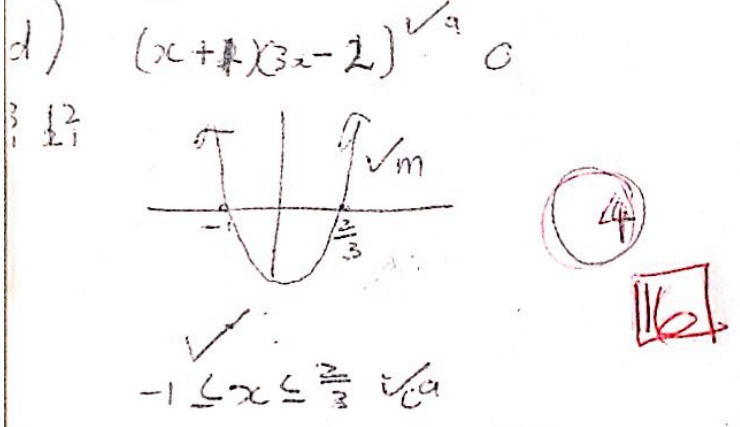


a1) $(x-3)^2 = 4x^2/m$
 $x^2 - 6x + 9 - 4x^2 = 0$
 $3x^2 + 6x - 9 = 0 \checkmark_{ca}$ (4)
 $(x+3)(x-1) = 0 \checkmark_{ca}$
 $x = -3$ or $x = 1$

b) $9x - 18 = x^2 - 12x + 36 \checkmark_{ca}$
 $x^2 - 21x + 54 = 0 \checkmark_{ca}$ (5)
 $(x-18)(x-3) = 0 \checkmark_{reject}$
 $x = 18$ or $x = 3$
 \checkmark_{ca}

c) $4^{2x} = 8^{3x-5}$
 $2^{4x} = 2^{9x-15} \checkmark_m$
 $4x = 9x - 15 \checkmark_m$ (3)
 $5x = 15$
 $x = 3 \checkmark_a$



2a) 640 \checkmark_a (1)
 bi) Quadratic \checkmark_a (1)
 ii) $2a = 20$, $3a + b = 40$
 $a = 10 \checkmark_m$, $b = 10 \checkmark_a$
 $a + b + c = 100$
 $c = 80 \checkmark_a$ (4) 6
 $T_n = 10n^2 + 10n + 80 \checkmark_{ca}$

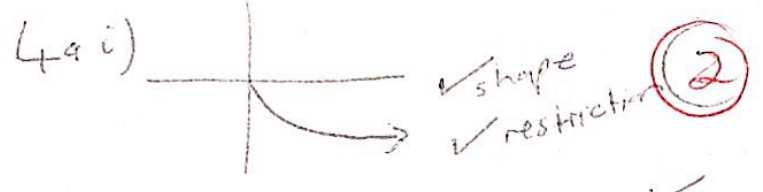
3a) $80000 = 210000(1-a)^8 \checkmark_m$
 $1-a = \sqrt[8]{\frac{8}{21}}$
 $a = 1 - \sqrt[8]{\frac{8}{21}} \checkmark_a$ (4)
 $a = 0.1136$
 11.36% \checkmark_a
 11,4% \checkmark_a

d) $k > 50$

3 bi) $500000 = x \left\{ 1 - \left(1 + \frac{0.09}{12} \right)^{-240} \right\} \checkmark_a$
 $\frac{0.09}{12} \checkmark_a$ (4)
 $x = 24498.63 \checkmark_m$ (2)

b2) $4498.63 \times 240 = 1079716 \checkmark_m$

b3) $P = 4498.63 \left[1 - \left(1 + \frac{0.09}{12} \right)^{-10} \right] \checkmark_{ca}$ (3)
 $P = 1216714.18 \checkmark_{ca}$ (13)



ii) Yes, for every x-value there is only one y-value (2)

bi) $16 = 16^{-2} \checkmark_m$ (2)
 $k = \frac{1}{4} \checkmark_a$

ii) $y = \frac{1}{4} x$ (2)
 $x = \left(\frac{1}{4} \right)^y \checkmark_m$
 $y = \log_{\frac{1}{4}} x \checkmark_a$ or $-\log_4 x$

iii) $0 \leq x \leq 1 \checkmark_a$ (2) 10

5a) $0 = 8(-6) + a \checkmark_m$
 $a = 48 \checkmark_a$ (2)

b) $y = a(x+6)(x-4) \checkmark_m$
 $48 = a(6)(-4) \checkmark_{ca}$
 $a = -2 \checkmark_a$ (4)

$f(x) = -2(x+6)(x-4) \checkmark_m$
 $y = -2x^2 - 4x + 48$

c) $x = \frac{-4}{2(-2)} = -1 \checkmark_a$ (3)
 $y = -2(-1)^2 - 4(-1) + 48 \checkmark_m$

d) $L > 50 \sqrt{\frac{m}{a}}$ (2)

6a1) $f'(x) = \lim_{h \rightarrow 0} \frac{(x^2 + 2xh + h^2 - 3x - 3h) - (x^2 - 3x)}{h} \sqrt{m}$
 $= \lim_{h \rightarrow 0} (2x + h - 3) \sqrt{a}$ (4)
 $= 2x - 3 \sqrt{a}$

a2) $2x - 3 = -1 \sqrt{m}$
 $x = 1 \sqrt{a}$

$f(1) = 1^2 - 3(1) = -2 \sqrt{m}$

$y = -1x + C$
 $-2 = -1(1) + C \sqrt{m}$ (5)
 $C = -1$

$y = -x - 1 \sqrt{a}$

6a2) b) $y = 4x^{\frac{1}{2}} - 8x^{-1} + \pi x^3 \sqrt{m}$
 $\frac{dy}{dx} = \frac{2}{\sqrt{x}} + \frac{8}{x^2} + 3\pi x^2 \sqrt{a}$ (4)

c) $f'(x) = 3ax^2 + 2bx + C \sqrt{m}$
 $3a = 18 \sqrt{a} \quad 2b = 14 \sqrt{a} \quad C = -8 \sqrt{a}$
 $a = 6 \sqrt{a} \quad b = 7 \sqrt{a}$
 $d = -7 \sqrt{a}$ (5)

7a) $S_{10} = 160$
 $a + 4d = 14 \sqrt{m}$
 $\frac{10}{2} [2a + 9d] = 160 \sqrt{m}$
 $2a + 9d = 32 \sqrt{m}$
 $d = 4 \sqrt{a}$ (5)
 $a = -2 \sqrt{a}$

b) A.S: $\log 2; \log 4$
 $\log 2; 2\log 2; 3\log 2; \dots \sqrt{m}$
 $T_n = \log 2 + (n-1)\log 2 \sqrt{m}$
 $= \log 2 (1+n-1)$
 $= n \log 2 \sqrt{a}$

G.S: $\log 2; 2\log 2; 4\log 2$
 $T_n = \log 2^a (2)^{n-1} \sqrt{m}$

$$7c) \sum_{t=1}^{12} 27p^k = \sum_{t=1}^{12} (2u - 3t)$$

$$\sum_{t=1}^{12} (2u - 3t) = 21 + 18 + \dots + (-12) \sqrt{a}$$

$$= \frac{12(21 - 12)}{2} \sqrt{a}$$

$$= 54 \sqrt{a} \quad (7)$$

$$\sum_{k=1}^8 27p^k = 27p + 27p^2 + 27p^3 + \dots = 54 \sqrt{a}$$

$$\frac{27p \sqrt{a}}{1-p} = 54$$

$$p = \frac{2}{3} \sqrt{a}$$

$$8a) y = \frac{2x+8}{x+2} \sqrt{a}$$

$$y = \frac{8}{2} \sqrt{a}$$

$$y = 4 \quad (0, 4) \sqrt{a}$$

$$0 = 2x + 8 \sqrt{a} \quad (4)$$

$$-8 = 2x$$

$$-4 = 0 \quad (-4, 0) \sqrt{a}$$

$$b) y = \frac{a}{x+2} + a \sqrt{a}$$

$$= \frac{a + ax + 2a}{x+2}$$

$$a+2=8 \Rightarrow a=6 \sqrt{a} \Rightarrow \frac{6}{x+2} + 1$$

$$x = -2 \sqrt{a}$$

$$y = 1 \sqrt{a} \quad c) y = 2 \sqrt{a}$$

$$x = -3 \sqrt{a} \quad (2)$$

$$9a) 10^3 = 1000 \sqrt{a} \sqrt{a} \quad (2)$$

$$b) \frac{5 \times 4 \times 3 \sqrt{a}}{1000 \sqrt{a}} = 0.06 \sqrt{a} \quad (3)$$

$$10a) \frac{11! \sqrt{a}}{2!2!2! \sqrt{a}} = 4989600 \sqrt{a} \quad (3)$$

$$b) \frac{8!4! \sqrt{a}}{11! \sqrt{a}} = \frac{4}{165} \sqrt{a} \quad (4)$$

$$11) \begin{matrix} \sqrt{a} & 0.9 & W & \sqrt{a} \\ & \swarrow & & \searrow \\ 0.7 & F & 0.1 & W \\ & \swarrow & & \searrow \\ & \sqrt{a} & & \sqrt{a} \\ & \swarrow & & \searrow \\ 0.3 & UP & 0.65 & W \\ & \swarrow & & \searrow \\ & & 0.35 & NW \end{matrix}$$

$$= 0.7 \times 0.9 + 0.3 \times 0.65 \sqrt{a}$$

$$= 0.8 \sqrt{a} \quad (5+2)$$

$$12a) -\frac{3}{2}t^2 + 24t = 0 \sqrt{a}$$

$$t(-\frac{3}{2}t + 24) = 0 \sqrt{a}$$

$$t = 16 \sqrt{a} \quad (4)$$

$$b) -\frac{1}{2}(16)^3 + 12(16)^2 \sqrt{a}$$

$$= 1024 m^2 \sqrt{a} \quad (2)$$

$$c) -\frac{3}{2}(1)^2 + 24(1) \sqrt{a}$$

$$= 22.5 m^2 / \text{month} \sqrt{a} \quad (3)$$

$$13a) m = 2 \sqrt{a} \quad (1)$$

$$b) -1 \sqrt{a} \sqrt{a} \quad (2)$$

$$c) x = -1 \sqrt{a} \text{ (minimum)} \quad (4)$$
$$x = 5 \sqrt{a} \text{ (maximum)}$$

$$14a) \log 5000000 - \log 5000 \quad \sqrt{m}$$

$$= \log \frac{5000000}{5000} \quad \sqrt{m}$$

$$= \log 1000 \quad \sqrt{a}$$

$$= 3 \quad (4)$$

$$b) \log \left(\frac{I}{I_0} \right) = 4 \quad \sqrt{m}$$

$$10^4 = 10000 \quad \sqrt{a} \quad (2)$$

$$15) a(a+a) - b = 0 \quad \sqrt{m}$$

$$2a^2 = b \quad \sqrt{a}$$

$$2b^2 + b - bd = 0 \quad \sqrt{m}$$

$$2(2a^2)^2 + 2a^2 - 2a^2 d = 0 \quad \sqrt{ca}$$

$$2a^2 (4a^2 + 1 - d) = 0 \quad \sqrt{a}$$

$$4a^2 + 1 - d = 0 \quad \sqrt{ca}$$

$$4a^2 = d - 1 \quad (7)$$