## SL MATHEMATICS

## Labour Day Review Packet

NAME: $\qquad$ -

## DATE:

$\qquad$

1. The mean of the ten numbers listed below is 5.5 .

$$
4,3, a, 8,7,3,9,5,8,3
$$

(a) Find the value of $a$.
(b) Find the median of these numbers.
2. The sports offered at a retirement village are Golf $(G)$, Tennis $(T)$ and Swimming $(S)$. The Venn diagram shows the numbers of people involved in each activity.

(a) How many people
(i) only play golf?
(ii) play both tennis and golf?
(iii) do not play golf?
(b) Shade the part of the Venn diagram that represents the set $C G \cap S$.
3. In the diagram, the lines $L_{1}$ and $L_{2}$ are parallel.

(a) What is the gradient of $L_{1}$ ?
(b) Write down the equation of $L_{1}$.
(c) Write down the equation of $L_{2}$ in the form $a x+b y+c=0$.
(Total 4 marks)
4. A woman deposits $\$ 100$ into her son's savings account on his first birthday. On his second birthday she deposits $\$ 125, \$ 150$ on his third birthday, and so on.
(a) How much money would she deposit into her son's account on his 17th birthday?
(b) How much in total would she have deposited after her son's 17th birthday?
(Total 4 marks)
(a) How many people
(i) only play golf?
(ii) play both tennis and golf?
(iii) do not play golf?
(b) Shade the part of the Venn diagram that represents the set
5. The graph of $y=x^{2}-2 x-3$ is shown on the axes below.

(a) Draw the graph of $y=5$ on the same axes.
(b) Use your graph to find:
(i) the values of $x$ when $x^{2}-2 x-3=5$
(ii) the value of $x$ that gives the minimum value of $x^{2}-2 x-3$
(Total 4 marks)
6. Of a group of five students, two will be selected to visit the United Nations. The five students are John, Maria, Raul, Henri and Susan.
(a) With the aid of a tree diagram or a table of outcomes, find the number of different possible combinations of students that could go to the United Nations.
(b) Find the probability that both Maria and Susan will go on the trip.
7. Two jars contain a number of coloured balls as indicated in the diagrams below.


Jar One


Jar Two

Two experiments are carried out.
First Experiment: A jar is first chosen at random and then a ball is drawn from that jar.
(a) Draw, and label fully, a tree diagram to show all possible outcomes of this experiment.
(b) What is the probability that a white ball is drawn?

Second Experiment: The ball drawn in the first experiment is not replaced. A second ball is then drawn from the same jar.
(c) What is the probability that both balls are white?
(Total 7 marks)
8. The tuition fees for the first three years of high school are given in the table below.

| Year | Tuition fees <br> (in dollars) |
| :---: | :---: |
| 1 | 2000 |
| 2 | 2500 |
| 3 | 3125 |

These tuition fees form a geometric sequence.
(a) Find the common ratio, $r$, for this sequence.
(b) If fees continue to rise at the same rate, calculate (to the nearest dollar) the total cost of tuition fees for the first six years of high school.
9. Mrs Harvey wants to put a 50 m long fence around her rectangular garden. She only needs to fence in 3 sides because the other side is alongside her house.


## Diagram not to scale

The width of the garden is denoted by $x$, and the length by $y$.
(a) Write an expression for $y$ in terms of $x$.
(b) Write an expression for the area, $A$, of the garden, in terms of $x$.
(c) If the area is $200 \mathrm{~m}^{2}$, find the dimensions of the garden.
(Total 8 marks)
10. The figure shows two adjacent triangular fields ABC and ACD where $\mathrm{AD}=30 \mathrm{~m}, \mathrm{CD}=80 \mathrm{~m}, \mathrm{BC}=$ 50 m . $\mathrm{A} \hat{\mathrm{D}} \mathrm{C}=60^{\circ}$ and $\mathrm{B} \hat{\mathrm{A}} \mathrm{C}=30^{\circ}$.

(a) Using triangle ACD calculate the length AC.
(b) Calculate the size of A $\hat{\mathrm{B}} \mathrm{C}$.
11. In the diagram below $\mathrm{ABEF}, \mathrm{ABCD}$ and CDFE are all rectangles. $\mathrm{AD}=12 \mathrm{~cm}, \mathrm{DC}=20 \mathrm{~cm}$ and $\mathrm{DF}=5$ cm.

M is the midpoint of EF and N is the midpoint of CD .

$\begin{array}{ll}\text { (a) Calculate } & \text { (i) the length of } \mathrm{AF} ; \\ & \text { (ii) the length of } \mathrm{AM} .\end{array}$
(b) Calculate the angle between AM and the face ABCD .

