

MATH 144 Summer I 2009
PRACTICE FINAL EXAM SOLUTIONS

1. 4

2. YES, because

$$\lim_{x \rightarrow 4^-} f(x) = \lim_{x \rightarrow 4^+} f(x) = f(4).$$

3. $y + 3 = \frac{5}{2}(x - 1)$

4. (a) $18(t^4 + 3t)^{17} * (4t^3 + 3)$

(b) $\frac{21x^2 - 4x}{7x^3 - 2x^2 + 3}$

(c) $4x^3e^{5x} + 5x^4e^{5x}$

(d) $y = \frac{(x^3 + 4x + 5)14e^{2x} - (7e^{2x} + 4)(3x^2 + 4)}{(x^3 + 4x + 5)^2}$

5. $y = 240x^2 - 36$

6. $\frac{dy}{dx} = \frac{-4x - 4x^3y}{x^4 - 9y^2}$

7. (0, 2) is a horizontal point of inflection, (3, -25) is a minimum, (2, -14) is a point of inflection

8. (a) VA at $x = 2$, HA at $y = 0$

(b) VA at $x = -2, x = 1$. HA at $y = 3$

9. VA at $x = 1$ and $x = -1$, HA at $y = 1$, (0, 0) is a maximum

10. (a) $\frac{1}{2} \left(\frac{(x^2 + 6x)^9}{9} \right) + C$

(b) $\frac{1}{4} \ln |x^4 - 8x| + C$

(c) $\frac{11}{8} e^{4x^2} + C$

11. 10 m by 15 m

12. $y^2 = \frac{1}{-\frac{1}{3}x^6 + C}$

13. 190,570

14. (a) $\frac{17}{4}$
(b) $\frac{14}{3}$
15. (a) 6
(b) $\frac{31}{15}$
16. $\frac{1}{6}$
17. 45
18. \$3830 per month
19. (a) 10
(b) $R(x) = 5x^2 + 20x$
(c) $C(x) = \frac{1}{3}x^3 + x^2 + 102$
(d) \$102
(e) $P(x) = -\frac{1}{3}x^3 + 4x^2 + 20x - 102$
(f) $P(10) \approx \$164.67$
20. $C(x) = 30(2x + 1)^{\frac{3}{2}} + 70$
21. (a) $3\left[-\frac{1}{2} \ln \left| \frac{2 + \sqrt{4 - x^2}}{x} \right| \right] + C$
(b) $\frac{1}{3}\left[\frac{1}{10} \ln \left| \frac{5 + (3x + 1)}{5 - (3x + 1)} \right| \right] + C$
22. (a) $x^2(x^2 + 7)^5 - \frac{(x^2 + 7)^6}{6} + C$
(b) $\frac{1}{3}$
(c) DNE