L-Università ta' Malta

Pure Mathematics Advanced Level June 2019 Examination – Answers

1. (a) $16x^4 - 96x^3y + 216x^2y^2 - 216xy^3 + 81y^4$.
1. (b) $4\log a - \log b$.
1. (c) $x = 8$ or $x = \frac{1}{16}$.

2. (a) $b = -4$.
2. (b) $f(x) = (x + 2)(3x - 2)(2x + 1)$.
2. (c) $x \leq -2$ or $-\frac{1}{2} \leq x \leq \frac{2}{3}$.

3. (a) (ii) $x^2 - 24x + 19 = 0$.
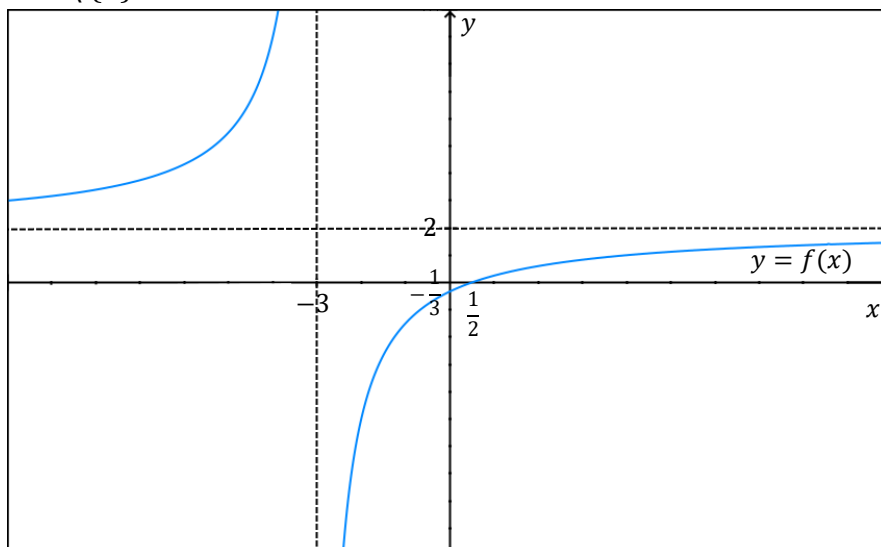3. (b) (i) $b = -10$.
3. (b) (ii) $x = 5 \pm \sqrt{2}$.

4. (a) (ii) $R(1, 2)$.
4. (a) (iii) $S(6, -1)$.

5. (a) $a = 2, b = -7$.
5. (b) Range: $f(x) \in \mathbb{R} \setminus \{2\}$.

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5. (c) $f^{-1}(x) = \frac{3x+1}{2-x}$. Domain: $x \in \mathbb{R} \setminus \{2\}$. Range: $f(x) \in \mathbb{R} \setminus \{-3\}$.

5. (d) $g \circ f(x) = \frac{x+3}{2x-1}$. Domain: $x \in \mathbb{R} \setminus \left\{-3, \frac{1}{2}\right\}$.

6. (a) (i) $R = 2, \alpha = \frac{\pi}{6}$.

6. (a) (ii) $\theta = -\frac{2\pi}{3}, -\frac{\pi}{2}, \frac{\pi}{3}, \frac{\pi}{2}$.

7. (a) $x = 13, y = 6$.

7. (b) (ii) 4096.

7. (b) (iii) 63.

8. (a) (i) $\frac{6}{(3x-1)^{3/2}}$.

8. (a) (ii) $\frac{1-2xe^y}{2y+x^2e^y}$.

8. (b) (ii) $x + 2y - 1 = 0$.

9. (a) $\frac{1}{9}e^{3x}(6x + 1) + k, \ a = 6, \ b = 1$.

9. (b) $\frac{3}{x-1} + \frac{2x}{x^2+2}$.

10. (a) $\sin y = \frac{1}{4}\left(3 - \frac{1}{(x^2+1)^2}\right)$.

10. (b) (i) $h = \frac{500}{\pi r^2}$ cm.

10. (b) (iii) $r = 4.3$ cm.