National 5 Mathematics

Similar Figures - Solutions

Marks are indicated in brackets after each question number

2014 Paper 2 Question 5, (3)

Linear scale factor $= \frac{24}{15}$

Volume scale factor $= (\frac{24}{15})^3$

Volume of the larger jar $= 750\ x\ (\frac{24}{15})^3 = 3,072\ cm^3$.

2015 Paper 2 Question 9, (4)

Linear Scale Factor $= \frac{30}{24} = 1.25$.

Area Scale Factor $= (1.25)^2 = 1.5625$.

Area of $PSR = 1.5625\ x\ 400 = 625\ cm^2$.

Area of $PSTQ = 625 - 400 = 225\ cm^2$.

2016 Paper 2 Question 11, (3)

Linear scale factor $= \frac{60}{100} = 0.6$.

Area scale factor $= 0.6^2 = 0.36$.

Cost $= £13.75\ x\ 0.36 = £4.95$.

2017 Paper 1 Question 15, (3)

Linear scale factor $= \frac{5}{7}$

Set up as a 'reduction' to give

$x = \frac{5}{7} \cdot (x + 2.6)$

$7x = 5(x + 2.6)$

$7x = 5x + 13$

$2x = 13$

$x = 6.5\ cm.$

2018 Paper 2 Question 18, (3) (2)

a) Linear Scale Factor $= \frac{24}{16} = 1.5.$

Volume Scale Factor $= 1.5^3 = 3.375.$

$\frac{1125}{576} = 1.96$

Since $1.96 \neq 3.375$ the two cartons are not mathematically similar.

b) Volume Scale Factor $= \frac{1500}{576} = 2.6$

$2.6 = (\frac{d}{16})^3$

$2.6 = \frac{d^3}{16^3}$

$2.6\ x\ 16^3 = d^3$

$d^3 = 10,649.6$

$d = \sqrt[3]{10,649.6}$

$d = 22$ cm.

2019 Paper 2 Question 12, (3)

a) Linear Scale Factor $= \frac{30}{50}$

Area Scale Factor $= (\frac{30}{50})^2 = 0.36$

Area $= 2,750\ x\ 0.36 = 990\ cm^2$

b) Area $= \frac{angle}{360}\ x\ \pi r^2$

Let the angle $ACB = x$

$2{,}750 = \frac{x}{360} x\ \pi\ x\ 50^2$

$2{,}750 = \frac{2{,}500\pi x}{360}$

$x = \frac{2{,}750\ x\ 360}{2{,}500\pi}$

$x = 126.1°.$