

CSSC NORTHERN ZONE
FORM TWO PRE-NATIONAL EXAMINATION-2026
MATHEMATICS-SET-2
MARKING GUIDE

Q1(a) Required; Importance of Mathematics.

- (i) Financial management
- (ii) Problem solving skills
- (iii) Time management.
- (iv) In hospital
- (v) In sports and games
- In school

@01 mark (Total=05)
Any well explained
points

Q1(b) Given $0.\dot{1}\dot{2}$ and $\frac{1}{3}$

Req: To state which value is greater than the other.

Soln

Converting $\frac{1}{3}$ into decimal

$$\frac{1}{3} = 0.3333... \text{ --- 01}$$

$$\frac{1}{3} = 0.\dot{3} \text{ --- 01}$$

Between $0.\dot{1}\dot{2}$ and $0.\dot{3}$

which are $0.121212...$ and $0.3333...$ --- 01

$\therefore$ The greater value $= \frac{1}{3}$ --- 02

Q2 @ Given; Ratio of Men: Women: Children = 6:7:3

Total number of women = 42,000

Req: (i) Number of children
(ii) Total population.

Soln (i) $\frac{\text{Men}}{6} : \frac{\text{Women}}{7} : \frac{\text{Children}}{3}$
Sum of ratio = $6 + 7 + 3 = 16$ --- 01

$$7 = 42,000$$

$$3 = x \text{ (children)}$$

$$x = \frac{3 \times 42,000}{7} = 18,000$$
 --- 01

$\therefore$ There are 18,000 children --- 01

Q2 @ (ii) If 7 (women) = 42,000 --- 00½

$$16 = x \text{ (total number of people)}$$

$$x = \frac{16 \times 42,000}{7}$$
 --- 00½

$$= 96,000$$

$\therefore$ The total population = 96,000 people --- 01

Q2 (b) Soln
 $x \propto y^2 \propto \frac{1}{p}$

$$x \propto \frac{y^2}{p}$$
 --- 01

$$x = \frac{ky^2}{p}$$

when $x = 2$, $y = 3$ and $p = 1$

$$k = \frac{xp}{y^2} = \frac{2 \times 1}{3^2} = \frac{2}{9}$$
 --- 01

Qn 02(b) cont...

$$k = \frac{2}{9}$$

Req: Value of y when $x=4$, $p=5$

from $x = \frac{ky^2}{p}$

Making y the subject

$$y = \sqrt{\frac{xp}{k}} \quad \text{--- 01}$$

$$y = \sqrt{\frac{4 \times 5}{\frac{2}{9}}} = \sqrt{20 \div \frac{2}{9}} \quad \text{--- 01}$$

$$y = \sqrt{20 \times \frac{9}{2}} = \sqrt{90}$$

$\therefore$ The value of $y = 3\sqrt{10}$ or 9.487 --- 01

03 @ Given number 628.02415

Req: (i) 3 s.f (ii) 4 d.p (iii) hundredths.

Soln

(i) 628 (to 3 s.f) --- 02

(ii) 628.0242 (to 4 d.p) --- 02

(iii) 628.02 (to hundredths) --- 02

03 (b) Given: 21,069,900 Tshs, Req: To be shared by 246 students. (to nearest thousands).

Soln

$$\frac{21,069,900}{246}$$

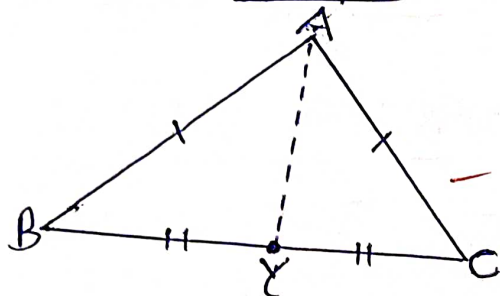
$$= 85,650 \text{ Tshs}$$

$$85650 \approx 86,000$$

$\therefore$ Each student will get 86,000 Tshs. --- 01

- 04 (a) Given: Isosceles triangle ABC where $AB = AC$ and Y is the mid point.
 Req: To prove That $\triangle ABY \cong \triangle ACY$

Soln

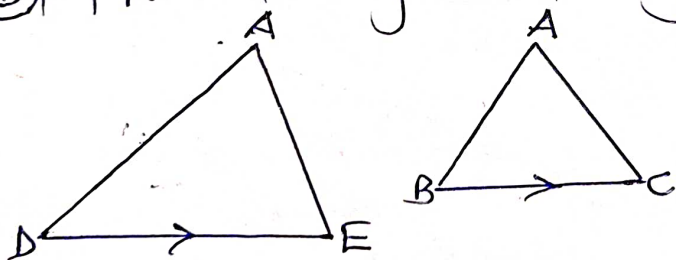


Proof: In $\triangle ABY$ and $\triangle ACY$

Argument/Statement	Reason
$\overline{AB} = \overline{AC}$	Given (S)
$\overline{BY} = \overline{CY}$	Given (S)
$\overline{AY} = \overline{AY}$	Common (S)

$\therefore \triangle ABY \cong \triangle ACY$ by SSS (Hence proved)

- 4 (b) From The Soln given triangles.



? @00 $\frac{1}{2}$ mark (Total = 01)

For similar Δ s;

$$\frac{\overline{AD}}{\overline{AB}} = \frac{\overline{DE}}{\overline{BC}} = \frac{\overline{AE}}{\overline{AC}}$$

Req: $\overline{AE}$ and $\overline{DE}$ when $\overline{AB} = 8\text{cm}$, $\overline{AC} = 9\text{cm}$,
 $\overline{BC} = 6\text{cm}$ and $\overline{AD} = 12\text{cm}$

Q4 (b) Cont...

$$\frac{12\text{cm}}{8\text{cm}} = \frac{\overline{AE}}{9\text{cm}} \quad \text{--- 01}$$

$$\overline{AE} = \frac{12\text{cm} \times 9\text{cm}}{8\text{cm}} = 13.5\text{cm}$$

$$\therefore \overline{AE} = 13.5\text{cm} \quad \text{--- 01}$$

To get $\overline{DE}$

$$\frac{\overline{DE}}{\overline{BC}} = \frac{\overline{AD}}{\overline{AB}}$$

$$\frac{\overline{DE}}{6\text{cm}} = \frac{12\text{cm}}{8\text{cm}} \quad \text{--- 01}$$

$$\overline{DE} = \frac{6\text{cm} \times 12\text{cm}}{8\text{cm}}$$

$$\therefore \overline{DE} = 9\text{cm} \quad \text{--- 01}$$

Q5 @ Given $\frac{\sqrt{3}+\sqrt{2}}{\sqrt{3}-\sqrt{2}}$; Req: To rationalize

Soln

Rationalizing factor (R.F) = $\sqrt{3}+\sqrt{2}$ --- 01

$$\frac{(\sqrt{3}+\sqrt{2}) \times (\sqrt{3}+\sqrt{2})}{(\sqrt{3}-\sqrt{2}) (\sqrt{3}+\sqrt{2})} \quad \text{--- 01}$$

$$\frac{\sqrt{9}+\sqrt{6}+\sqrt{6}+\sqrt{4}}{\sqrt{9}-\sqrt{4}} \quad \text{--- 01}$$

$$\frac{3+2\sqrt{6}+2}{3-2} \quad \text{--- 01}$$

$$\frac{3+2+2\sqrt{6}}{1} \quad \text{--- 01}$$

$$= 5+2\sqrt{6} \quad \text{Hence rationalized}$$

05 (b) Given; $\log x = 2.9285$; Req: Value of x .

Soln
 $\log x = 2.9285$

$$x = \log^{-1}(2.9285) \text{ --- 01}$$

$$x = 848.2 \text{ --- 01}$$

05 (b)(ii) Given; $(8 \times 10^5) \times (27.5 \times 10^5)$;
Req: Product in standard form

Soln
 $(8 \times 27.5) \times (10^5 \times 10^5) \text{ --- 01}$

$$= 220 \times 10^{5+5}$$

$$= 220 \times 10^{10} \text{ --- 01}$$

$$= 2.20 \times 10^2 \times 10^{10}$$

$$= 2.2 \times 10^{2+10}$$

$$= 2.2 \times 10^{12} \text{ --- 01}$$

06 (a) Let x stands for Markers pens' price and
Let y stands for Correction fluid's price. } 01

$$1^{\text{st}} \text{ order} = 50x + 20y = 40,000 \text{ } \} 01$$

$$2^{\text{nd}} \text{ order} = 10x + 20y = 24,000$$

Req: Value of Cost for each (x and y)

Soln
Solving simultaneously.

$$\begin{cases} 5x + 2y = 4000 & \text{--- (i)} \\ 1x + 2y = 2400 & \text{--- (ii)} \end{cases}$$

Q6 @ Cont...

By Elimination

$$5x + 2y = 4000$$

$$- \quad x + 2y = 2400$$

$$5x - x = 4000 - 2400$$

$$4x = 1600$$

$$x = \frac{1600}{4} = 400$$

$\therefore x = 400$ Tshs.

To get y from eqn (i)

$$5x + 2y = 4000$$

$$5(400) + 2y = 4000$$

$$2y = 4000 - 2000$$

$$2y = 2000$$

$$y = \frac{2000}{2} = 1000$$

$$y = 1000 \text{ Tshs.}$$

$\therefore$ The price (Cost) of a Marker pen box = 400 Tshs
and That of Correction fluid box = 1000 Tshs.

Q6(b) Given; $3y^2 - 11y + 10$; Req: Possible lengths.

Soln
Technique used; To find factors.

$$3y^2 - 11y + 10$$

$$a = 3, b = -11, c = 10$$

$$ac = 30 \quad (-6 \times -5)$$

$$3y^2 - 6y - 5y + 10$$

$$3y(y-2) - 5(y-2)$$

$$(3y-5)(y-2)$$

$\therefore$ Possible lengths are $(3y-5)$ and $(y-2)$

Q7 (i) Soln

From $a^2 - b^2 = (a+b)(a-b)$ ----- 01

Thus, $(50001)^2 - (49999)^2$

$= (50001 + 49999) \times (50001 - 49999)$ ----- 01

$(100,000) \times 2$

$= 200,000$ ----- 01

Q7 (ii) Given; $Kx^2 + 24x + 16$;

Req: Value of K for a perfect square.

Soln

$a = K, b = 24, c = 16$

for a perfect square eqn or expression;

$b^2 = 4ac$ ----- 00½

$(24)^2 = 4 \times K \times 16$ ----- 00½

$K = \frac{24 \times 24}{4 \times 16}$ ----- 01

$= \frac{576}{64} = 9$

$\therefore$ The value of $K = 9$ ----- 01

Q7 (b) Given inequality; $\sqrt{5x-1} \leq 3$; Req: Value of X.

Soln

Squaring both sides;

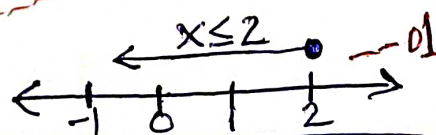
$5x - 1 \leq (3)^2$ ----- 01

$5x - 1 \leq 9$ ----- 01

$5x \leq 9 + 1$ ----- 01

$5x \leq 10$

$x \leq \frac{10}{5}; x \leq 2$



08 (a) Given $\mu = \{\text{Natural numbers less than } 20\}$
 $A = \{\text{All even numbers}\}$
 $B = \{\text{All odd numbers}\}$

Required to find (i) $n(A \cup B)$ (ii) $n(A \cap B)$

Solution.

$$\mu = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19\} \quad \text{--- } 00\frac{1}{2}$$

$$A = \{2, 4, 6, 8, 10, 12, 14, 16, 18\} \quad \text{--- } 00\frac{1}{2}$$

$$B = \{1, 3, 5, 7, 9, 11, 13, 15, 17, 19\} \quad \text{--- } 00\frac{1}{2}$$

(i) $n(A \cup B) = ?$

$$A \cup B = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19\} \quad \text{--- } 00\frac{1}{2}$$

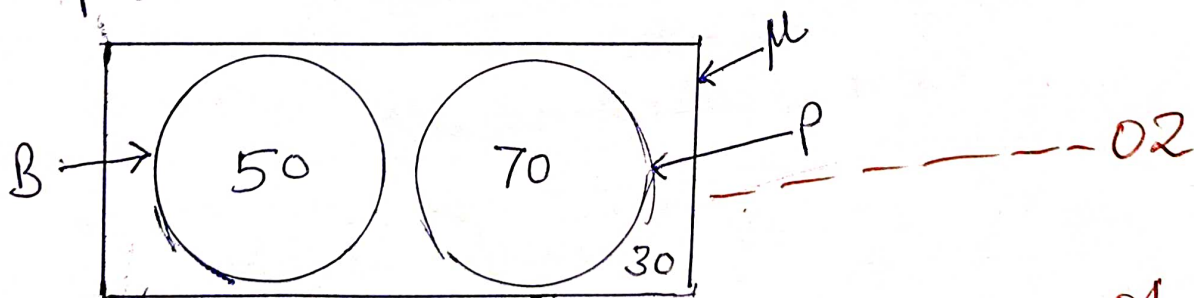
$$\therefore n(A \cup B) = 19. \quad \text{--- } 01$$

(ii) $n(A \cap B) = ?$

$$A \cap B = \{\}$$

$$\therefore n(A \cap B) = 0. \quad \text{--- } 01$$

8 (b) (i) - Let B represents the set of students with Bread
 - Let P represents the set of students with sweet potatoes.



(ii) $n(B \cup P)' = n(\mu) - n(B \cup P) \quad \text{--- } 01$

$$= 150 - (50 + 70) \quad \text{--- } 01$$

$$= 150 - 120$$

$$\therefore n(B \cup P)' = 30 \quad \text{--- } 01$$

$\therefore 30$ students have neither bread nor sweet potatoes.

9(a) Given points $P(k, 4)$ and $Q(3, k+2)$
Required to find k .

Solution

For a horizontal line, slope(m) = 0. --- 01

$$m = \frac{\Delta y}{\Delta x} = \frac{y_2 - y_1}{x_2 - x_1} \text{ --- 01}$$

$$m = \frac{k+2-4}{3-k} \text{ --- 01}$$

$$\frac{0}{1} = \frac{k-2}{3-k} \text{ --- 01}$$

$$k-2 = 0$$

$$\therefore k = 2 \text{ --- 01}$$

(b) Given the equation of a straight line
 $4x + y + 6 = 0$.

Solution

(i) The gradient = ?

Gradient, M is obtained when
 y is the subject.

$$y = -4x - 6 \text{ --- 0 1/2}$$

Comparing with $y = mx + c$

$$\therefore M = -4 \text{ --- 0 1/2}$$

(ii) y -intercept = ?

y -intercept = c .

but $c = -6$

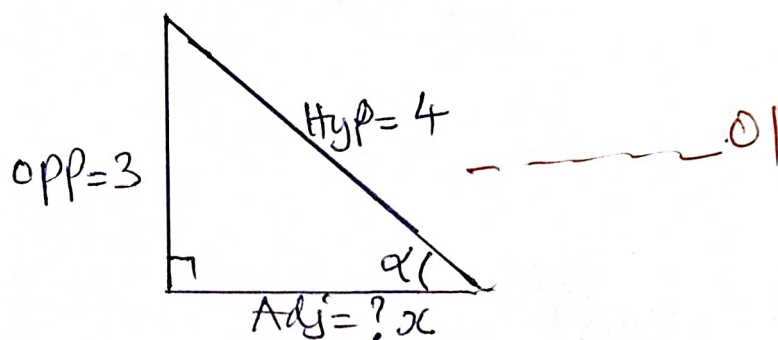
$$\therefore y\text{-intercept} = -6 \text{ --- 0.2}$$

10(a) (i) Given $\alpha = \text{acute angle}$
and $\sin \alpha = 0.75$
 $\cos \alpha = ?$

Solution

$\sin \alpha = 0.75$
changing 0.75 into fraction
 $\sin \alpha = \frac{75}{100} = \frac{3}{4}$ --- 00k2

but $\sin \alpha = \frac{\text{opp.}}{\text{hyp}}$



From Pythagoras' theorem:

$$a^2 + b^2 = c^2$$

$$x^2 + 3^2 = 4^2$$

$$x = \sqrt{16 - 9}$$

$$x = \sqrt{7}$$

but $\cos \alpha = \frac{\text{Adj}}{\text{Hyp}}$

$$\therefore \cos \alpha = \frac{\sqrt{7}}{4}$$

(ii) Required to find the value of

$$(\sin 60^\circ)^2 \cdot \cos 60^\circ$$

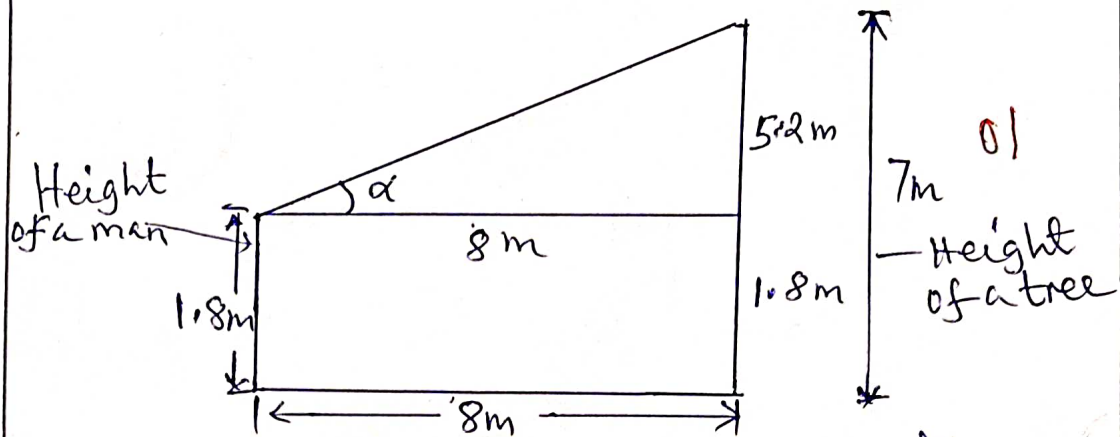
$$\text{but } \sin 60^\circ = \frac{\sqrt{3}}{2}$$

$$\cos 60^\circ = \frac{1}{2}$$

$$\therefore (\sin 60^\circ)^2 \times \cos 60^\circ = \left(\frac{\sqrt{3}}{2}\right)^2 \times \frac{1}{2}$$

$$= \frac{3}{8}$$

10(b)



Let α be the angle of elevation

From $\tan \alpha = \frac{\text{opp.}}{\text{Adj.}}$ --- 00 1/2

$$\tan \alpha = \frac{5.2 \text{ m}}{8 \text{ m}} \text{ --- 01}$$

$$\tan \alpha = 0.65$$

$$\alpha = \tan^{-1} 0.65 \text{ --- 00 1/2}$$

$$\alpha = 33^\circ$$

$\therefore$ The angle of elevation is 33° . --- 01