GCSE HIGHER · REVISION MAT 5

Upper and lower bounds

1 A volume is 2.50 litres to 2 d.p.

Write down its bounds.

2 A room is 8.4 m by 12.7 m, both to 1 d.p.

Find the upper bound of its perimeter.

3 Explain why a number that is 20 to 1 s.f. has error interval

$$15 \leq x < 25$$

4 A lift's safe load is 800 kg to the nearest 50 kg.

People weigh 75 kg each, to the nearest kg.

How many people can always travel safely?

5 $a = 5$, $b = 7$ and $c = 3$, each to the nearest whole number.

Show that the lower bound of $\frac{a+b}{c}$ is 3.14, to 2 d.p.

6 A runner runs 400 m (nearest m) in 52.3 s (1 d.p.).

Find the upper bound of the average speed.

7 A sphere has radius 3.0 cm to 1 d.p.

Show that the upper bound of its volume is 118.8 cm^3, to 1 d.p.

8 In a right-angled triangle, the hypotenuse is 10 cm and the side opposite angle θ is 6 cm, both to the nearest cm.

Find the upper bound of θ.

Mr&Mrs MATHS

ANSWERS · REVISION MAT 5

Upper and lower bounds

1 **2.495 litres and 2.505 litres**

2 $2(8.45 + 12.75)$

42.4 m

3 **To 1 s.f. it is rounded to the nearest 10, so it is within 5 of 20.**

4 Lowest load 775 kg, heaviest person 75.5 kg

$\frac{775}{75.5} = 10.26$

10 people

5 $\frac{4.5 + 6.5}{3.5} = \frac{11}{3.5}$

= 3.142...

6 $\frac{400.5}{52.25}$

7.67 m/s

7 $\frac{4}{3}\pi \times 3.05^3$

= 118.84... cm³

8 Largest $\sin\theta = \frac{6.5}{9.5}$

$\theta = \sin^{-1}(0.684...)$

43.2°