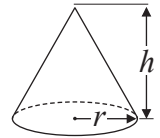


1 A cone has a volume of  $98 \text{ cm}^3$ .  
The radius of the cone is  $5.13 \text{ cm}$ .

(a) Work out an estimate for the height of the cone.

$$\text{Volume of cone} = \frac{1}{3} \pi r^2 h$$



.....cm  
(3)

John uses a calculator to work out the height of the cone to 2 decimal places.

(b) Will your estimate be more than John's answer or less than John's answer?  
Give reasons for your answer.

.....  
.....  
.....  
(1)

**(Total for Question 1 is 4 marks)**

2 A cycle race across America is 3069.25 miles in length.

Juan knows his average speed for his previous races is 15.12 miles per hour.  
For the next race across America he will cycle for 8 hours per day.

(a) Estimate how many days Juan will take to complete the race.

.....  
(3)

Juan trains for the race.  
The average speed he can cycle at increases.  
It is now 16.27 miles per hour.

(b) How does this affect your answer to part (a)?

.....  
.....  
(1)

---

**(Total for Question 2 is 4 marks)**

- 3 (a) Work out an estimate for the value of  $\sqrt{63.5 \times 101.7}$

.....  
(2)

$(2.3)^6 = 148$  correct to 3 significant figures.

- (b) Find the value of  $(0.23)^6$  correct to 3 significant figures.

.....  
(1)

- (c) Find the value of  $5^{-2}$

.....  
(1)

---

**(Total for Question 3 is 4 marks)**

4 A person's heart beats approximately  $10^5$  times each day.  
A person lives for approximately 81 years.

- (a) Work out an estimate for the number of times a person's heart beats in their lifetime.  
Give your answer in standard form correct to 2 significant figures.

.....  
(2)

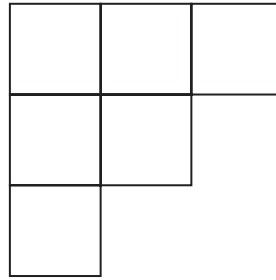
$2 \times 10^{12}$  red blood cells have a total mass of 90 grams.

- (b) Work out the average mass of 1 red blood cell.  
Give your answer in standard form.

..... grams  
(2)

**(Total for Question 4 is 4 marks)**

5 The diagram shows a shape made from 6 identical squares.



The total area of the shape is  $5406 \text{ cm}^2$

- (a) Find an estimate for the length of one side of each square.  
Give your answer correct to the nearest whole number.

..... cm  
(3)

- (b) Is your answer to part (a) an underestimate or an overestimate?  
You must give a reason for your answer.

.....  
.....  
.....  
(1)

**(Total for Question 5 is 4 marks)**

6 A plane travels at a speed of 213 miles per hour.

(a) Work out an estimate for the number of seconds the plane takes to travel 1 mile.

..... seconds  
(3)

(b) Is your answer to part (a) an underestimate or an overestimate?  
Give a reason for your answer.

.....  
.....  
(1)

**(Total for Question 6 is 4 marks)**