

KS3 – Rates

Section A – Speed

Q1 (3 marks)

Complete each statement.

a) Write the formula connecting speed, distance and time.

b) What unit is commonly used for speed when distance is measured in kilometres and time in hours?

c) A greater speed means more distance is travelled in the same amount of _____.

Q2 (4 marks)

Calculate the speed.

a) A car travels 120 km in 2 hours.

b) A cyclist travels 45 km in 3 hours.

c) A runner travels 8 km in 1 hour.

d) A train travels 300 km in 4 hours.

Q3 (3 marks)

Calculate the distance travelled.

a) A car travels at 50 km/h for 3 hours.

b) A cyclist travels at 18 km/h for 2 hours.

c) A train travels at 80 km/h for 5 hours.

Q4 (3 marks)

Calculate the time taken.

a) A coach travels 180 km at 60 km/h.

b) A cyclist travels 48 km at 16 km/h.

c) A car travels 350 km at 70 km/h.

Q5 (3 marks)

Solve each problem. Give the correct units.

a) A van travels 150 km in 2.5 hours. Find its average speed.

b) A cyclist travels at 24 km/h for 1.5 hours. How far does she travel?

c) A train travels 210 km at an average speed of 70 km/h. How long does the journey take?

Challenge

Q6 (4 marks)

A family drives 90 km in 1.5 hours, stops for a break, then drives another 150 km in 2.5 hours.

Find the average speed for the 4 hours of driving time.

Section B – Density

Q7 (3 marks)

Complete each statement.

- a) Write the formula connecting density, mass and volume.

- b) If mass is measured in grams and volume in cm^3 , what unit is used for density?

- c) Two objects have the same volume. The object with the greater mass has the _____ density.

Q8 (4 marks)

Calculate the density.

- a) Mass = 40 g, volume = 10 cm^3

- b) Mass = 90 g, volume = 30 cm^3

- c) Mass = 150 g, volume = 50 cm^3

- d) Mass = 72 g, volume = 8 cm^3

Q9 (3 marks)

Calculate the mass.

- a) Density = 4 g/cm^3 , volume = 6 cm^3

b) Density = 2.5 g/cm^3 , volume = 20 cm^3

c) Density = 7 g/cm^3 , volume = 9 cm^3

Q10 (3 marks)

Calculate the volume.

a) Mass = 48 g , density = 6 g/cm^3

b) Mass = 100 g , density = 5 g/cm^3

c) Mass = 84 g , density = 7 g/cm^3

Q11 (3 marks)

Solve each problem.

a) A block has mass 120 g and volume 40 cm^3 . Find its density.

b) A material has density 8 g/cm^3 and volume 15 cm^3 . Find its mass.

c) An object has mass 96 g and density 4 g/cm^3 . Find its volume.

Challenge

Q12 (4 marks)

Two blocks have the same volume of 25 cm^3 . Block A has mass 75 g and Block B has mass 125 g.

Calculate the density of each block and state which block is denser.

Section C – Pressure

Q13 (3 marks)

Complete each statement.

- a) Write the formula connecting pressure, force and area.

- b) What is the unit of pressure when force is measured in newtons and area in m^2 ?

- c) For the same force, decreasing the area causes the pressure to _____.

Q14 (4 marks)

Calculate the pressure.

- a) Force = 60 N, area = 3 m^2

- b) Force = 100 N, area = 5 m^2

- c) Force = 240 N, area = 8 m^2

- d) Force = 150 N, area = 10 m^2

Q15 (3 marks)

Calculate the force.

- a) Pressure = 20 N/m^2 , area = 4 m^2

b) Pressure = 15 N/m^2 , area = 6 m^2

c) Pressure = 25 N/m^2 , area = 8 m^2

Q16 (3 marks)

Calculate the area.

a) Force = 120 N , pressure = 30 N/m^2

b) Force = 90 N , pressure = 15 N/m^2

c) Force = 200 N , pressure = 40 N/m^2

Q17 (3 marks)

Solve each problem.

a) A force of 180 N acts over an area of 6 m^2 . Find the pressure.

b) A pressure of 12 N/m^2 acts over an area of 7 m^2 . Find the force.

c) A force of 160 N produces a pressure of 20 N/m^2 . Find the area.

Challenge

Q18 (4 marks)

Two boxes each exert a force of 120 N. Box A rests on an area of 6 m^2 and Box B rests on an area of 3 m^2 .

Calculate the pressure produced by each box and state which box produces the greater pressure.

Total: ____ / 60

Percentage: ____%