BASIC MATH
FORM II
MARKING GUIDE

1. (a) The five equivalent fractions

(i) $14/20$, multiply both numerator and denominator by 2.

$$\frac{7\times 2}{10\times 2} = \frac{14}{20} \quad 01$$

$$\frac{7\times 3}{10\times 3} = \frac{21}{30} \quad 01$$

$$\frac{7\times 4}{10\times 4} = \frac{28}{40} \quad 01$$

$$\frac{7\times 5}{10\times 5} = 35/50 \quad \text{and} \quad \frac{7\times 6}{10\times 6} = \frac{42}{60} \quad 01$$

The fractions all represent the same amount of pizza as $7/10$ even though they have different numerators and denominator.

(b) (i) 999, 888, 777 01

(ii) Given fractions $2/3$, $4/7$, $3/8$, and $5/9$

find LCM for the denominators

2	3	7	8	9
2	3	7	4	9
2	3	7	2	9
3	3	7	1	9
3	1	7	1	3
7	1	7	1	1
	1	1	1	1

$LCM = 2\times2\times2\times3\times3\times7$

$LCM = 504$ 1/2

for $2/3 \rightarrow \dfrac{\frac{504}{3}\times 2}{504} = 336/504$ 01

for $4/7 \rightarrow \dfrac{504\,(4/7)}{504} = \dfrac{288}{504}$ 01

for $3/8 \rightarrow \dfrac{504\,(3/8)}{504} = \dfrac{189}{504}$ 01

for $5/9 \rightarrow \dfrac{504\,(5/9)}{504} = \dfrac{280}{504}$ 01

$\therefore$ Arrange w.r.t to the increasing of the numerator

$3/8$, $5/9$, $4/7$, $2/3$ 1/2

Scanned with OKEN Scanner

02. (a) Lets Denote the number of mangoes David received be $2X$, then Rose received $3X$ mangoes (01)

Given that Rose received 21 more mangoes than David :, $3x = 2x + 21$.

$x = 21$ (01)

So David received $2 \times 21 = 42$ mangoes (01/2)

Rose received $3 \times 21 = 63$ mangoes (01/2)

Now, we know the ratio of David's mangoes to Mariam's mangoes is 5:2 If David got 42 mangoes, then Mariam got

$(2/5) \times 42 = 16.8$ mangoes. (01)

However since we can't have a fraction of mangoes, we can round up 16.8 to the nearest whole number

$16.8 \simeq 17$

∴ Mariam received 17 mangoes. (01)

(b) (i) Required, to find the ammount of money after with drawing 106,000 /=

$360{,}000 - (106{,}000 + 1000) = 253{,}000$ Tsh (02)

∴ Amount remained was 253,000/= Tsh (01/2)

(ii) For further drawing of Tsh 50,000 from the remaining ammount

$= 253{,}000 - (50{,}000 + 1000)$

$= 253000 - 51000$ (02)

$= 202{,}000$

∴ The remaining amount after second drawing of money is 282,000 /= Tsh (01/2)

UBN COOPERATION

03 (a) $5kg \times 1500 = 7500kg = 750kg$ 01

$9dag \times 1500 = 13500 dag = 135kg$ 01

$8g \times 1500 = 12000g = 12 kg$ 01

Total $= (750+135+12)kg = 897 kg$ 02

(b) To subtract $0.\dot{2}$ of Tsh 2700,000/=

let $x = 0.\dot{2}$ —— (1) 0½

$10x = 2.\dot{2}$ —— (2) 0½

$10x - x = 2.2 - 0.2$ 0½

$9x = 2$

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

$x = 2/9$ 0½

$2/9\,(2700,000) = 600,000$ Tsh 0½

Then 36% of Tsh 50,000/=

$\frac{36}{100} \times 500,000 = 18,000$ Tsh 0½

Then $600,000 - 18,000 = 582000$ Tsh 02

04 (a) Given I = Tsh 114,000/=

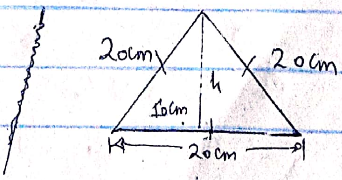
R = 9.5% and T = 3 years, find P

$I = \frac{PRT}{100}$ 02

$114,000 = \frac{P \times 19 \times 3}{2 \times 100}$ 02

P = Tsh 400,000/= 01

(b)



0½

$h = \sqrt{20^2 - 10^2} = 10\sqrt{3}$ 0½

(i) Area $= \frac{1}{2}bh = \frac{1}{2} \times 10\sqrt{3} \times 20 = 100\sqrt{3}\,cm^2$ 01

Area $= 173.2 cm^2$ 01

Perimeter = L+L+L (01)

(ii) Perimeter = (20+20+20) Cm

= 60 Cm (01)

05 (a) Given $tp^{1/2} = q(p+r)$

$(tp^{1/2})^2 = [q(p+r)]^2$ Squaring both sides (1/2)

$t^2p = (qp+qr)(qp+qr)$ (1/2)

$t^2p = q^2p^2 + q^2pr + q^2pr + q^2r^2$ (1/2)

$t^2p = q^2p^2 + 2q^2pr + q^2r^2$ (1/2)

$0 = q^2p^2 + 2q^2pr + q^2r^2 - t^2p$ (1/2)

$0 = q^2p^2 + p(2q^2r - t^2) + q^2r^2$ a quadratic eqn in p (1/2)

Using general formula

$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ (1/2)

where $x = p$, $b = 2q^2r - t^2$, $a = q^2$, $c = q^2r^2$

$p = \frac{-2q^2r + t^2 \pm \sqrt{(2q^2 - t)^2 - 4q^2(q^2r^2)}}{2q^2}$ (1/2)

$p = \frac{-2q^2r + t^2 \pm \sqrt{4q^4r^2 - 4q^2rt + t^2 - 4q^4r^2}}{2q^2}$ (1/2)

$\therefore p = \frac{-2q^2r + t^2 \sqrt{t^2 - 4q^2rt}}{2q^2}$ (1/2)

(b) $x^2 - \frac{x}{4} - \frac{8}{4} = 0$, from $4x^2 - x - 8 = 0$ divide by 4 throughout (1/2)

~~Div~~

$x^2 - \frac{x}{4} = 2$ ... add $8/4$ to both sides (1/2)

$x^2 - x/4 + c = 2 + c$, add a certain number c which will make eqn a perfect square ie $b^2 = 4ac$ (1/2)

$(1/4)^2 = 4(1)c$

$1/16 = 4c$ (1/2)

5 (b) $c = \frac{1}{16 \times 4} = 1/64 = (-1/8)^2$ 01/2

$x^2 - \frac{x}{4} + \left(\frac{-1}{8}\right)^2 = 2 + (-1/8)^2$ 01/2

$(x - 1/8)^2 = \frac{2}{1} + 1/64$ 01/2

$(x - 1/8)^2 = \frac{128 + 1}{64} = \frac{129}{64}$ 01/2

$x - 1/8 = \sqrt{\frac{129}{64}}$ 01/2

$x = 1/8 \pm \frac{\sqrt{129}}{8}$

$x = \frac{1 \pm \sqrt{129}}{8}$ 01/2

06 (a) $\text{slope} = \frac{y_2 - y_1}{x_2 - x_1}$ 01

$\text{slope} = \frac{4 - (-3)}{-3 - 4} = \frac{7}{-7} = -1$ 01

eqn of a line, $-1 = \frac{y - 4}{x - (-3)}$ 01

$y - 4 = -x + -3$ 01

$y = -x + 1$

at $x = 0$, $y = 1$

∴ y intercept $= 1$ 01

(b) $c = 4$ 01/2

$m = 1/2$ 01/2

from $y = mx + c$ 01

$y = \frac{1}{2}x + 4$ 01

at x-intercept, $y = 0$

$0 = \frac{1}{2}x + 4$ 01

$0 = x + 4$, $x = -4$

∴ x-intercept $\Rightarrow x = -4$ 01

07 (a) find x from the equation

$3 - x\log 2 = \log 250$

$3 - \log 250 = x\log 2 = \log 2^x$ 01

$\log 1000 - \log 250 = x\log 2$ 01

$\log\left(\frac{1000}{250}\right) = \log 2^x$ 01

$\log 4 = \log 2^x$ 01

$\cancel{2x} = 4$

$2^x = 2^2$

$x = 2$, 01

07 (b) To express x in terms of p and q

$p = \sqrt{q+x}$ apply square both sides 01

$p^2 = (\sqrt{q+x})^2$ 01

$p^2 = q + x$ 01

$p^2 - q = x$

$x = p^2 - q$ 01

If $p = 3$, and $q = 1$

$x = 3^2 - (1)^2 = 10$

$\therefore$ Value of $x = 10$ 01

08 (a) let $BE = y$ then the ratio of the corresponding sides gives

$\frac{AB}{AC} = \frac{BE}{CD}$, $\frac{4}{8} = \frac{y}{6}$ 01

$y = \frac{6\times 6}{8}$

$y = 4.5$ 01

$\therefore BE = 4.5$ cm

Again $\frac{AB}{AC} = \frac{AE}{AD}$ 01

UBM COOPERATION

08 (a) $\frac{6}{8} = \frac{x}{x+3}$

$6(x+3) = 8x$

$6x + 18 = 8x$ 01

$2x = 18$

$x = 9.$

Therefore $AE = 9\text{cm}$ 01

(b) Angle $\hat{A}$ is common. - given (A) 01

Angle $B\hat{E}A = C\hat{D}A$ -- Corresponding angles (A) 01

$\therefore A\hat{B}E = A\hat{C}D$ --- Corresponding angles (A) 01

Therefore, $\Delta ABE \sim \Delta ACD$ ---- by AAA similarity theorem. 02

09. (a) $(104)^2 = (100+4)^2$ 01

from $(a+b)^2 = a^2 + 2ab + b^2$

$(100+4)^2 = 100^2 + 2(100)(4) + 4^2$ 01

$= 10000 + 800 + 16$ 01

$(104)^2 = 10816$ 01

(b) $x^2 + y^2 = 13$ ⟶ (i)

$2x - 3y = 5$ ⟶ (ii)

from (ii) $x = \frac{5+3y}{2}$, substitute this in (i) 01

$\left(\frac{5+3y}{2}\right)^2 + y^2 = 13$

$25 + 30y + 9y^2 + 4y^2 = 52$ 01

$13y^2 + 30y - 27 = 0$

$13y(y+3) - 9(y+3) = 0$ 01

$(13y - 9)(y+3) = 0$

$y = 9/13$ or -3 01

Put $y = 9/13$ in $x = \frac{5+3y}{2}$ and get $x = 46/13$ 01

UBM COOPERATION

and $y = -3$ gives $x = -2$, Thus the solutions of the given equations (01)
are $x = \frac{46}{13}$, $y = 9/13$ or $x = -2$, $y = -3$

10 (a) let W = width
L = Length
Area $= LW = 98 \longrightarrow$ (i) (01)
Perimeter $= 2(L + W) = 42 \longrightarrow$ (ii)
$\therefore L + W = 21$ (01)
from (i) $L = \frac{98}{W}$, put this in (ii) and get

$$W^2 - 21W + 98 = 0$$

solve for W, $W = 14$ or 7 (01)
for $W = 14$, $L = 21 - W$
$L = 21 - 14$, $L = 7$ (01)
for $W = 7$, $L = 21 - 7$, $L = 14$ (01)

(b)
$$\frac{9^{2n-1}}{27^{n-1}} = \frac{3^{2(2n-1)}}{3^{3(n-1)}}$$

$$= \frac{3^{4n-2}}{3^{3n-3}} \quad (01)$$

$$= 3^{4n-2-(3n-3)} \quad (01)$$

$$= 3^{4n-3n-2+3}$$

$$= 3^{n+1} \quad (01)$$

$$= 3^n \times 3^1 \quad (01)$$

$$= 1.2 \times 3$$

$$= 3.6 \quad (01)$$

UBM COOPERATION