

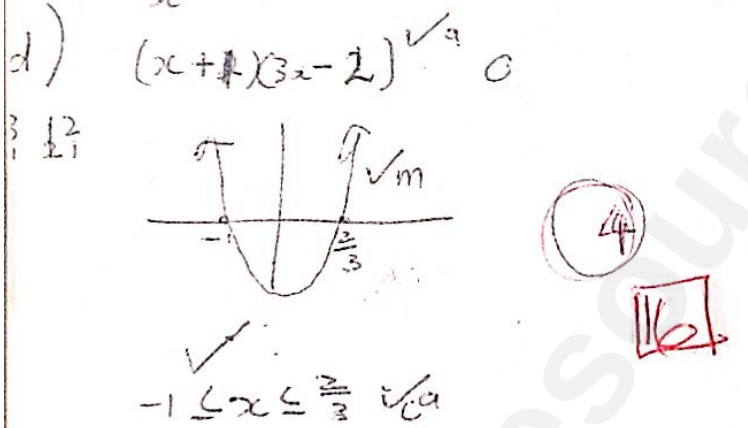


eduresourceza.com

a1) $(x-3)^2 = 4x^2$ ✓
 $x^2 - 6x + 9 - 4x^2 = 0$ ✓
 $3x^2 + 6x - 9 = 0$ ✓ (4)
 $(x+3)(x-1) = 0$ ✓
 $x = -3$ or $x = 1$ ✓

b) $9x - 18 = x^2 - 12x + 36$ ✓
 $x^2 - 21x + 54 = 0$ ✓ (5)
 $(x-18)(x-3) = 0$ ✓
 $x = 18$ or $x = 3$ ✓
 reject ✓

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

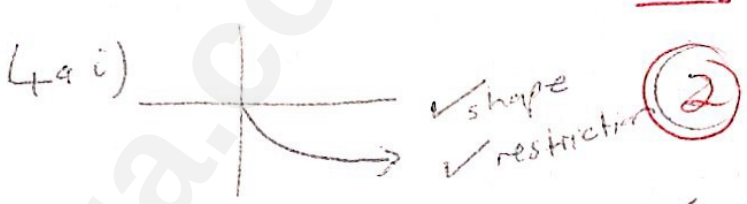


2a) 640 ✓ (1)
 bi) Quadratic ✓ (1)
 ii) $2a = 20$ ✓ $3a + b = 40$ ✓
 $a = 10$ ✓ $b = 10$ ✓
 $a + b + c = 100$ ✓
 $c = 80$ ✓ (4) [6]
 $T_n = 10n^2 + 10n + 80$ ✓

3a) $80000 = 210000(1-a)^8$ ✓
 $1-a = \sqrt[8]{\frac{8}{21}}$ ✓
 $a = 1 - \sqrt[8]{\frac{8}{21}}$ ✓ (4)
 $a = 0.1136$ ✓
 11.36% ✓
 11.4% ✓

$\sqrt{a} = x \left(1 - \left(1 + \frac{0.09}{12} \right)^{-240} \right)$ ✓
 $\frac{0.09}{12}$ ✓ (4)
 $x = 24498.63$ ✓ (2)

b2) $4498.63 \times 240 = 1107767.6$ ✓
 b3) $P = 4498.63 \left[1 - \left(1 + \frac{0.09}{12} \right)^{-240} \right]$ ✓
 $\frac{0.09}{12}$ ✓ (3)
 $P = 1216714.18$ ✓ (13)



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

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

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

iii) $0 \leq x \leq 1$ ✓ (2) [10]

5a) $0 = 8(-6) + q$ ✓
 $q = 48$ ✓ (2)

b) $y = a(x+6)(x-4)$ ✓
 $48 = a(6)(-4)$ ✓
 $a = -2$ ✓ (4)

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

c) $x = \frac{-4}{2(-2)} = -1$ ✓
 $\frac{-4}{2(-2)}$ ✓ (3)

d) $L > 50$ ✓
 Downloaded from eduresourceza.com

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

a2) $2x - 3 = -1$ ✓
 $x = 1$ ✓

$f(1) = 1^2 - 3(1) = -2$ ✓

$y = -x + C$

$-2 = -1(1) + C$ ✓
 $C = -1$ ✓
 (5)

$y = -x - 1$ ✓

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

c) $f'(x) = 3ax^2 + 2bx + C$ ✓

$3a = 18$ ✓ $2b = 14$ ✓ $C = -8$ ✓
 $a = 6$ ✓ $b = 7$ ✓

$d = -7$ ✓

(5)

7a) $S_{10} = 160$

$a + 4d = 14$ ✓

$\frac{10}{2} [2a + 9d] = 160$ ✓

$2a + 9d = 32$ ✓

$d = 4$ ✓

$a = -2$ ✓

(5)

b) A.S: $\log 2; \log 4$

$\log 2; 2\log 2; 3\log 2; \dots$ ✓

$T_n = \log 2 + (n-1)\log 2$ ✓

$= \log 2 (1 + n - 1)$

$= n \log 2$ ✓

G.S: $\log 2; 2\log 2; 4\log 2$ ✓

$T_n = \log 2 (2)^{n-1}$ ✓

$$7c) \sum_{k=1}^{12} 21p^k = \sum_{k=1}^{12} (2u-3t)$$

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

$$= \frac{12(21-12)}{2} \checkmark m$$

$$= 54 \checkmark a$$

(7)

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

$$\frac{27p}{1-p} = 54 \checkmark m$$

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

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

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

$$y = 4 \quad (0, 4) \checkmark a$$

$$0 = 2x + 8 \checkmark m$$

$$-8 = 2x$$

$$-4 = x \quad (-4, 0) \checkmark a$$

(4)

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

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

$$q = 1 \checkmark a$$

$$a+2=8 \checkmark a$$

$$a=6 \checkmark a$$

$$\frac{6}{x+2} + 1$$

$$x = -2 \checkmark a$$

$$y = 1 \checkmark a$$

$$c) y = 2 \checkmark a$$

$$x = -3 \checkmark a$$

(2)

$$9a) 10^3$$

$$= 1000 \checkmark a$$

(2)

$$b) \frac{5 \times 4 \times 3}{1000} \checkmark a$$

$$= 0.06 \checkmark a$$

(3)

$$10a) \frac{11!}{2!2!2!} \checkmark a = 4989600 \checkmark a$$

(3)

$$b) \frac{8!4!}{11!} \checkmark a = \frac{4}{165} \checkmark a$$

(4)

$$11) \begin{array}{l} \text{0.7} \swarrow \text{F} \searrow \text{0.1} \text{NW} \\ \text{0.3} \swarrow \text{UP} \searrow \text{0.35} \text{NW} \\ \text{0.65} \text{W} \end{array} \checkmark a$$

$$= 0.7 \times 0.9 + 0.3 \times 0.45 \checkmark a$$

$$= 0.8 \checkmark a$$

(5+2)

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

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

$$t = 16 \checkmark a$$

(4)

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

$$= 1024 \text{ m}^2 \checkmark a$$

(2)

$$c) -\frac{3}{2}(1)^2 + 24(1) \checkmark m$$

$$= 22.5 \text{ m}^2/\text{month} \checkmark a$$

(3)

13a) $m=2$ ✓ (1)

b) $-1 \leq x \leq 5$ ✓ (2)

c) $x = -1$ (minimum) ✓
 $x = 5$ (maximum) ✓ (4)

14a) $\log 5000000 - \log 5000$ ✓
 $= \log \frac{5000000}{5000}$ ✓
 $= \log 1000$ ✓
 $= 3$ ✓ (4)

b) $\log \left(\frac{I}{I_0} \right) = 4$ ✓
 $10^4 = 10000$ ✓ (2)

15) $a(a+b) - b = 0$ ✓
 $2a^2 = b$ ✓

$2b^2 + b - bd = 0$ ✓

$2(2a^2)^2 + 2a^2 - 2a^2d = 0$ ✓

$2a^2(4a^2 + 1 - d) = 0$ ✓

$4a^2 + 1 - d = 0$ ✓

$4a^2 = d - 1$

(7)