

**LINDI REGION**  
**FORM TWO REGIONAL MOCK EXAMINATIONS MAY, 2023**  
**BASIC MATHEMATICS**

**MARKING SCHEME**

1. a) Natural numbers between 1 and 19 are  
 1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18 and 19  
 → Prim embers are 2,3,5,7,11,13,17 and 19 02  
 Sum = 2+3+5+7+11+13+17+19 02  
 = 77 01
- b)  $0.125 \times 1.23 = 0.15375$  01  
 = 0.15 correct to 2 significant figures 02  
 $\approx 0.1538$  correct to nearest ten thousandths. 02
2. a) Let x be total no. of periods  
 Periods allocated to civics =  $\frac{1}{5}x$   
 Periods allocated to geography =  $\frac{1}{4}x$  01  
 Periods allocated to history =  $\frac{1}{8}x$   
 Periods allocated to English = 17  
 then,  
 $x = \frac{1}{5}x + \frac{1}{4}x + \frac{1}{8}x + 17$   
 $x = \frac{8x+10x+5x+17}{40}$  01  
 $x = \frac{23x+17}{40}$   
 $40x = 23x + 680$   
 $40x - 23x = 680$   
 $17x = 680$   
 $\frac{17}{17}x = \frac{680}{17}$  01  
 $X = 40$
- Hence
- (i) Total no of periods is 40 01  
 (ii) No. of Civics =  $\frac{1}{5} \times 40$  01

= 8 periods

(b) given  $U = 0.\dot{2}$

$$\longrightarrow 10U = 2.\dot{2}$$

$$10U - U = 2.\dot{2} - 0\dot{2}$$

$$9U = 2$$

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

02

And  $V = 1.86666\dots$

$$\longrightarrow V = 1.8\dot{6}$$

$$10V = 18.\dot{6}$$

$$100V = 186.\dot{6}$$

$$100V - 10V = 186.\dot{6} - 18.\dot{6}$$

$$90V = 168$$

$$V = \frac{168}{90}$$

$$V = \frac{28}{15}$$

02

$$\longrightarrow W = \frac{2}{9} + \frac{28}{15}$$

$$= \frac{10+84}{45}$$

$$= \frac{94}{45}$$

02

3. a) Since  $1L = 1000 \text{ cm}^3$

02

$$\longrightarrow \text{No. of buckets} = \frac{100,000,000 \text{ cm}^3}{(20 \times 1000) \text{ cm}^3}$$
$$= 5000 \text{ buckets}$$

02

01

$$\begin{aligned}
 \text{b) } I &= \frac{PRT}{100} && 01 \\
 &= \frac{200,000 \times \frac{3}{2} \times \frac{30}{12}}{100} && 02 \\
 &= \text{Shs. } 7500 && 02
 \end{aligned}$$

4. a) Let x be size of exterior angle

————→ interior angle is 2x

since ext angle + interior angle = 180°

————→  $x + 2x = 180^\circ$

$$\frac{3x}{3} = \frac{180^\circ}{3}$$

X = 60°

————→ Interior angle = 2 (60°)

= 120°

Let n be no of sides

Then,

Sum of interior angles = 120n

But also,

Sum of interior angles = 180 (n - 2) 01

————→  $\frac{120n}{60} = \frac{180(n-2)}{60}$  01

$$2n = 3(n-2)$$

$$2n = 3n - 6$$

$$6 = 3n - 2n$$

$$n = 6$$

alternative

$$n = \frac{360}{\text{exterior angle}(x)}$$

$$n = \frac{360^\circ}{60^\circ}$$

$$n=6$$

Hence,

The polygon is an hexagon 01

b) (i) Total length of rope =  $\frac{1C}{2} + 2r$  01

$$= \frac{1}{2} (2\pi r) + 2r$$

$$= \pi r + 2r$$

$$= r (\pi + 2)$$

$$= 35 (3.14 + 2)$$
 01

$$= 35(5.14)$$

$$= 179.9 \text{ dm}$$

$$\approx 180\text{dm}$$
 01

(ii) Area  $= \frac{1}{2} \pi r^2$  01

$$= \frac{1}{2} \times \frac{22}{7} \times 35^2$$

$$= 1925\text{dm}^2$$
 01

5. a) Let x and y be the numbers  
then,

$$\begin{cases} 3x + 2y = 12 & \dots\dots\dots\text{(i)} \\ x + y = 5 & \dots\dots\dots\text{(ii)} \end{cases}$$
 01

$$\longrightarrow \begin{cases} 3x + 2y = 12 & \dots\dots\dots\text{(i)} \\ 3(x+y) = 15 & \dots\dots\dots\text{(ii)} \end{cases}$$

$$\begin{cases} 3x + 2y = 12 & \dots\dots\dots\text{(i)} \\ 3x + 3y = 15 & \dots\dots\dots\text{(ii)} \end{cases}$$

$$\frac{-y}{-1} = \frac{-3}{-1}$$

$$y = 3$$

01

In (i) :  $3x + 2(3) = 12$

$$3x + 6 = 12$$

$$3x = 12 - 6$$

$$\frac{3x}{3} = \frac{6}{3}$$

$$x = 2$$

01

Hence, the numbers are 2 and 3 01  
 Product =  $2 \times 3 = 6$  01

b)  $x^2 - x - 6 = 0$   
 $\longrightarrow x^2 - 3x + 2x - 6 = 0$  01  
 $x(x-3) + 2(x-3) = 0$  01  
 $(x-3)(x+2) = 0$  01  
 $x-3 = 0$  or  $x+2 = 0$  01  
 $x = 0+3$  or  $x = 0-2$   
 $x = 3$  or  $x = -2$  01

6. a) Given -2 and 5 as x and y intercepts

Since  $y = mx + c$  01  
 $0 = -2m + 5$  01  
 $\longrightarrow \frac{2m}{2} = \frac{5}{2}$   
 $M = \frac{5}{2}$  01

Hence, the equation is  $y = \frac{5x}{2} + 5$  02

b) Given  $y^2 - By + 16$  is a perfect square then,

$b^2 = 4ac$  01  
 $\longrightarrow B^2 = 4(1)(16)$  01  
 $B^2 = 64$  01  
 $\sqrt{B^2} = \pm \sqrt{64}$  01  
 $B = \pm 8$  01

7. a) Given  $\left[\frac{1}{3}\right]^{\sqrt{x}} = 81^{-x}$

$\longrightarrow \left(\frac{1}{3}\right)^{\sqrt{x}} = \left(\frac{1}{81}\right)^x$  01

$$= \left(\frac{1}{3}\right)^{\sqrt{x}} = \left(\frac{1}{3}\right)^{4x} \quad 01$$

Compare exponents since bases are the same

$$\longrightarrow \sqrt{x} = 4x \quad 01$$

square both sides

$$(\sqrt{x})^2 = (4x)^2$$

$$X = 16x^2 \quad 01$$

$$\longrightarrow 16x^2 - x = 0$$

$$X(16x - 1) = 0 \quad 01$$

$$X=0 \text{ or } 16x-1=0$$

$$X=0 \text{ or } 16x=0+1$$

$$X=0 \text{ or } 16x=1$$

$$X=0 \text{ or } x = \frac{1}{16} \quad 01$$

$$\text{b) } Z = \frac{x}{y}$$

$$= \frac{0.125}{1.25} \quad 01$$

$$= 0.1 \quad 01$$

$$= 1 \times 10^{-1} \quad 02$$

8. a) In  $\triangle AOB$  and  $\triangle COD$ :

$$\overline{AO} = \overline{DO} \text{ (bisection)}$$

$$\overline{BO} = \overline{CO} \text{ (bisection)} \quad 01$$

$$\overline{AB} = \overline{CD} \text{ (given)}$$

$$\triangle AOB = \triangle COD \text{ (SSS)} \quad 01$$

$$\hat{A}BO = \hat{D}CO \text{ (definition of congruence of triangles)} \quad 01$$

$$\hat{O}AB = \hat{O}DC \text{ (definition of congruence of triangles)}$$

But these are alternate interior angles 01

Hence,  $\overline{AB} \parallel \overline{CD}$ . 01

b) Given  $\triangle UVW \sim \triangle XYZ$

$$\longrightarrow \hat{U}VW = \hat{X}YZ = 90^\circ$$

$$\hat{U}\hat{W}\hat{V} = \hat{X}\hat{Z}\hat{Y} = 30^\circ \quad 01$$

$$\hat{U}\hat{V}\hat{W} + \hat{U}\hat{W}\hat{V} + \hat{W}\hat{U}\hat{V} = 180^\circ$$

$$90^\circ + 30^\circ + \hat{W}\hat{U}\hat{V} = 180^\circ \quad 01$$

$$120^\circ + \hat{W}\hat{U}\hat{V} = 180^\circ$$

$$\hat{W}\hat{U}\hat{V} = 180 - 120^\circ$$

$$\hat{W}\hat{U}\hat{V} = 60^\circ \quad 01$$

But,

$$\hat{Z}\hat{X}\hat{Y} = \hat{W}\hat{U}\hat{V} = 60^\circ \text{ (corresponding angles)} \quad 01$$

Hence, values of the rest of angles are

$$\hat{W}\hat{U}\hat{V} = 60^\circ$$

$$\hat{X}\hat{Z}\hat{Y} = 30^\circ$$

$$\hat{Z}\hat{X}\hat{Y} = 60^\circ \quad 01$$

$$9. a) \frac{5 - 2\sqrt{3}}{\sqrt{2} + \sqrt{3}} = \frac{(5 - 2\sqrt{3})(\sqrt{2} - \sqrt{3})}{(\sqrt{2} + \sqrt{3})(\sqrt{2} - \sqrt{3})}$$

$$\frac{5\sqrt{2} - 5\sqrt{3} - 2\sqrt{3}\sqrt{2} + 2\sqrt{3}\sqrt{3}}{(\sqrt{2})^2 - (\sqrt{3})^2} \quad 01$$

$$= \frac{5\sqrt{2} - 5\sqrt{3} - 2\sqrt{3}\sqrt{2} + 2\sqrt{3}\sqrt{3}}{(\sqrt{2})^2 - (\sqrt{3})^2}$$

$$\quad 02$$

$$= \frac{5\sqrt{2} - 5\sqrt{3} - 2\sqrt{3}\sqrt{2} + 2(3)}{2 - 3}$$

$$\quad 01$$

$$2 - 3$$

$$= \frac{5\sqrt{2} - 5\sqrt{3} - 2\sqrt{6} + 6}{-1}$$

$$\quad 01$$

$$b) \text{ Given } (3^{x+3})(5^{2-y}) = \left(\frac{1}{27}\right)^5 \left(\frac{1}{5}\right)^{-2}$$

$$\longrightarrow (3^{x+3})(5^{2-y}) = \left[\frac{5}{3}\right] (5^{-1})^{-2}$$

$$(3^{x+3}) (5^{2-y}) = (3^{-3})^5 (5^2)$$

$$(3^{x+3}) (5^{2-y}) = (3^{-15}) (5^2)$$

02

$$\longrightarrow 3^{x+3} = 3^{-15} \text{ and } 5^{2-y} = 5^2$$

01

$$\longrightarrow X+3 = -15 \text{ and } 2-y = 2$$

01

$$X = -15-3 \text{ and } y = 2-2$$

$$X = -18 \text{ when } y = 0$$

01

10. a) Given  $\left[ \frac{x-y}{x+y} \right]^2 = 0.25$

$$\sqrt{\left[ \frac{x-y}{x+y} \right]^2} = \sqrt{0.25}$$

01

$$\frac{x-y}{x+y} = \sqrt{\frac{25}{100}}$$

01

$$\frac{x-y}{x+y} = \frac{5}{10}$$

$$\frac{x-y}{x+y} = \frac{1}{2}$$

01

$$x-y = 2(x-y)$$

$$x-y = 2x-2y$$

$$y+2y = 2x-x$$

$$3y = x$$

$$y = \frac{1x}{3}$$

01

b) Let x and y be the numbers

then,

$$\begin{cases} x^2 + y^2 = 25 \dots\dots\dots(i) \\ x - y = 1 \dots\dots\dots(ii) \end{cases}$$

01

from (ii)  $x = y+1$

In (i):

$$(y+1)^2 + y^2 = 25$$

$$y^2+2y+1+y^2 = 25$$

01

$$2y^2+2y+1 = 25$$

$$2y^2+2y+1-25 = 0$$

$$2y^2 + 2y - 24 = 0$$

$$\rightarrow y^2+y-12 = 0$$

01

$$y^2-3y+4y-12 = 0$$

$$y(y-3)+4(y-3)=0$$

$$(y-3)(y+4) = 0$$

$$y-3=0 \text{ or } y+4=0$$

$$y=3 \text{ or } y=-4$$

$$\rightarrow y=3$$

01

In (ii) :  $x-3 = 1$

$$x = 1+3$$

$$x = 4$$

01

Hence, the two numbers are 3 and 4.