GENMATHS RESOURCES

BOUND CALCULATIONS

1) A rectangle has a length of 7 m and a width of 4 m, each rounded to the nearest metre.
   a. What is the minimum possible perimeter of the rectangle?
   b. What is the maximum possible area of the rectangle?

2) Jupiter's diameter is 142,000 km to the nearest thousand. Saturn's diameter is 120,500 km to the nearest 500 km. Work out the minimum difference in their diameters.

3) A cyclist travelled 48 km to the nearest kilometre at a speed of 16 km/h, correct to the nearest km/h. Work out the maximum time travelled. Give your answer in hours and minutes, to the nearest minute.

4) The radius of a circle is 6 cm to the nearest cm.
   a. Work out the maximum circumference of the circle. Give your answer in terms of π.
   b. Work out the minimum area. Give your answer to 2 decimal places.

5) The height of plants measure: 7.2 cm, 5.8 cm, 6.5 cm, 6.9 cm, 7.0 cm, each to the nearest tenth.
   a. Work out the greatest possible mean.
   b. Work out the smallest possible median.

6) A frame has a length of 3.2 m and a width of 1.5 m, both to 1 decimal place. Work out the maximum possible area of the frame.

7) The length of a square field is measured as 40 m to the nearest metre. Find the minimum possible area of the field.

8) A circular pond has a radius of 8 m, correct to the nearest metre. Work out the maximum circumference. Give your answer in terms of π.

9) A parcel has a mass of 2.4 kg, correct to the nearest 0.1 kg. Work out the maximum mass of the parcel.

10) A string is measured as 12.5 m, correct to the nearest 0.1 m. Find the minimum possible length.

11) A cube has side length 6 cm, correct to the nearest cm. Work out the maximum possible volume.

12) $a = b - c$
    $b = 3.54$ correct to 2 decimal places
    $c = 2.168$ correct to 3 decimal places
    Work out the upper bound of a.

13) $x = \frac{y}{z}$
    $y = 10.2$ correct to 3 significant figures
    $z = 0.5$ correct to 1 decimal place
    Work out the lower bound of x.

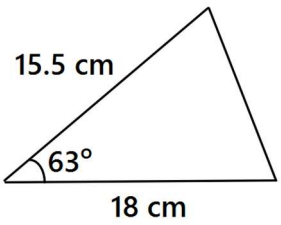
14) $m = np$
    $n = 5.46$ correct to 2 decimal places
    $p = 10$ correct to 2 significant figures
    Work out the lower bound of m.

15) A rectangular swimming pool is measured 10 m × 4 m, both to the nearest metre. Work out the maximum possible perimeter.

16) A cylinder has radius 4.0 cm to 1 decimal place and a height of 12 cm to the nearest centimetre. Given that the cylinder weights 200 g to the nearest gram, work out the minimum possible density to 2 decimal places.

17) A car travels 150 km, correct to the nearest km, in 2 hours, correct to the nearest tenth. Work out the minimum possible average speed. Give your answer to 1 decimal place.

18) A triangle is pictured below. The length 15.5 cm has been rounded to 1 decimal place. The length 18 cm has been rounded to 2 significant figures. The angle 63° has been rounded to the nearest degree. Work out the lower bound of the area of the triangle. Give your answer to 1 decimal place.



19) $y = \frac{3x}{k}$
$x = 12.4$ correct to 3 significant figures
$k = 7.01$ correct to 3 significant figures
By considering bounds, work out the value of y to a suitable degree of accuracy. Give a reason for your answer.

20) The area of a circle is given by the formula $A = \pi \times r^2$. The radius of the circle is measured as 4.00 cm, correct to 2 decimal places. By considering bounds, work out the value of the area of the circle to a suitable degree of accuracy. Give a reason for your answer.

21) A runner completes a distance of 1500 m in a recorded time of 4.8 minutes, correct to 1 decimal place. By considering bounds, work out the runner's speed in m/s to a suitable degree of accuracy. Give a reason for your answer.

22) The kinetic energy of a meteor is given by
$$KE = \frac{1}{2}mv^2$$
The mass of the meteor, m, is 3.62 kg, correct to 3 significant figures. The velocity of the meteor, v, is 1000 m/s, correct to 4 significant figures. By considering bounds, work out the value of KE to a suitable degree of accuracy. Give a reason for your answer.

Challenge

23) In triangle DEF
$$d^2 = e^2 + f^2 - (2ef\cos D)$$
where d is the side opposite angle D.
$e = 7.6\ cm$, correct to 1 decimal place
$f = 5.42\ cm$, correct to 3 significant figures
$D = 38°C$, correct to the nearest degree
By considering bounds, work out the value of d to a suitable degree of accuracy. Give a reason for your answer.