MATH 103 – Sample Final Exam 1 Answers

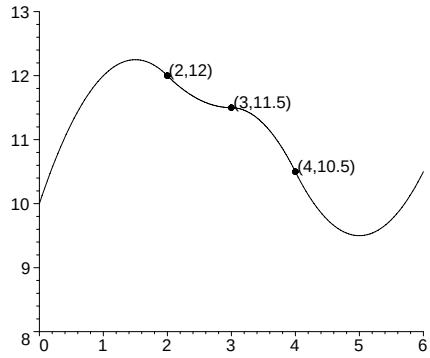
1. B 2. C 3. B 4. C 5. D 6. C
7. D 8. E 9. D 10. B 11. A 12. C

13. (a) $100 \cdot 2^{3/5} \approx 151.6$ grams, (b) $40 \ln 2 \approx 27.7$ grams/hour,
(c) $150/\ln 2 \approx 216.4$ grams

14. (a)

x	0	1	2	3	4	5	6
$g(x)$	10	12	12	11.5	10.5	9.5	10.5

(b)(1.5, 12.25) and (5,9.5)
(c) on [2,3] and [4,6], (d) $x = 2, 3, 4$
(e)



15. $30\sqrt{3}$ feet for the two opposite shrub sides, $100\sqrt{3}/3$ feet for the fence and opposite sides

16. (a) max at $(e, 1/e)$, no min, inflection at $(e\sqrt{e}, \frac{3}{2e\sqrt{e}})$
(b)$(-\infty, 1/e]$, (c) $c \in (-\infty, 1/e]$, (d) $c \in (0, 1/e)$, (e) $a \in (0, e^{1/e}]$

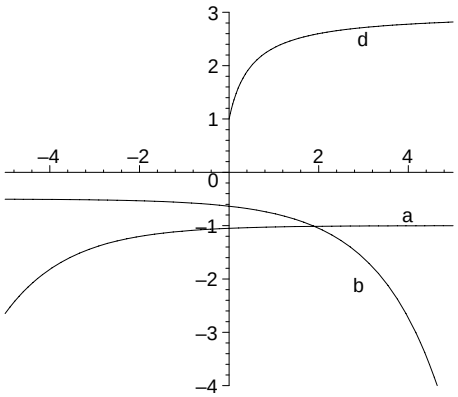
MATH 103 – Sample Final Exam 2 Answers

1. F 2. E 3. D 4. C 5. D 6. D
7. B 8. C 9. D 10. A 11. A 12. G

13. radius $= \dfrac{\sqrt[3]{4}}{2\sqrt[3]{\pi}}$ m, height $= \sqrt[3]{4\pi}$ m, total length $= 3\sqrt[3]{4\pi}$ m.

14. (a) $P = 800e^{\frac{1}{3}(\ln \frac{7}{4})t}$ (b) $3 \ln 10/\ln \frac{7}{4}$ days (about 12.3)
(c) $800e^{-\ln \frac{7}{4}}$ aphids (about 664)
(d) $\dfrac{800}{3}(\ln \dfrac{7}{4})e^{\frac{5}{3}\ln \frac{7}{4}}$ aphids per day (about 379) – On the fifth day, the population is increasing by about 379 aphids per day.

15. C can't exist since graph must be above tangent lines, and there must be a point x_0 with $f'(x_0) \neq 0$ since f'' is nonzero. If $f'(x_0) > 0$, follow tangent line to the right from x_0, it must hit the x axis and graph will be above. If $f'(x_0) < 0$, then go left. For other three, see:



16. $k = 1/2$