



LEARN MORE
ABOUT OUR
E. MATH TUITION



FREE
MINI-COURSE
REGISTER FOR
FREE MATH
ONLINE COURSE



STUDY GUIDE



VIDEO SOLUTIONS
FOR THIS
WORKSHEET

SEC 2 ELEMENTARY MATHEMATICS

UNIT 1: DIRECT AND INVERSE PROPORTION

1.1 DIRECT PROPORTION

1.1 CONCEPTUAL BRIDGING: PROBLEM INVOLVING DIRECT PROPORTION

15 blacksmiths can make 30 identical knives. Assuming all the blacksmiths work at the same rate, find the number of identical knives 8 blacksmiths can make.

1.1 WORKED EXAMPLE 1

A baker uses 325 g of flour in making a loaf of bread. How many kilograms of flour are required for 120 loaves?

1.1 PRACTICE NOW 1**QUESTION 1**

If the mass of 3 books is 0.48 kg, find the mass of 8 books, leaving your answer in grams.

1.1 WORKED EXAMPLE 2 (PROVING TWO VARIABLES IN DIRECT PROPORTION)

The table shows some corresponding values of x and b .

x	2	4	6
b	12	24	36

- (a) Show that x and b are in direct proportion.
- (b) Sketch the graph of b against x .

1.1 PRACTICE NOW 2

QUESTION 1

The table below shows the number of chocolate bars, n , and the corresponding mass of the bars, M grams.

M (grams)	60	120	180	240	300
n	5	10	15	20	25

- Show that M and n are in direct proportion.
- Write down an equation connecting M and n .
- Find the value of n when the mass of the bar is 480 grams.

1.1 WORKED EXAMPLE 3 (FINDING EQUATION OF DIRECT PROPORTIONS)

The cost \$ C of a metal pipe is directly proportional to its length x cm. When the length is 30 cm, its cost is \$2.

- Find an equation connecting C and x .
- Find the length of a metal pipe if its cost is \$15.

1.1 WORKED EXAMPLE 3 (ESSENTIAL STEPS – EQUATION OF DIRECT PROPORTION)

Step 1:

For direct proportion, equation will be in the form of $\square = k \square$

Step 2 :

Substitute the given values of x and y to find k .

Step 3 :

Substitute the value of k into step 1 equation to form the equation connecting x and y .

**1.1 PRACTICE NOW 3****QUESTION 1**

The price (p), in cents, of a toy is directly proportional to the mass (m) of the toy. When the toy cost 30 cents, the mass is 100g. Find

- (a) the equation connecting p and m ,
- (b) the price of a toy, in cents, with a mass of 220g,
- (c) the mass, in grams, of a toy which cost \$2.40.



1.1 WORKED EXAMPLE 4 (FINDING EQUATION OF ANOTHER FORM OF DIRECT PROPORTION)

y is directly proportional to x^2 . Given that $y = 144$ when $x = 4$, find

- (a) an expression for y in terms of x ,
- (b) the value(s) of x when $y = 2025$.

WHERE PASSIONATE TEACHING INSPIRES
www.timganmath.com

TIMGANMATH

WHERE PASSIONATE TEACHING INSPIRES
www.timganmath.com

1.1 PRACTICE NOW 4**QUESTION 1**

y is directly proportional to x^3 . It is also given that $y = 24$ when $x = 2$.

- (a) Find the equation connecting y and x .
- (b) Hence, find the value of y when $x = 3$.

WHERE PASSIONATE TEACHING INSPIRES
www.timganmath.com

TIMGANMATH

WHERE PASSIONATE TEACHING INSPIRES
www.timganmath.com

1.1 WORKED EXAMPLE 5 (APPLICATION OF DIRECT PROPORTION)

The volume of water, $V \text{ m}^3$, flowing through a cylindrical pipe is directly proportional to the square of its cross-sectional radius, $R \text{ m}$. When the radius is 0.2 m , the volume is 12 m^3 .

- (a) Find the value of V when $R = 0.5$.
- (b) If the radius is increased by 100% , find the percentage increase in the volume.

1.1 PRACTICE NOW 5**QUESTION 1**

Given \sqrt{p} is directly proportional to $\frac{1}{2}q$ and $p = 25$ when $q = 8$.

- (a) Express p in terms of q .
- (b) Find the percentage decrease in p if q is decreased by 10% .

1.1 EXERCISE

QUESTION 1

Given that p is directly proportional to $(q+1)^2$ and that the difference between the value of p when $q = 2$ and $q = 6$ is 80.

- Express p in terms of q .
- Hence, find the value of p when $q = 3$.

QUESTION 2

x is directly proportional to $(y-3)^2$ and y is positive. The table below shows some corresponding values of x and y .

x	a	2	72
y	1.2	5	b

Find the

- equation connecting x and y .
- value of a .
- value of b .

QUESTION 3

It was found that when the brakes of a vehicle were applied, the braking distance, d meters, is proportional to the square of its speed, v km/h. A vehicle traveling at a speed of 36 km/h has a braking distance of 25 meters. Find

- the relationship between d and v .
- the braking distance when the speed is 72 km/h.
- the speed when the braking distance is 8.5 meters.

QUESTION 4

It is given that x and y are in direct proportion and the difference in y , when x is 5 and 13, is 48.

- (a) Find the equation connecting x and y .
- (b) Find the value of x when $y = 72$.

QUESTION 5

y is directly proportional to the square of x .

- (a) Given that $y = 12$ when $x = 0.2$, find the equation for y in terms of x .
- (b) It is known that $y = p$ for a particular value of x . Describe the change in y when the value of x is doubled.

QUESTION 6

y is directly proportional to x^2 . It is known that $y = 8$ for a particular value of x . Find the value of y when this value of x is halved.