Lesson 5

Proportionality : GCSE

5.1 Practice

Example 1 (Answer over the page)

(i) Express "B is **directly** proportional to the square of V" as a proportionality.

(ii) If $B = 36$ when $V = 3$, find the constant of the proportionality.

(iii) Write down a formula relating B and V.

(iv) Use your formula to determine the value of B when $V = 5$.

Example 2 (Answer over the page)

(i) Express "d is **inversely** proportional to the square root of m" as a proportionality.

(ii) If $d = 20$ when $m = 16$ find the constant of the proportionality.

(iii) Write down a formula relating d and m.

(iv) Use your formula to determine the value of d when $m = 100$.

Now check your answers with those over the page...

Answer for Example 1

(i) $B \propto V^2$ **(ii)** $k = 4$

(iii) $B = 4V^2$ **(iv)** $B = 100$

Answer for Example 2

(i) $d \propto \frac{1}{\sqrt{m}}$ **(ii)** $k = 80$

(iii) $d = \frac{80}{\sqrt{m}}$ **(iv)** $d = 8$

How did you do ?

- ☐ I done real good. A* here I come.
- ☐ Messed up but I understand it now.
- ☐ Is there any chance of moving down a set or two ?

5.2 Exercise

Question 1

(i) Express "T is **directly** proportional to the square of U" as a proportionality.

(ii) If $T = 28$ when $U = 2$ find the constant of the proportionality.

(iii) Write down a formula relating T and U.

(iv) Use your formula to determine the value of T when $U = 3$.

(v) Use your formula to determine the value of T when $U = 5$.

Question 2

(i) Express "Z is **directly** proportional to Y" as a proportionality.

(ii) If $Z = 210$ when $Y = 3$ find the constant of the proportionality.

(iii) Write down a formula relating Z and Y.

(iv) Use your formula to determine the value of Z when:

(a) $Y = 2$ **(b)** $Y = 8$ **(c)** $Y = 20$

Question 3

(i) Express "A is **inversely** proportional to the square root of Q" as a proportionality.

(ii) If $A = 100$ when $Q = 36$ find the constant of the proportionality.

(iii) Write down a formula relating A and Q.

(iv) Use your formula to determine the value of A when $Q = 100$.

(v) Use your formula to determine the value of A when $Q = 400$.

Question 4

(i) Express "T is **inversely** proportional to N" as a proportionality.

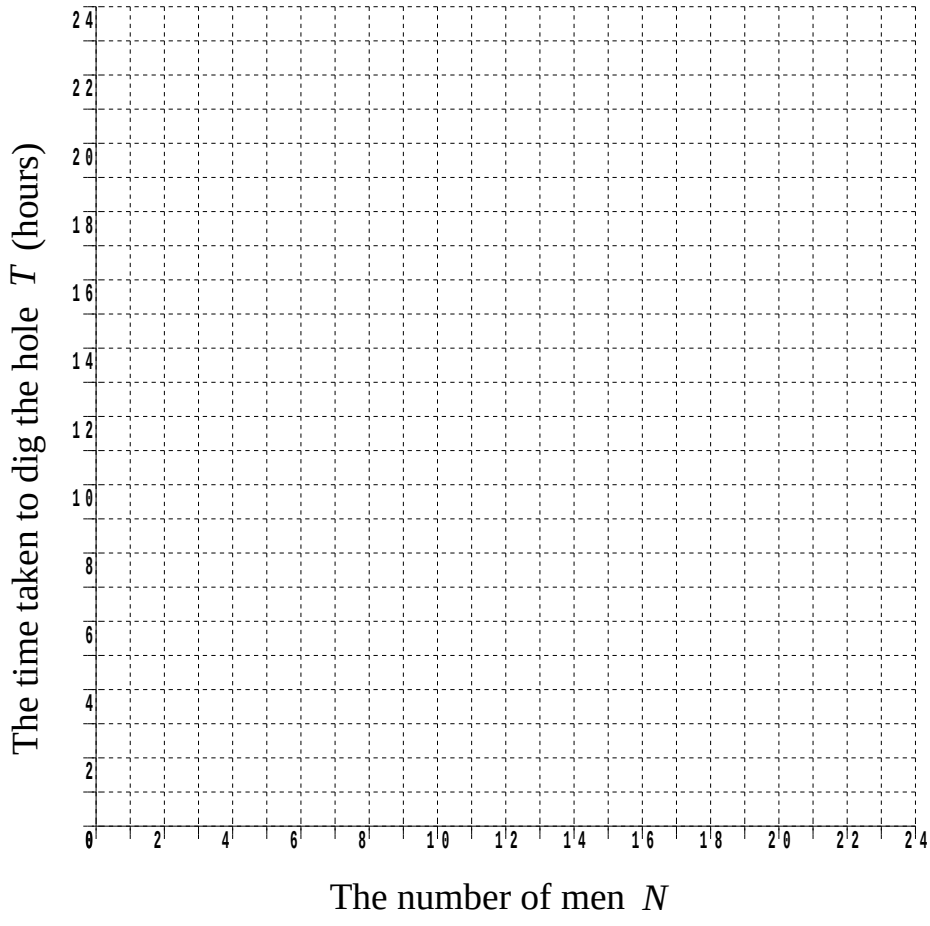
(ii) It is estimated that it will take 4 hours for 6 men to dig a hole.
By letting $T = 4$ when $N = 6$ find the constant of the proportionality.

(iii) Write down a formula relating T and N.

(iv) Use your formula to complete the following table:

N	1	2	3	4	6	8	12	24
T								

(v) Use your table to plot a graph of inverse proportion for "men digging hole"



Question 5

(i) Express "M is **inversely** proportional to the square of S" as a proportionality.

(ii) If $M = 4$ when $S = 5$, find the constant of proportionality.

(iii) Write down a formula relating M and S.

(iv) Use your formula to find the value of M when:

(a) $S = 2$ **(b)** $S = 10$ **(c)** $S = 0.1$

Question 6

$$P \propto \frac{Q}{R}$$

(i) If $P = 8$ when $Q = 2$ and $R = 5$, find the constant of proportionality.

(ii) Write down a formula relating P, Q and R.

(iii) Use your formula to find the value of P when:

(a) $Q = 3$ and $R = 15$

(b) $Q = 7$ and $R = 200$.

Question 7

$$M \alpha \frac{\sqrt{F}}{I}$$

(i) If $M = 400$ when $F = 16$ and $I = 0.1$, find the constant of proportionality.

(ii) Write down a formula relating *M, F* and *I.*

(iii) Use your formula to find the value of *M* when:

(a) $F = 121$ and $I = 2$

(b) $F = 0.04$ and $I = 4$.

Question 8

$$Q \alpha M H^2$$

(i) If $Q = 0.25$ when $M = 40$ and $H = 0.1$, find the constant of proportionality.

(ii) Write down a formula relating *Q, M* and *H.*

(iii) Use your formula to find the value of *Q* when:

(a) $M = 100$ and $H = 8$

(b) $M = 4$ and $H = 15$.