The Maths And Science Tutor

Practice Worksheet

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Pearson Edexcel GCSE (9-1)
Mathematics
Higher Tier
Topic Paper: Proportion
Time: 1 hour 30 minutes
Total Marks: 30

Answer ALL questions.
Write your answers in the spaces provided.
You must write down all stages in your working.

1. y is directly proportional to $\sqrt{x}$.
When x = 16, y = 24
(a) Find an equation connecting x and y.
(b) Calculate the value of y when x = 36

2. The volume of a sphere (V) is directly proportional to the cube of its radius (r). *(3)*
Sphere A has radius 5cm and volume 523.6cm³.
Sphere B has radius 8cm.
Calculate the volume of sphere B.
Give your answer to 1 decimal place.

3. The time taken (t hours) to complete a job is inversely proportional to the number of workers (n). *(3)*
When 4 workers are employed, the job takes 6 hours.
(a) Find an equation connecting t and n.
(b) How long would it take 10 workers to complete the job?
(c) How many workers would be needed to complete the job in 2 hours?

4. In a factory, y items are produced in x hours where y is directly proportional to x^2. *(4)*
When x = 2, y = 50
Calculate how many items are produced in 5 hours.

5. Triangle ABC is similar to triangle PQR. *(3)*
AB = 8cm, BC = 12cm, AC = 15cm
PQ = 20cm
Calculate the lengths of QR and PR.

6. The area of circle A is k times the area of circle B, where k is a positive constant. *(3)*
The radius of circle A is 15cm.
The radius of circle B is 9cm.
Find the value of k. Give your answer in its simplest form.

7. The force (F newtons) exerted by a spring is directly proportional to its extension (e centimetres). *(2)*
When the extension is 5cm, the force is 40N.
Calculate the extension when the force is 70N.

8. A cone has volume V and surface area A. *(3)*
If the radius (r) is doubled and the height (h) is halved:
(a) What is the ratio of the new volume to the original volume?
(b) What is the ratio of the new surface area to the original surface area?
Give your answers in their simplest form.

9. The time (T seconds) taken for a pendulum to complete one swing is proportional to the square root of its length (L metres). *(4)*
When L = 2.25, T = 3
Find T when L = 4

10. In a chemical reaction, y grams of substance A react with x grams of substance B where y is inversely proportional to the square of x. *(3)*
When x = 3, y = 12
Find the value of x when y = 3

(2)