

Fractions

- 1 In Jodie's school, one fifth of the pupils are in Year 7. The ratio of girls to boys in Year 7 is 3 : 2, and 20% of the girls in Year 7 have blonde hair.



- a) What fraction of the pupils in the school are girls in Year 7 with blonde hair?

.....
[3]

- b) State whether your answer to part a) would convert to a recurring decimal or to a terminating decimal. Explain your answer.

.....
.....
[1]

[Total 4 marks]

- 2 Look at the fraction sum below.



$$\frac{a}{11} + \frac{b}{6} = \frac{25}{33}$$

- a) Work out the values of a and b , given that they are positive integers.

$a = \dots\dots\dots, b = \dots\dots\dots$
[3]

- b) Write $\frac{25}{33}$ as a recurring decimal.

.....
[2]

[Total 5 marks]

- 3 Add together $\frac{96}{180}$ and $1.14\dot{6}$. Give your answer as a mixed number in its simplest form.



.....
[Total 5 marks]

- 4 Some square wall tiles have a side length of $2.2\dot{2}$ cm.
Heather wants to cover an area of 1600 cm^2 with these tiles.



Given that she can cover the area exactly with whole tiles, work out the number of tiles she will need to use.

.....
[Total 4 marks]

- 5 Which of the numbers below is biggest? Show how you get your answer.



$0.12\dot{7}$, $\frac{38}{275}$, $\frac{160}{1375}$

Start by converting the decimal to a fraction.

.....
[Total 4 marks]

- 6 Solve the equation below, giving your answer as a fraction in its simplest form.



$\frac{7x-3}{6} = 0.0\dot{4}$

$x =$
[Total 4 marks]

Score:

26



Bounds

- 1 Look at the formula below.

$$4z^3 = \frac{(x^{\frac{1}{2}}y^{-3}z)^2}{y^{-5}}$$

- a) Rearrange the formula to make z the subject.

.....
[3]

- b) If $x = 6.8$ and $y = 1.2$, both rounded to one decimal place, work out the upper bound for z .
Give your answer to 3 significant figures.

.....
[3]

[Total 6 marks]

- 2 Shannon is performing in a gymnastics competition. Her overall score is calculated by adding together the scores for each piece of equipment. Her scores for each piece of equipment are shown below, correct to 4 significant figures. She has not done the vault yet.

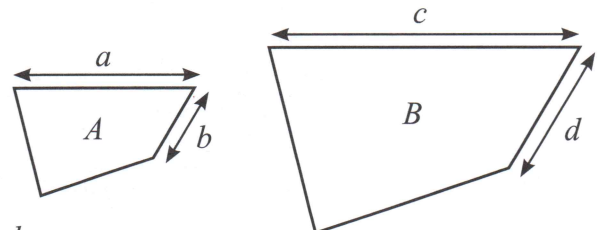
Floor: 16.42 Beam: 13.15 Bars: 14.88 Vault: ?

The current leader of the competition has a score of 60.15 to 4 significant figures.
After the vault, Shannon was in the lead by exactly 0.05 points.
What is the lowest possible score she could have got on the vault?

.....
[Total 3 marks]

- 3 A and B are similar shapes.

$a = 6.2$ cm correct to the nearest 0.1 cm
 $b = 3.5$ cm correct to the nearest 0.1 cm
 $c = 11.8$ cm correct to the nearest 0.1 cm



Calculate the minimum possible value for the length d .

.....
[Total 3 marks]

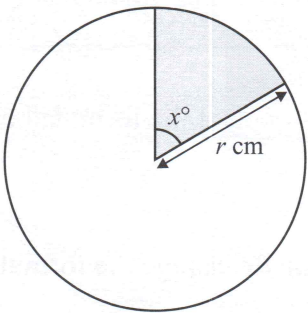
Scale factor = new length ÷ old length

..... cm
[Total 4 marks]

- 4
- The circle opposite represents a pizza.
The shaded sector shows a slice of pizza with area $S\text{ cm}^2$.

$S = 179.2$ correct to 1 decimal place.
 $x = 60$ correct to the nearest whole number.
The length $r\text{ cm}$ is the radius of the pizza.

Find the lower and upper bounds for the radius of the pizza.
Give your answers to 2 decimal places.



The formula for the area of a sector is $A = \frac{x}{360} \times \pi \times r^2$.

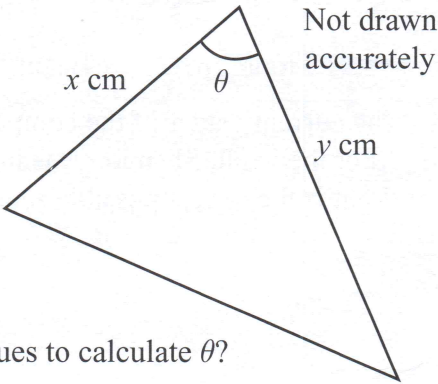
Lower bound cm
Upper bound cm
[Total 5 marks]

- 5
- The diagram shows a triangle with area $A\text{ cm}^2$.

$A = 2900$ to 2 significant figures.
 $x = 97.0$ to 3 significant figures.
 $y = 78.9$ to 3 significant figures.

θ is an acute angle.
The value of θ can be found using this formula: $\sin \theta = \frac{2A}{xy}$

What is the maximum possible error if you use the rounded values to calculate θ ?
Give your answer to 3 significant figures.



Work out the lower and upper bounds for θ and compare them to the calculation using the rounded values.

[Total 7 marks]

Score:

25

Standard Form

- 1 Express $(3 \times 10^{11})^4$ in standard form.



.....
[Total 2 marks]

- 2 The area of a national park is 6.4×10^5 acres. 65% of the park is woodland, and three-quarters of the woodland is protected.



Work out the area of woodland that is NOT protected.
Give your answer as an ordinary number.

..... acres
[Total 3 marks]

- 3 Write $\frac{25^2 \times 6}{2^2 \times 50^4}$ in standard form.



.....
[Total 3 marks]

- 4 A shipping container has a weight of 4.2×10^4 N to 2 significant figures.
The area of the base of the shipping container is 30 m^2 to 1 significant figure.

The deck of a cargo ship has a pressure restriction of 1600 N/m^2 . Is it safe for the shipping container to be transported on the cargo ship? Show working to support your answer.

$$\begin{array}{c} \diagup \text{|||||} \diagdown \\ \text{---} \text{Pressure} = \text{force} \div \text{area} \text{---} \\ \diagdown \text{|||||} \diagup \end{array}$$

.....
[Total 3 marks]

- 5
- The Heron Sea has a volume of 1.4×10^{14} litres, of which 12% is salt.
The Cobalt Sea has a volume of 8.5×10^{12} litres, of which 8% is salt.

What is the percentage decrease in the volume of salt from the Heron Sea to the Cobalt Sea?
Give your answer to 2 decimal places.

..... %
[Total 3 marks]

- 6
- A newspaper claims that the mass of muffins eaten in the world last year was 1.8×10^{12} kg.
Given that there are approximately 7.2 billion people in the world and the average mass of a muffin is 120 g, do you think the newspaper is correct? Show working to support your answer.



1 billion = 1 000 000 000

.....

.....

.....

[Total 4 marks]

- 7
- $a = 2^{10} \times 5^9$, $b = 9\,000\,000$, $c = 2.4 \times 10^9$
Work out the lowest common multiple of a , b and c .



Give your answer in standard form.

.....
[Total 4 marks]

Score:
22