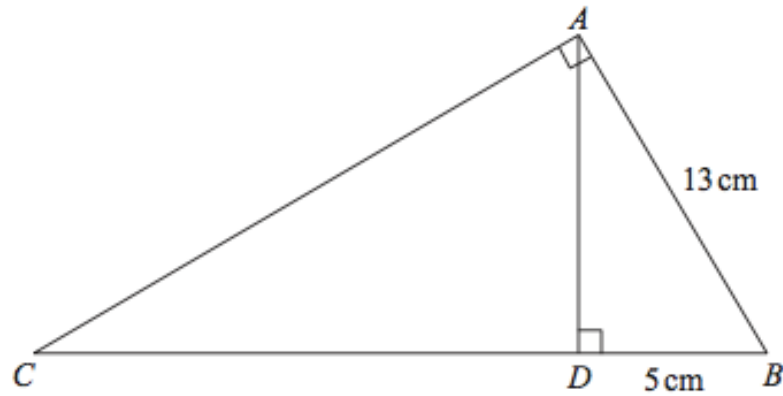
At a constant temperature, the volume of a gas  $V$  is inversely proportional to its pressure  $p$ .

By what percentage will the pressure of a gas change if its volume increases by 25%?

(Total 4 marks)

7.

$ABC$  and  $ABD$  are two right-angled triangles.



Angle  $BAC = \text{angle } ADB = 90^\circ$

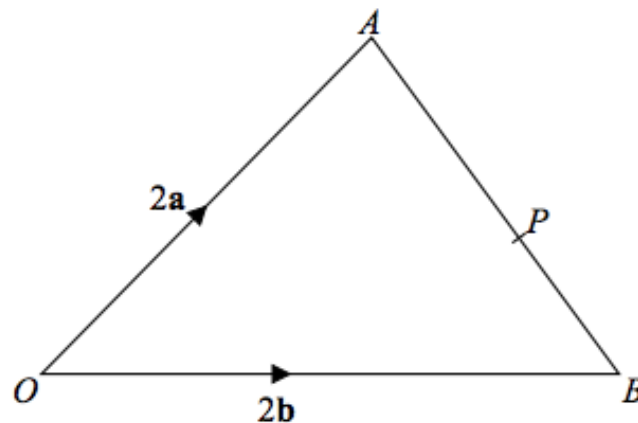
$AB = 13 \text{ cm}$

$DB = 5 \text{ cm}$

Work out the length of  $CB$ .

(Total 3 marks)

8.



$OAB$  is a triangle.

$P$  is the point on  $AB$  such that  $AP:PB = 5:3$

$$\vec{OA} = 2\mathbf{a}$$

$$\vec{OB} = 2\mathbf{b}$$

$$\vec{OP} = k(3\mathbf{a} + 5\mathbf{b}) \text{ where } k \text{ is a scalar quantity.}$$

Find the value of  $k$ .

(Total 4 marks)