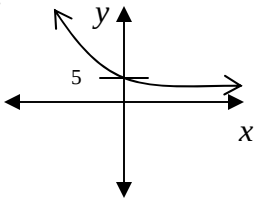
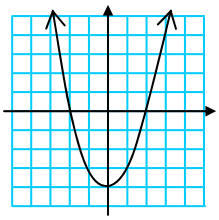
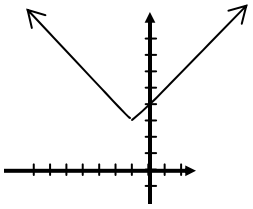
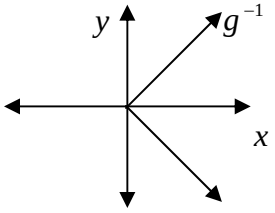
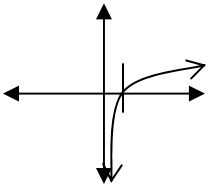
Functions, Statistics, and Trigonometry
First Semester Final Exam Review Key

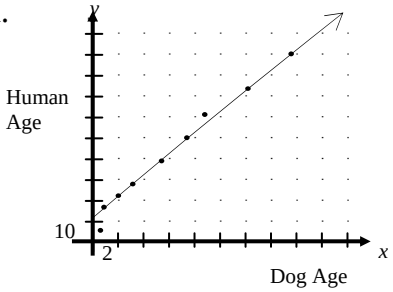
1. a. D: all real #'s except 0
   R: all real #'s except 0
   b. yes, passes the vertical line test.
2. a. 14.5 b. 14.5 c. 2.5
3. a.



   b. decay
4. a. 48 b. 4 and –12
   c. (-4, 64) d. maximum
5. 
6. –7
7. D
8. a. $y = (x+7)^3 - 1$
   b. Moves left 7 and down 1
9. a. $p(x) = |x|$
   b. $T(x, y) \rightarrow (x-1, y+3)$
   c. 
10. (-3, 1)
11. $S(x, y) \rightarrow \left(\frac{x}{2}, \frac{y}{3}\right)$
12. $f(x) = \frac{1}{5}\left(\frac{x}{3}\right)^2$
13. A
14. Substitute -x for x:
    $f(-x) = 6(-x)^5 + 7(-x)^3 - (-x)$
    $f(-x) = -6x^5 - 7x^3 + x$
    $f(-x) = -\left(6x^5 + 7x^3 - x\right)$
    $f(-x) = -f(x)$
    therefore, f(x) is odd
15. Line symmetry with line of symmetry the x-axis.
16. a. $3\sqrt{3}$
    b. $38 - 2\sqrt{13}$
    c. $(f \circ g)(x) = \sqrt{43 - 2x}$
    d. $D: x \le 21.5$
17. a. 11
    b. $g(f(x)) = 3x^2 - 1$
18. *ii* and *iv*
19. a. absolute value; $p(x) = |x|$
    b. 

    c. no, original does not pass horizontal line test *or* inverse does not pass vertical line test.
20. B
21. a. $y^{-1} = \frac{1}{x-2}$
    b. yes, original passes the horizontal line test *or* the inverse passes the vertical line test.
22. $\frac{3}{4}$
23. $\frac{1}{27}$
24. $5x^5$
25. $a^{1/3}b^{2/3}$
26. $\sqrt[5]{mn^3}$
27. B
28. 
29. 4
30. 4
31. 2
32. 2.5440
33. 2.1978

34. a. min: – 6 max: N/A
    b. rel. min.: – 6 and – 4;
       rel. max.: – 1
    c. – 8 and 8
    d. $-4 < x < -1;\ x > 4$
    e. $x < -4;\ -1 < x < 4$
    f. $x < -8;\ x > 8$
    g. $-8 < x < 8$
    h. – 2
35. $q(x) = x^3 - 4x^2 + 2x - 3$
    $r(x) = 7$
36. $q(x) = 2x^3 + x^2 + 2x + 2$
    $r(x) = 14$
37. $-\frac{3}{4} \pm \frac{\sqrt{55}}{4}i$
38. $(x+2)(x-2)(x-7)$
39. $(5x-2)(2x-7)$
40. $g(m) = (m-5)(m+3)(2m+5)$
41. a. D: x = 4, 6, – 4, – 1
    b. R: y = – 1, 1, 0
    c. true d. true
42. a. r = 0.55 b. *ii*
43. a.



    b. $y = 6x + 8$
    c. 116 d. (6.17, 42.67)
    e. 42.67 = 5.29(6.17) + 10.03
44. a. $y = 1.04x + 1.23$
    b. $31.39 thousand; interpolation
    c. $36.59 thousand; error = 0.81
45. a. $p = 3500(1.051)^n$
    b. 11,549 people
46. a. $a = 200(.73)^d$
    b. 2.20 days
47. a. $h = -4.9t^2 + 18t + 1.5$
    b. 3.75 seconds
48. $y = .18x^2 - 3.54x + 272.99$
49. D
50. $8671.14
51. 3.45 days
52. $\log_3\left(\frac{b^{3/2}}{c^4}\right)$
53. $\ln(x^7 w^{12})$
54. x = .71
55. x = 1.86
56. x = 1875
57. x = 173.5
58. x = 7
59. C
60. 11.5 years
61. $g(x) = x^3 - x^2 - 2x - 3$
62. a. $3i$
    b. $-3 - i$
    c. $-\frac{3}{10} - \frac{9i}{10}$
63. $y = k(x+8)(4x+3)(5x-1)(x-2)$
64. $y = (x-6)^2(x+1)(5x+3)^3$
65. D
66. $-\frac{33}{50} - \frac{19i}{50}$
67. x = -3, $2 \pm i$
68. $x = \frac{1}{3}$ multiplicity 2, $\pm i\sqrt{2}$
69. a. 0 b. 4