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= $\frac{1}{5}x$ $= \frac{1}{4}x$ 01

   ⟶Periods allocated to geography

   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

$$\frac{17}{X} = \frac{17}{40}$$

Hence

(i) Total no of periods is 40 01

(ii) No. of Civics = $1 \times \frac{40}{5}$ 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 $V = 1.86666\ldots\ldots$

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

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

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

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

$90V = 168$

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

$V = \frac{28}{15}$ 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^o 01

⟶ $x + 2x = 180^o$ $3x = 180^o$

$\frac{3}{3} = \frac{180^o}{3}$

$X = 60^o$ 01

⟶ Interior angle = $2(60^o)$

$= 120^o$

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

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

$= 3n - 6$

$6 = 3n - 2n$

$n = 6$

alternative

$n = 360$

$ex\ te\ ri\ or\ a\ n\ gl\ e(x)$

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

n=6

Hence,

The polygon is an hexagon 01

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

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

$= \pi r + 2r$

$= r(\pi + 2)$

$= 35(3.14 + 2)$ 01

$= 35(5.14)$

$= 179.9$ dm

≈ 180dm 01

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

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

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

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

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

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

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

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

$y = 3$ 01

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

$3x + 6 = 12$

$3x = 12 - 6$

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

$x = 2$ 01

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 $y = 5x + \frac{5}{2}$ 02

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

then,

$\longrightarrow$

$b^2 = 4ac$ 01

$B^2 = 4 (1) (16)$ 01

$B^2 = 64$ 01

$B^2 = \pm \sqrt{64}$ 01

$B = \pm 8$ 01

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

$= (\quad)^x$

$\longrightarrow -)^{-} \quad (^{1}\sqrt{x}$ 01

$$\sqrt[3]{81} = \sqrt{x} \qquad \left(\frac{1}{3}\right)^{4x} = \left(\frac{1}{3}\right)^{x} \qquad 01$$

Compare exponents since bases are the same

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

square both sides

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

$X = 16x^2$ 01

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

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

X=0 or 16x-1=0

X=0 or 16x=0+1

X=0 or 16x=1 X=0

or x= 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:

AO = DO (bisection)

BO = CO (bisection) 01

AB = CD (given)

$\angle$AOB = $\angle$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,

AB // CD. 01

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

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

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

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

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

But,

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

$Z\hat{X}Y = W\hat{U}V = 60^o$ (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) $5 - 2$ $(5 - 2$ $)($ $-$ $)$

$\frac{\sqrt{3}}{\sqrt{2}\ \sqrt{3}} = \frac{\sqrt{3}\ \sqrt{2}\ \sqrt{3}}{(\sqrt{2}+\sqrt{3})(\ -\ )}$ 01

$= 5\sqrt{2} - 5\sqrt{3} - 2\sqrt{3}X\sqrt{2} + 2\sqrt{3}X\sqrt{3}$

$(\sqrt{2})^2 - (\sqrt{3})^2$ 02

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

$\sqrt{2} = 5$ $2 - 3$

-5 $\sqrt{22}$ $6+\sqrt{6}$ $\sqrt{}$

-1

$= 5$

01

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

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

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

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

$\longrightarrow$

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

$\longrightarrow$ 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.