MA129 Mock Exam

Answers

(Full Solutions will NOT be posted;
use the MAC's drop-in help centre if you have any questions.)

**** Please remember that the mock test was meant as a means of providing an extra set of practice questions and basis for a review class. Do not study for the midterm based solely on the topics covered by the mock test! Go back through notes/labs/homework to ensure you have reviewed all concepts discussed in the course.

1. $x = 11$
2. $x = 6$
3. $(-\infty, -5) \cup (-5, -2) \cup (2, \infty)$
4. $y = 3x - 2$
5. $g'(x) = 2x \log_2(3 - x) - \dfrac{x^2}{(\ln 4)(3 - x)}$
6. $y'' = (2 \ln 3)^2 \cdot 3^{2x+1} + 4x\left(2x^3 - 1\right)^{-2/3} - 8x^4\left(2x^3 - 1\right)^{-5/3}$
7. \$1200/month
8. $\begin{bmatrix} 2 & 2 \\ 2 & 1 \end{bmatrix}$
9. (a) increasing for $x \in (-\infty, 0) \cup (4, \infty)$; decreasing for $x \in (0, 2) \cup (2, 4)$
   (b) relative minimum at $(4, 8)$; relative maximum at $(0, 0)$
   (c) concave down for $x \in (-\infty, 2)$; concave up for $x \in (2, \infty)$
10. $\dfrac{1}{3}x^3 + 3x + \dfrac{4}{x} + C$
11. $\ln|x| + \dfrac{x^2}{2e} - \dfrac{x^{e+1}}{e+1} + e^x - 2^{e+1}x + C$
12. $\dfrac{14}{27}$
13. $\ln^2\left(x^2 + 1\right) + C$
14. (a) 13 (b) 3
15. (a) x-intercepts: $(2, 0)$, $(5, 0)$; vertex: $\left(\dfrac{7}{2}, -\dfrac{9}{4}\right)$ (b) $A = 12$
16. (a) — (b) after 18 months
17. (a) $(0, 0)$ and $(1, 2)$ (b) $(0, 0)$ is a saddle point; $(1, 2)$ is location of a relative min
18. 2000 units at Plant A and 8000 units at Plant B, to get a min cost of \$1 920 000 025 000 (!!)