

Fall 2005 Math 151
Exam 2 Review Exercises - Solutions

1. a.) $\frac{3}{5}$
 b.) $\frac{5}{3}$
 c.) $\frac{2\sqrt{2}}{3\pi}$
2. $\cos^2 x - \sin^2 x$
3. $\frac{2\sqrt{2}(\pi - 4)}{\pi^2}$
4. $y - 2 = 2\sqrt{3}(x - \frac{\pi}{3})$
5. $12 \sin^2 4x \cos 4x$
6. $y = -\frac{3}{2}x + 4$
7. -20
8. 20
9. $G'(x) = -\sin(f(x))f'(x) - f'(\cos x)(\sin x)$
10. $\frac{3x^2y^3 + \sin(x - 2y)}{2\sin(x - 2y) - 3x^3y^2}$
11. $y = x$
12. $g'(x) = \frac{f(x^2) + 2x^2f'(x^2)}{6 - 2g(x)}$
13. $\langle \frac{2}{\sqrt{85}}, \frac{9}{\sqrt{85}} \rangle$
14. a.) velocity: $\langle 5, 20 \rangle$, speed: $\sqrt{425}$ feet per second
 b.) $\sqrt{1321}$ feet per second
 c.) 90 feet
15. a.) The curve is the ellipse $\frac{x^2}{4} + \frac{y^2}{9} = 1$.
 b.) Position: $\langle 1, 1.5\sqrt{3} \rangle$, tangent: $\langle -\sqrt{3}, 1.5 \rangle$,
 acceleration: $\langle -1, -1.5\sqrt{3} \rangle$
 c.) $x = 1 - \sqrt{3}t$, $y = 1.5\sqrt{3} + 1.5t$
16. $2 \cos^2 x - 2 \sin^2 x$
17. $\theta = 15.25^\circ$ (approximately)
18. $y = -x$
19. a.) $y - 9 = 3/4(x - 5)$
 b.) Vertical: $(0, 0)$ and $(-27, 9)$; horizontal: $(-3, -3)$.
20. $(-5, 6), (-\frac{208}{27}, \frac{32}{3})$
21. 62.5 mph
22. Increasing at a rate of 30π cubic inches/minute
23. $\frac{12}{125}$ radians/second
24. $\frac{2}{9\pi}$ inches/minute
25. a.) $\Delta y = -1.25$
 b.) $dy = -1$
26. 5.1
27. 12π
28. $L(x) = 2 + 1/4(x - 1)$; 1.995
29. quadratic approximation:
 $1/3 - 1/9(x - 1) + 1/27(x - 1)^2$
30. $\frac{81}{40}$
31. Draw the tangent line to the curve at $x = x_1$.
 Where this tangent line intersects the x axis, that
 is the location of x_2 .
32. 0
33. 0
34. $2e^{2+e^2}$
35. $r = -3$ or $r = 1$
36. $\frac{\cos(e^{\sqrt{t}} + 1)e^{\sqrt{t}}}{2\sqrt{t}}$
37. $\frac{1}{3^{21}}e^{\frac{x}{3}}$
38. a.) $g(10) = 1$
 b.) $g'(10) = \frac{1}{12}$
39. $f^{-1}(x) = \frac{x^3 - 5}{2}$
40. $f^{-1}(x) = \frac{2x + 2}{1 - x}$.

41. $-\frac{1}{3}$

42. 3

43. $\log_8 \frac{x(x+1)}{\sqrt{9x+2}}$

44. $x = 2$

45. $x = \frac{e^y + 9}{7}$

46. There is NO solution.

47. $\frac{\ln x + 3}{6}$

48. $\log \frac{2}{3}$

49. 1.5

50. $-2 < x < 2$