**1.** Given $p = x - \frac{\sqrt{y}}{z}$, $x = 1.775$, $y = 1.44$ and $z = 48$,

(a) calculate the value of $p$.

**(2)**

Barry **first** writes $x$, $y$ and $z$ correct to one significant figure and **then** uses these values to estimate the value of $p$.

(b) (i) Write down $x$, $y$ and $z$ each correct to one significant figure.

(ii) Write down Barry's estimate of the value of $p$.

**(2)**

(c) Calculate the percentage error in Barry's estimate of the value of $p$.

**(2)**
**(Total 6 marks)**

**2.** A shipping container is a cuboid with dimensions 16 m, $1\frac{3}{4}$ m and $2\frac{2}{3}$ m.

(a) Calculate the **exact** volume of the container. Give your answer as a fraction.

**(3)**

Jim estimates the dimensions of the container as 15 m, 2 m and 3 m and uses these to estimate the volume of the container.

(b) Calculate the percentage error in Jim's estimated volume of the container.

**(3)**
**(Total 6 marks)**

**3.** In a television show there is a transparent box completely filled with identical cubes. Participants have to estimate the number of cubes in the box. The box is 50 cm wide, 100 cm long and 40 cm tall.

(a) Find the volume of the box.

**(2)**

Joaquin estimates the volume of one cube to be 500 $cm^3$. He uses this value to estimate the number of cubes in the box.

(b) Find Joaquin's estimated number of cubes in the box.

**(2)**

The actual number of cubes in the box is 350.

(c) Find the percentage error in Joaquin's estimated number of cubes in the box.

**(2)**
**(Total 6 marks)**

**4.** The following diagram shows a rectangle with sides of length $9.5 \times 10^2$ m and $1.6 \times 10^3$ m.

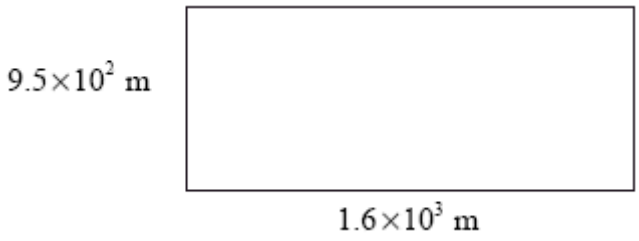


***diagram not to scale***

(a) Write down the area of the rectangle in the form $a \times 10^k$, where $1 \leq a < 10$, $k \in \mathbb{Z}$.

**(3)**

Helen's estimate of the area of the rectangle is 1 600 000 $m^2$.

(b) Find the percentage error in Helen's estimate.

**(3)**
**(Total 6 marks)**

**5.** (a) Calculate exactly $\frac{(3\times 2.1)^3}{7\times 1.2}$.

**(1)**

(b) Write the answer to part (a) correct to 2 significant figures.

**(1)**

(c) Calculate the percentage error when the answer to part (a) is written correct to 2 significant figures.

**(2)**

(d) Write your answer to **part (c)** in the form $a \times 10^k$ where $1 \leq a < 10$ and $k \in \mathbb{Z}$.

**(2)**

**(Total 6 marks)**

**6.** (a) Calculate $\frac{77.2\times 3^3}{3.60\times 2^2}$.

**(1)**

(b) Express your answer to part (a) in the form $a \times 10^k$, where $1 \leq a < 10$ and $k \in \mathbb{Z}$.

**(2)**

(c) Juan estimates the length of a carpet to be 12 metres and the width to be 8 metres. He then estimates the area of the carpet.

(i) Write down his estimated area of the carpet.

**(1)**

When the carpet is accurately measured it is found to have an area of 90 square metres.

(ii) Calculate the percentage error made by Juan.

**(2)**

**(Total 6 marks)**

**7.** A problem has an **exact** answer of $x = 0.1265$.

(a) Write down the **exact** value of $x$ in the form $a\times 10^k$ where $k$ is an integer and $1 \leq a \leq 10$.

(b) State the value of $x$ given correct to **two** significant figures.

(c) Calculate the percentage error if $x$ is given correct to **two** significant figures.

**(Total 6 marks)**