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 X 1.23 = 0.15375 01
= 0.15 correct to 2 significant figures 02
≈ 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,
$x= \frac{1}{5}x + \frac{1}{4}x + \frac{1}{8}x+17$
$x= \frac{8x+10x+5x}{40}+17$ 01
$x= \frac{23x}{40}+17$
$40x=23x+680$
$40x-23x=680$
$17x=680$
$\frac{17}{17}x = \frac{680}{17}$ 01
X=40
Hence
(i) Total no of periods is 40 01
(ii) No. of Civics = $\frac{1}{5}$ X 40 01

= 8 periods

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

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

$10U - U = 2.\dot{2} - 02.\dot{}$

$9U = 2$

$U = \frac{2}{9}$ 02

And $V = 1.86666.....$

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

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

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

$100V - 10V = 186.\dot{6} - 8.\dot{6}$

$90V = 168$

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

$V = \frac{28}{15}$ 02

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

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

$= \frac{94}{45}$ 02

3. a) Since $1L = 1000\ cm^3$ 02

$\longrightarrow$ No. of buckets $= \frac{100,000,000\ cm^3}{(20 \times 1000)\ cm^3}$ 02

$= 5000$ buckets 01

b) $I = \frac{PRT}{100}$ 01

$= \frac{200{,}000 \times {}^{3}/_{2} \times {}^{30}/_{12}}{100}$ 02

= Shs. 7500 02

4. a) Let x be size of exterior angle

⟶ interior angle is 2x

since ext angle + interior angle = 180° 01

⟶ $x + 2x = 180°$

$\frac{3x}{3} = \frac{180°}{3}$

$X = 60°$ 01

⟶ 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

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

$2n = 3(n-z)$

$2n = 3n - 6$

$6 = 3n - 2n$

$n = 6$

alternative

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

$$n = \frac{360^0}{60^0}$$

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 (π + 2)

= 35 (3.14 +2) 01

=35(5.14)

= 179.9 dm

≈ 180dm 01

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

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

= 1925dm^2 01

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

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

$\longrightarrow$ $\begin{cases} 3x + 2y = 12 \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\text{(i)} \\ 3\,(x+y = 5) \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\text{(ii)} \end{cases}$

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

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

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=2x3=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 $\left[\frac{1}{3}\right]^{\sqrt{x}} = 81^{-x}$

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

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

Compare exponents since bases are the same

$\sqrt{x} = 4x$ 01

square both sides

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

$X = 16x^2$ 01

$16x^2 - x = 0$

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

X=0 or 16x-1=0

X=0 or 16x=0+1

X=0 or 16x=1

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

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

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

$= 0.1$ 01

$= 1x10^{-1}$ 02

8. a) In ΔAOB and ΔCOD:

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

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

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

$\triangle AOB = \triangle COD$ (SSS) 01

$A\hat{B}O = D\hat{C}O$ (definition of congruence of triangles) 01

$O\hat{A}B = O\hat{D}C$ (definition of congruence of triangles)

But these are alternate interior angles 01

Hence,

$\overline{AB} \;//\; \overline{CD}$. 01

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

$U\hat{V}W = X\hat{Y}Z = 90^o$

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

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

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

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

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

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

But,

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

Hence, values of the rest of angles are

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

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

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

9. a) $\dfrac{5 - 2\sqrt{3}}{\sqrt{2} + \sqrt{3}} = \dfrac{(5 - 2\sqrt{3})(\sqrt{2} - \sqrt{3})}{(\sqrt{2} + \sqrt{3})(\sqrt{2} - \sqrt{3})}$ 01

$= \dfrac{5\sqrt{2} - 5\sqrt{3} - 2\sqrt{3}X\sqrt{2} + 2\sqrt{3}X\sqrt{3}}{(\sqrt{2})^2 - (\sqrt{3})^2}$ 02

$= 5\dfrac{\sqrt{2} - 5\sqrt{3} - 2\sqrt{3X2} + 2(3)}{2 - 3}$ 01

$= \dfrac{5\sqrt{2} - 5\sqrt{3} - 2\sqrt{6} + 6}{-1}$ 01

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

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

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

$(3^{x+3})\ (5^{2-y}) = (3^{-15})\ (5^2)$ 02

⟶ $3^{x+3} = 3^{-15}$ and $5^{2-y} = 5^2$ 01

⟶ X+3 = -15 and 2-y = 2 01

X = $^{-}$15-3 and y = 2-2

X = $^{-}$18 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 01

y +2y = 2x –x

3y = x

y = $\frac{1x}{3}$ 01

b) Let x and y be the numbers

then,

$x^2 + y^2 = 25$ .....(i)

x –y = 1.....(ii) 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

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

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

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

$y-3=0$ or $y+4=0$

$y=3$ 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.