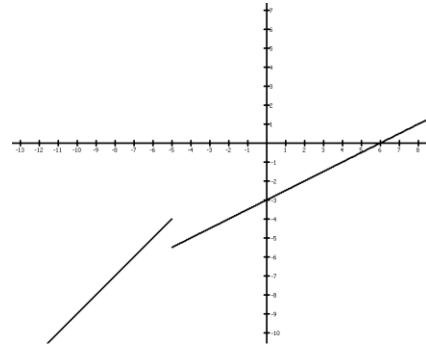


Math 1510 Final Exam Review Answers

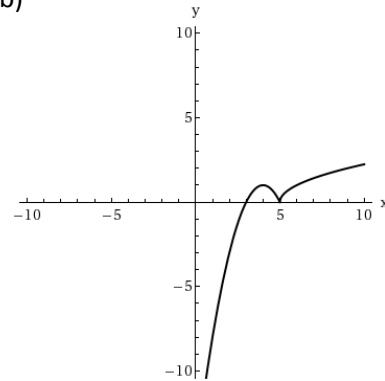
1. a) 2,3
b) $-9, 18$
c) 8, 16
d) $-2 - 2\sqrt{3}, 2\sqrt{3} - 2$
e) No Real Solution
f) $-\frac{4}{3}, 0, \frac{4}{3}$
g) $\frac{1}{2}(-5 - \sqrt{57}), \frac{1}{2}(\sqrt{57} - 5)$
h) $1, -\frac{343}{64}$
i) -16
j) $340, -346$
k) $-6, 2$
2. a) $2 - i\sqrt{2}, 2 + i\sqrt{2}$
b) $-3, 3, -4i, 4i$
c) $-2, -i\sqrt{7}, i\sqrt{7}$
3. a) $(-\infty, -2) \cup (4, \infty)$
b) $[-2, 0] \cup [2, \infty)$
c) No solution
d) $(-\infty, \frac{9}{5}] \cup (9, \infty)$
4. a) parallel to $y = \frac{4}{3} - \frac{2x}{3}$,
perpendicular to $y = \frac{3x}{2} + \frac{29}{12}$
b) parallel to $x = 5$,
perpendicular to $y = -7$
5. $w(S) = 0.03S + 4700$
6. a) 5
b) $5t^2 - 29t + 41$
c) $5t^2 - 9t - 2$
7. a) 10, b) 18, c) 0
8. a) All real numbers
b) All real numbers x such that $x \geq 14$
c) All real numbers s such that $s \geq 5$
except $s = 9$
9. domain $(-\infty, \infty)$, range $(-\infty, 4]$
a) -5, b) 0, c) 4, d) -5
10. No, y is not a function of x

11. a) increasing $(-\infty, 0) \cup (2, \infty)$
decreasing $(0, 2)$
constant DNE
a) increasing $(-\infty, 0) \cup (2, \infty)$
decreasing *DNE*
constant $(0, 2)$

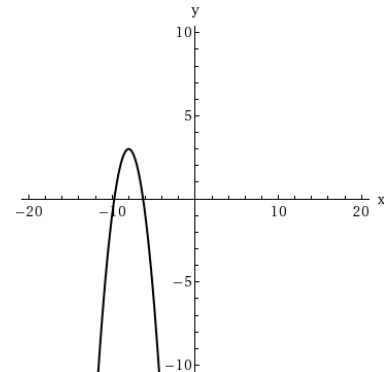
12. a)



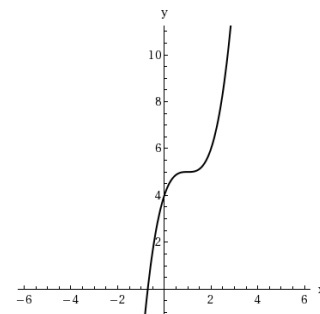
b)



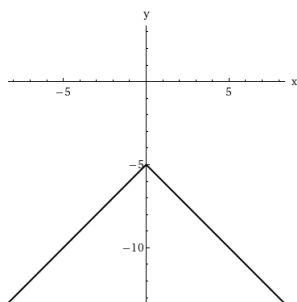
13. a)



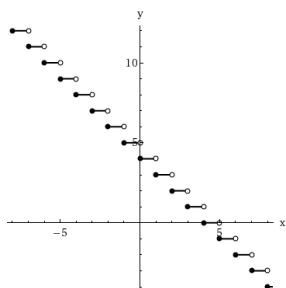
b)



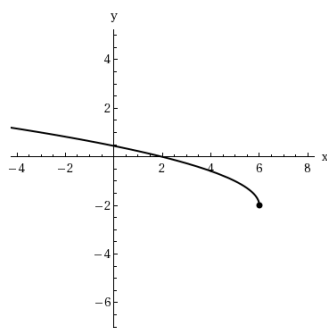
c)



d)



e)



14. a) $(f + g)(x) = x^2 + 3x - 5$

b) $(f - g)(x) = x^2 - 3x + 5$

c) $(fg)(x) = 3x^3 - 5x^2$

d) $(f/g)(x) = \frac{x^2}{3x-5}$

e) $\left(-\infty, \frac{5}{3}\right) \cup \left(\frac{5}{3}, \infty\right)$

15. a) $(f + g)(x) = \frac{6}{x^2} + \frac{6}{x}$

b) $(f - g)(x) = \frac{6}{x} - \frac{6}{x^2}$

c) $(fg)(x) = \frac{36}{x^3}$

d) $\left(\frac{f}{g}\right)(x) = x$

e) $(-\infty, 0) \cup (0, \infty)$

16. a) $(f \circ g)(x) = (x - 5)^2$

b) $(g \circ f)(x) = x^2 - 5$

c) $(g \circ g)(x) = x - 10$

17. $f(x) = x^2 + 4$

18. a) $(f \circ g)(x) = \sqrt{x^2 + 7}$

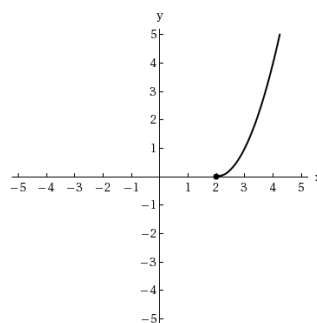
b) $(g \circ f)(x) = x + 7$

c) $(-\infty, \infty)$

d) $[-7, \infty)$

19. a) 5, b) 0, c) 0, d) 4

20.



21. No, it is not 1-1

22. a) yes, $f^{-1}(x) = \frac{x-9}{8}$

b) yes, $f^{-1}(x) = \sqrt{x} - 1, x \geq 0$

23. $y = 5 - (x + 2)^2$

a) $(-2, 5)$

b) $x = -2$

c) $(-2 - \sqrt{5}, 0) (-2 + \sqrt{5}, 0)$

d) $(0, 1)$

24. $y = 8\left(x - \frac{1}{2}\right)^2 + 19$

a) $\left(\frac{1}{2}, 19\right)$

b) $x = \frac{1}{2}$

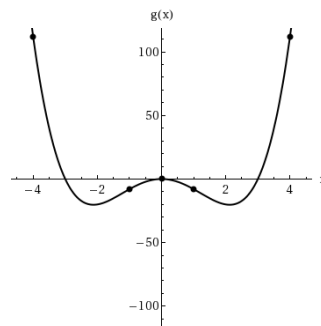
c) DNE

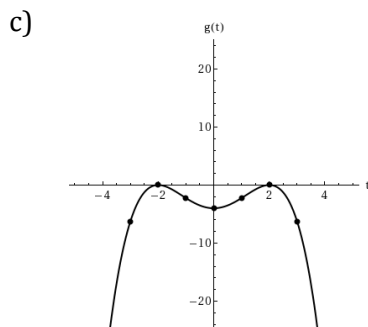
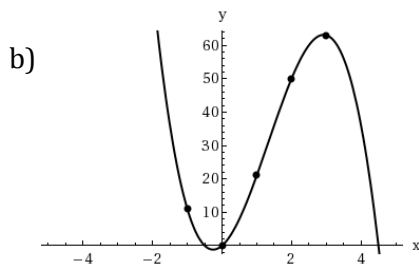
d) $(0, 21)$

25. a) $y = 2(x - 6)^2 - 1$

b) $y = \frac{5}{4} - \frac{125}{64}\left(x + \frac{1}{5}\right)^2$

26. a)



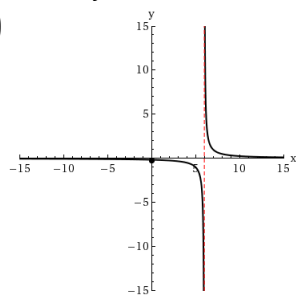


27. a) $2x^2 - 4x + 5, x \neq \frac{4}{5}$
 b) $x^2 + 3x + 9, x \neq 3$
 c) $7 - \frac{11}{x+2}, x \neq -2$

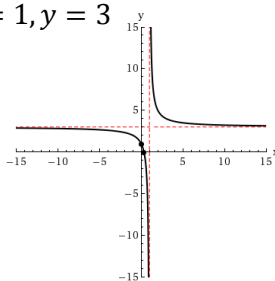
28. a) 1, 5, 6
 b) $-2, -\frac{2}{3}, \frac{2}{3}, 3$

29. a) -2, 1
 b) -8, -1, 0, 9

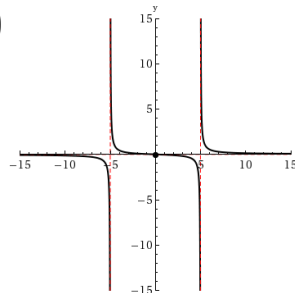
30. i) all real number x except $x = -6$
 ii) *no x - intercepts* $(0, -\frac{1}{6})$
 iii) $x = 6, y = 0$
 iv)



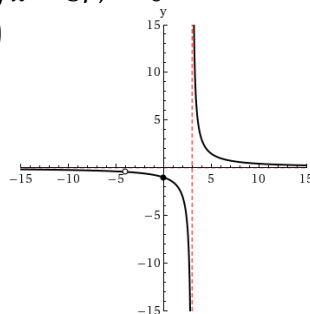
31. i) all real number x except $x = 1$
 ii) $(\frac{1}{3}, 0)$ $(0, 1)$
 iii) $x = 1, y = 3$
 iv)



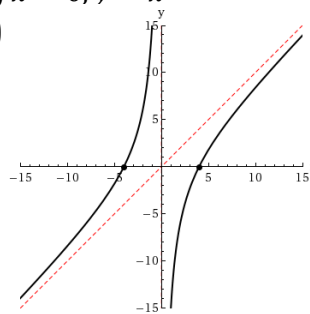
32. i) all real number x except $x = \pm 5$
 ii) $(0, 0)$
 iii) $x = -5, x = 5, y = 0$
 iv)



33. i) all real number x except $x = -4, x = 3$
 ii) *no x - int.*, $(0, -1)$
 iii) $x = 3, y = 0$
 iv)

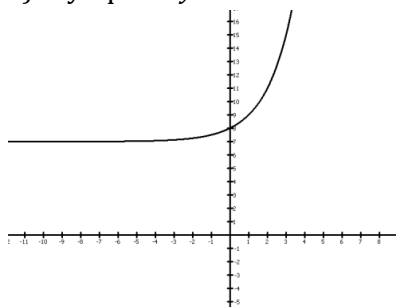


34. i) all real number x except $x = 0$
 ii) $(-4, 0), (4, 0)$, *no y - int.*
 iii) $x = 0, y = x$
 iv)

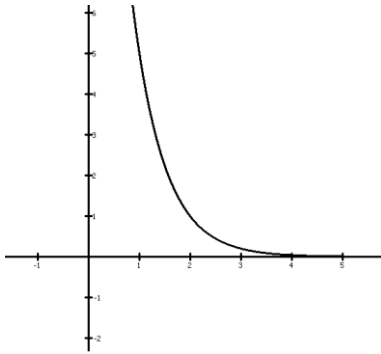


35. a) $(x - 1)^2 + (y + 6)^2 = 1, C = (1, -6), r = 1$
 b) $(x - \frac{1}{2})^2 + (y - \frac{1}{2})^2 = 81, C = (\frac{1}{2}, \frac{1}{2}), r = 9$

36. a) asymptote $y = 7$



b) asymptote $y = 0$



37. $4^2 = 16$

38. $\log_2 8 = 3$

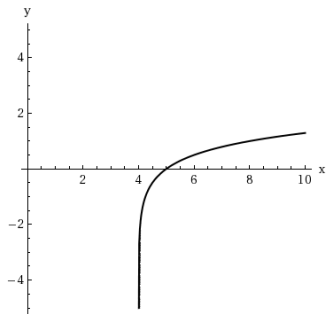
39. a) $\frac{1}{3}$

b) 0

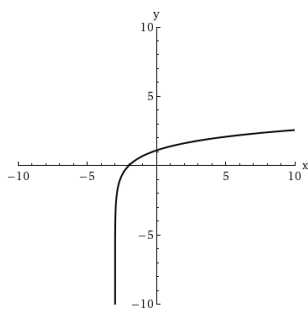
c) -2

d) 2

40. a) domain $(4, \infty)$, x - int $(5, 0)$, vertical asy. $x = 4$



b) domain $(-3, \infty)$, x - int $(-2, 0)$,
vertical asy. $x = -3$



41. a) $-8 \log_2(z)$

b) $\frac{1}{2} \ln(x) + 3 \ln(y) - 4 \ln(z)$

42. a) $\log_5 \left(\frac{6}{t} \right)$

b) $\ln(64(z-4)^9)$

43. a) $x = 2$

b) $x = \ln \left(\frac{71}{5} \right) \approx 2.653$

c) $t = -\frac{\ln(0.9)}{8 \ln(7)} \approx 0.007$

d) $x = \frac{\ln \left(\frac{19}{180} \right)}{-5} \approx 0.45$

e) $x = e^4 \approx 54.598$

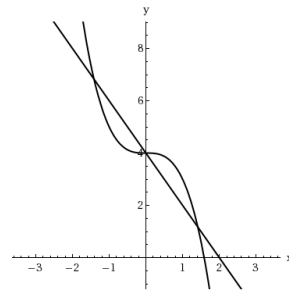
44. 49.51 years

45. 12.09%

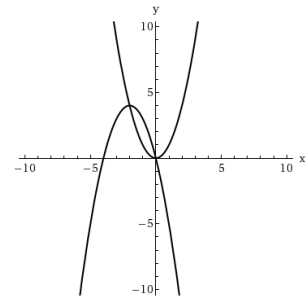
46. 7.13 g

47. $(-1, 2)$

48. a) $(-\sqrt{2}, 4 + 2\sqrt{2}), (0, 4), (\sqrt{2}, 4 - 2\sqrt{2})$



b) $(-2, 4), (0, 0)$



49. a) $\left(\frac{3}{2}, -\frac{1}{2} \right)$

b) No solution

50. airspeed of plane 540 mph
wind speed 60mph

51. a) $\frac{48x^2 - 175x + 5}{(7x+1)^4}$

b) $\frac{-7x^2 - 8x + 24}{(x+2)^4(x^2-8)^3}$

c) $\frac{2}{(x+5)^{2/3}(x+7)^{7/4}}$

52. a) $\frac{4}{(x+3)^2 + 64}$

b) $\frac{1}{\sqrt{64 - (x-1)^2}}$