Weekly Review #4   Name :_____

Show all Work!

1.   The volume of a sphere is $V = \sqrt{\dfrac{S^3}{36\pi}}$, where S is its surface area.

      The surface area of a sphere is 500 cm^2.

      (a)   Calculate the volume of the sphere. Give your answer correct to **two decimal places**.

                                                                                                    (3)

      (b)   Write down your answer to (a) correct to the nearest integer.

                                                                                                    (1)

      (c)   Write down your answer to (b) in the form $a \times 10^n$, where $1 \leq a < 10$ and $n \in \mathbb{Z}$.

                                                                                                    (2)
                                                                                         (Total 6 marks)

2.   **Give all answers in this question to the nearest whole currency unit.**

      In January 2008 Larry had 90 000 USD to invest for his retirement in January 2011.

      He invested 40 000 USD in US government bonds which paid 4 % per annum **simple interest**.

      (a)   Calculate the value of Larry's investment in government bonds in January 2011.

                                                                                                    (3)

      Larry changed this investment into South African rand (ZAR) at an exchange rate of
      1 USD = 18.624 ZAR.

      (b)   Calculate the amount that Larry received in ZAR from the exchange.

                                                                                                    (2)

He changed the remaining 50 000 USD to South African rand (ZAR) in January 2008. The exchange rate between USD and ZAR was 1 USD = 10.608 ZAR. There was 2.5 % commission charged on the exchange.

(c)   Calculate the value, **in USD,** of the commission Larry paid.

(2)

(d)   Show that the amount that Larry had to invest is 517 000 ZAR, correct to the nearest thousand ZAR.

(3)

In January 2008, Larry deposited this money into a bank account that paid interest at a nominal annual rate of 12 %, **compounded monthly**.

(e)   Find the value of the money in Larry's bank account in January 2011.

(3)
(Total 13 marks)

3. In a particular school, students must choose at least one of three optional subjects: art, psychology or history.

Consider the following propositions

a: I choose art,
p: I choose psychology,
h: I choose history.

(a) Write, in words, the compound proposition

$$\neg h \Rightarrow (p \vee a).$$

(3)

(b) Complete the truth table for $\neg a \Rightarrow p$.

a	p	$\neg a$	$\neg a \Rightarrow p$
T	T	F	
T	F	F	
F	T	T	
F	F	T	

(1)

(c) State whether $\neg a \Rightarrow p$ is a tautology, a contradiction **or** neither. Justify your answer.

(2)
(Total 6 marks)

4. A survey was carried out at an international airport. A number of travelers were interviewed and asked for their flight destinations. The results are shown in the table below.

Destination	America	Africa	Asia
Number of males	45	62	37
Number of females	35	46	25

One traveler is to be chosen at random from all those interviewed.

(a) Find the probability that this traveler was going to Africa.

(2)

One female traveler is to be chosen at random from all those interviewed.

(b) Find the probability that this female traveler was going to Asia.

(2)

One traveler is to be chosen at random from those **not** going to America.

(c) Find the probability that the chosen traveler is female.

(2)
(Total 6 marks)

5. Consider the function $f(x) = 1.25 - a^{-x}$, where a is a positive constant and $x \geq 0$.
The diagram shows a sketch of the graph of f. The graph intersects the y-axis at point A and the line L is its horizontal asymptote.
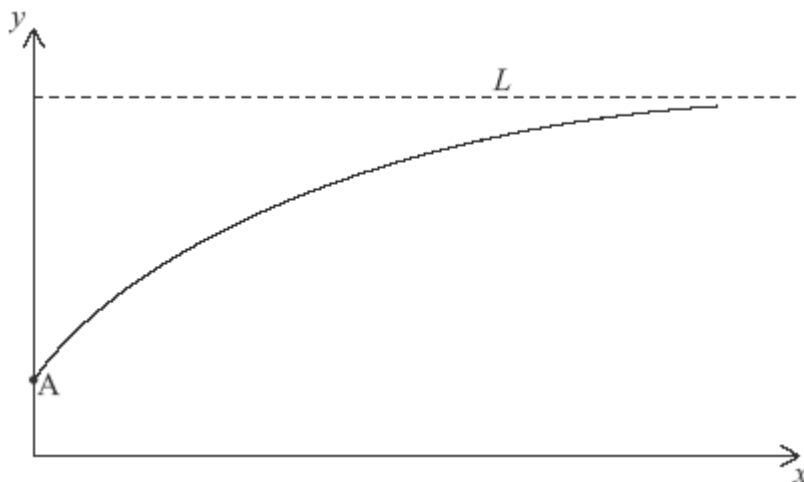
(a) Find the y-coordinate of A.

(2)

The point (2, 1) lies on the graph of $y = f(x)$

(b) Calculate the value of a.

(2)

(c) Write down the equation of L.

(2)
(Total 6 marks)

6. 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)

7. The weights in kg, of 80 adult males, were collected and are summarized in the box and whisker plot shown below.
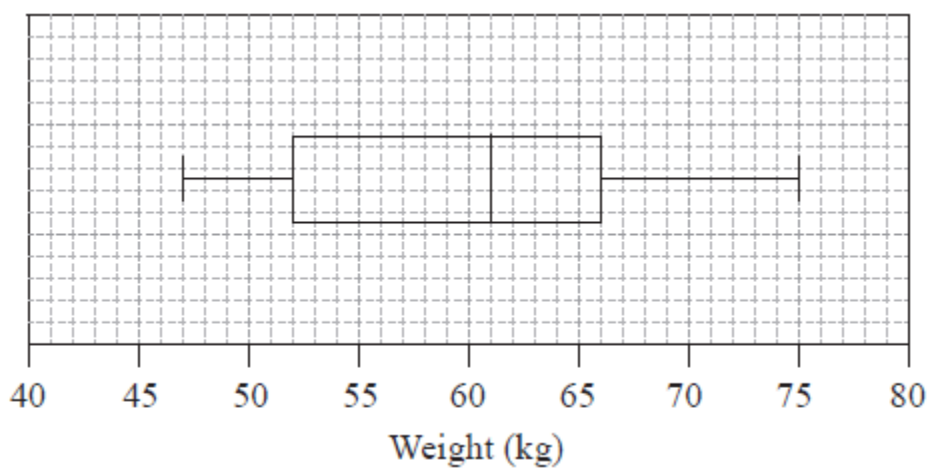
Weight (kg)

(a) Write down the median weight of the males.

(1)

(b) Calculate the interquartile range.

(2)

(c) Estimate the number of males who weigh between 61 kg and 66 kg.

(1)

(d) Estimate the mean weight of the lightest 40 males.

(2)
(Total 6 marks)