

Maths 165

Review Sheet 3 Answers

1. 9.99
2. 9.99
4. $y = x$ is a slant asymptote (as $x \rightarrow -\infty$)
5. When $x = 1,000/3$, then $P(x) = \dots$
6. 2.68269579
7. 1.01395761
8. $-\frac{16}{5}$
9. (a) $-\frac{1}{2}$
(b) 2
(c) 2
(d) $e^{-1/2}$
10. (a) Absolute max = 7. Absolute min = -9.
(b) Abs. max = $4e^2$. Abs. min = 0.
(c) Abs. max 0. Abs. min = -6.
11. $f'(x) = 0$ at $x = \frac{1}{3}$ and $f'(x)$ d.n.e. at $x = 0$.
12. $4 \leq f(4) \leq 16$.
13. It does not contradict the Mean Value Theorem!
14. (a) Increasing on $(-\infty, \frac{1}{3}) \cup (1, \infty)$ and decreasing on $(\frac{1}{3}, 1)$. Local max at $x = \frac{1}{3}$. Local min at $x = 1$.
- (b) Increasing on $(-2, \frac{2}{5})$ and decreasing on $(-\infty, -2) \cup (\frac{2}{5}, \infty)$. Local min at $x = -2$, Local max at $x = \frac{2}{5}$.
- (c) Decreasing on $(-\infty, 0)$ and increasing on $(0, \infty)$. Local min at $x = 0$.
- (d) Increasing on $(-\pi, -\frac{\pi}{2}) \cup (0, \frac{\pi}{2})$ and decreasing on $(-\frac{\pi}{2}, 0) \cup (\frac{\pi}{2}, \pi)$. Local max at $x = \pm\frac{\pi}{2}$ and local min at $x = 0$.
15. It is always concave up. No inflection points!
16. About 2.33 hours.
17. 2.
18. $f(x) = 3e^x - 5\sin(x) + 4x - 2$.
19. (a) $v(t) = 80 - 40t$ and $x(t) = 80t - 20t^2$.
(b) No.
20. (a) $p(t) = 100e^{\left(\frac{-t \ln 2}{1.4 \times 10^{-4}}\right)}$
(b) $p(4.3 \times 10^{-4}) = 100e^{\left(\frac{-(4.3) \ln 2}{1.4}\right)} \approx 11.896$ mg