

SEROMA CHRISTIAN HIGH SCHOOL

S.2 MATHEMATICS

2 hours

Instructions

- *Attempt all questions*
- *Clearly show all the necessary workings*

SECTION A

1. Simplify: $2\frac{3}{4} + 3\frac{1}{6} - 1\frac{1}{3}$
2. Given that $a * b = \frac{a+b}{a-b}$, find the value of
 - (i) $5 * 3$
 - (ii) $(5 * 3) * -2$
3. Convert: 5.272727... to a fraction.
4. Given that $\mathbf{a} = \begin{pmatrix} -2 \\ -9 \end{pmatrix}$, $\mathbf{b} = \begin{pmatrix} 7 \\ 2 \end{pmatrix}$ and $\mathbf{m} = \mathbf{a} + 2\mathbf{b}$. Find vector $\mathbf{m}$.
5. Given that $A = 2\pi\sqrt{\frac{C}{B}}$
 - (i) Make B the subject of A, π and C
 - (ii) Find the value of B if $C = 240$, $\pi = 3.14$ and $A = 12.56$.
6. Find the equation of the line of gradient $^{-3}/_5$ and passing through the point (3, 4)
7. A forex bureau buys one US dollar at shs 1,900 and sells one pound sterling (£) at shs 3450. Atim wants to exchange 3,000 US dollars to pound sterling. How many pound sterling will she get?
8. Simplify: $\log 75 + 2\log 2 - \log 3$
9. Solve the simultaneous equations below:
$$4x + y = 14$$
$$2x - 3y = 0$$
10. Factorize the quadratic expression $x^2 + 9x + 20$. Hence solve the equation $x^2 + 9x + 20 = 0$

SECTION B

11. a) Factorise $a^2 - b^2$ completely. Hence evaluate $3.14^2 - 0.14^2$.

- b) Betty is 9 years younger than David. John is three times as old as Betty. The sum of all their ages is 49 years.
Find;
(i) John's age
(ii) David's age
12. a) Given that $f(x) = ax + b$, $f(4) = 4$ and $f(-1) = -6$. Find the values of a and b .
b) Three pens and 4 exercise books cost shs 87,000. Two pens and 5 exercise books cost shs 93,000. Find the cost of one pen and one exercise book.
13. a) Use logarithm tables to evaluate $\frac{22.60}{47.80 \times 0.329}$
b) Given that $\log 7 = 0.845$ and $\log 2 = 0.301$, use this information to find $\log\left(\frac{49}{64}\right)$.
14. a) Using a scale of 2cm to represent 1 unit on both, draw a curve $y = x^2 + 2x - 2$ for $-4 \leq x \leq 2$ and a line $y = x + 4$.
b) Use your graph to find the point of intersection of the curve and the line.
c) State the minimum value and the line of symmetry of the curve.
15. A ship leaves a port and sails for 120km on a bearing of 062° . It then changes direction to a bearing of 160° and sails for 200km to an island. Using a scale drawing with 1cm representing 20km, find
a) the distance of the Island from the port.
b) the bearing of the port from the Island.
c) how long it would take the ship to sail directly back to the port at a speed of 20kmh^{-1} .

END