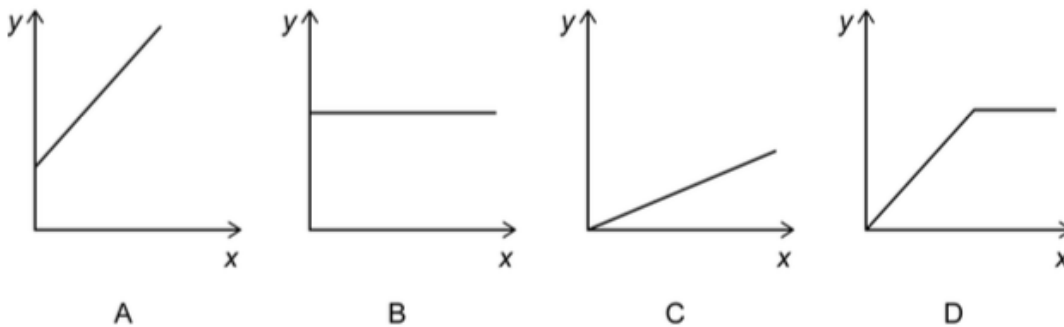


## Topic 19 Proportion equations (Post-TT) [37]

1.

(a) Which graph shows that  $y$  is directly proportional to  $x$ ?



(b)

In this table  $y$  is directly proportional to  $x$ .

$x$	16	24
$y$	36	$b$

Calculate  $b$ .

(Total 3 marks)

2.

The number of days,  $D$ , to complete a project is inversely proportional to the number of people,  $P$ , who work on the project.

(a) The project takes 18 days to complete if 150 people work on it.

(i) Find an equation connecting  $D$  and  $P$ .

(3)

(ii) How many people are needed to complete the project in 10 days?

(2)

(b) Sketch a graph which shows that  $D$  is inversely proportional to  $P$ .

(2)

(Total 7 marks)

3.

$y$  is inversely proportional to the square of  $x$ .

When  $y = 3$ ,  $x = 2$

Find the value of  $y$  when  $x = 4$

(Total 3 marks)

4.

$W$  and  $P$  are both positive quantities.  $W$  is directly proportional to the square root of  $P$ .

When  $W = 12$ ,  $P = 16$ .

(a) Express  $W$  in terms of  $P$ .

(3)

(b) What is the value of  $W$  when  $P = 25$ ?

(1)

(c) What is the value of  $P$  when  $W = 21$ ?

(2)

(Total 6 marks)

5.

The force of attraction  $F$  between two magnets varies inversely as the square of the distance  $d$  between them.

When the magnets are 1.5 cm apart, the force of attraction is 28 Newtons.

(a) Find an equation connecting  $F$  and  $d$ .

(3)

(b) What is the distance between the magnets when the force of attraction is 43.75 Newtons?

(2)

(Total 5 marks)

6.

$M$  and  $G$  are positive quantities.

$M$  is inversely proportional to  $G$ .

When  $M = 90$ ,  $G = 40$ .

Find the value of  $M$  when  $G = M$ .

(Total 4 marks)

7.

Hack's Law states that the area draining into a river,  $A$ , is proportional to the square of the distance from its start,  $d$ .

At Minneapolis, the area draining into the Mississippi river is 20 000 square miles.

Minneapolis is 200 miles from the start of the river.

(a) Find an equation connecting  $A$  and  $d$ .

(3)

(b) Memphis is 1400 miles from the start of the Mississippi river.

Find the area draining into the river at Memphis.

(2)

(Total 5 marks)

8.

In an experiment measurements of  $t$  and  $m$  were taken.

The results were as follows:

$t$	2	2.4	3
$m$	36	25	16

The results are connected by one of these rules.

A  $t \propto \sqrt{m}$

B  $t \propto \frac{1}{m}$

C  $t \propto \frac{1}{\sqrt{m}}$

Which rule is the correct one?

State your answer clearly.

You **must** show your working.

(Total 4 marks)