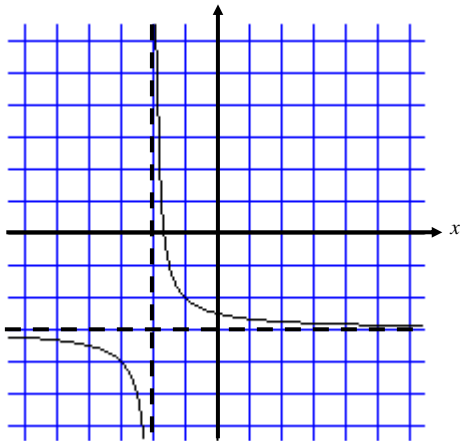


# Precalculus First Semester Exam Review Key

1. (a)  $f(x) = \frac{1}{x}$

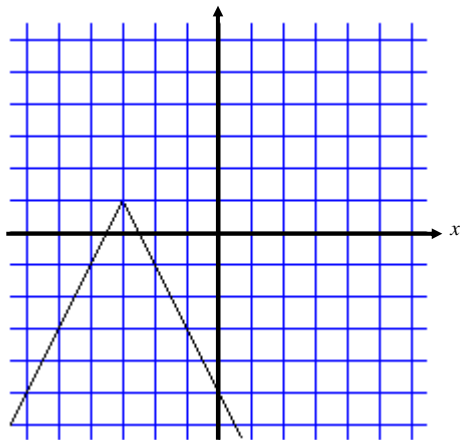
(b)  $T(x,y) = (x - 2, y - 3)$



2. (a)  $f(x) = |x|$

(b)  $T(x, y) = (x - 3, y + 1)$

$S(x, y) = (x, -2y)$



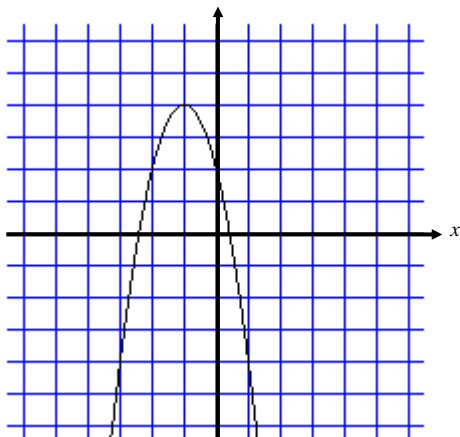
3. (a)  $f(x) = x^2$

(b)  $T(x, y) = (x - 1, y + 4)$

$S(x, y) = (x, -2y)$

vertex  $(-1, 4)$

axis:  $x = -1$

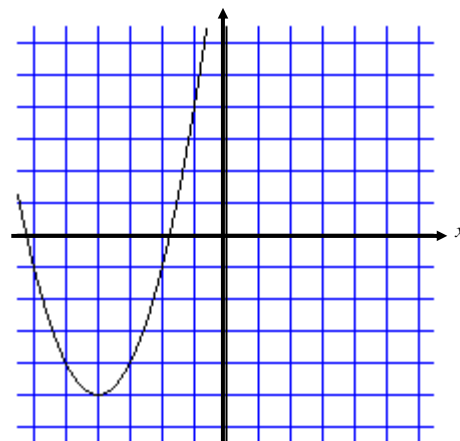


4. (a)  $f(x) = x^2$

(b)  $T(x, y) = (x - 4, y - 5)$

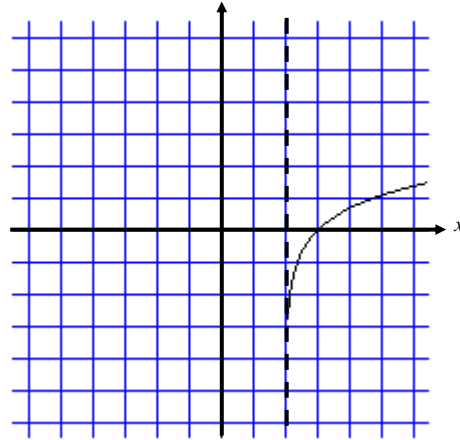
Vertex  $(-4, -5)$

axis:  $x = -4$



5. (a)  $f(x) = \log x$

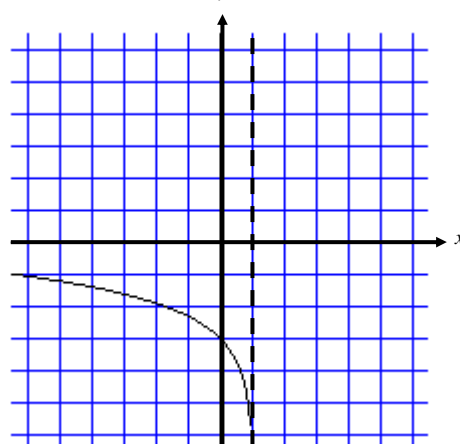
(b)  $T(x, y) = (x + 2, y)$



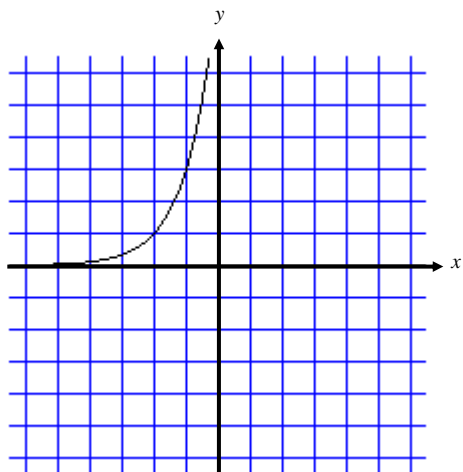
6. (a)  $f(x) = \ln x$

(b)  $T(x, y) = (x + 1, y - 3)$

$S(x, y) = (-x, y)$



7. (a)  $f(x) = 3^x$   
 (b)  $T(x, y) = (x - 2, y)$



8.  $y \leq 3$   
 9.  $x = -\frac{9}{5}$   
 10.  $x < 0.4$  or  $x > 4.6$   
 11.  $-6 \leq x \leq 14$

12.  $x = -\frac{5}{3}$

13.  $x = \frac{7}{8} \pm \frac{i\sqrt{31}}{8}$

14.  $-3 < x \leq 2$   
 15.  $(-\infty, -3) \cup [-1/2, 1)$   
 16.  $[0, \infty)$   
 17.  $(-\infty, -13) \cup (-1, 5)$

18.  $u^2v^4$   
 19.  $\frac{6}{ab^4}$

20. (a)  $5x - y - 19 = 0$   
 (b)  $x + 5y + 17 = 0$

21.  $(-\infty, \infty)$   
 22.  $[0, 5) \cup (5, \infty)$   
 23.  $f(-x) = 3(-x)^3 - 2(-x)$   
 $= -3x^3 + 2x$   
 $= -f(x)$

$\therefore f(x)$  is odd

24.  $f(-x) = -2(-x)^4 - 4(-x) + 7$   
 $= -2x^4 + 4x + 7$   
 $\neq f(x)$  and  $\neq -f(x)$

$\therefore f(x)$  is neither

25. 1  
 26.  $2x^2 - 16x + 29$   
 27.  $x^2 - 6x + 13$

28.  $2x^3 - 19x^2 + 56x - 48$

29.  $f^{-1}(x) = \sqrt[3]{x-2}$

30.  $f(g(x)) = 2\left(\frac{x-8}{2}\right) + 8$   
 $= x - 8 + 8 = x$

$g(f(x)) = \frac{2x+8-8}{2}$   
 $= \frac{2x}{2} = x$

$\therefore f(x)$  &  $g(x)$  are inverses of each other

31.  $\lim_{x \rightarrow \infty} f(x) = -\infty$

$\lim_{x \rightarrow -\infty} f(x) = \infty$

32.  $\lim_{x \rightarrow \infty} f(x) = \infty$

$\lim_{x \rightarrow -\infty} f(x) = \infty$

33.  $x = -\frac{5}{3}, 1$

34.  $x = 0, -6, 6$

35.  $f(x) = (x-2)(x^2+x+1)$

$x = 2, -\frac{1}{2} \pm \frac{i\sqrt{3}}{2}$

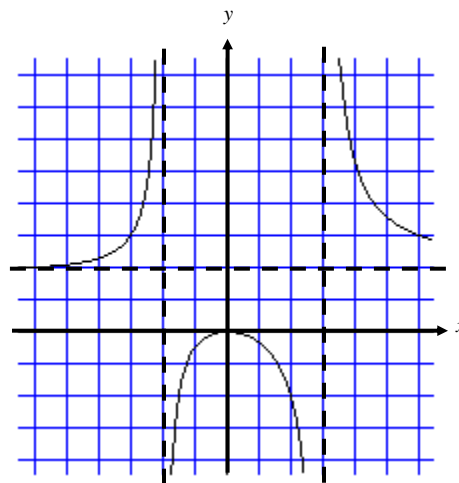
36.  $f(x) = (x-1)(x+4)(x^2+1)$

$x = 1, -4, \pm i$

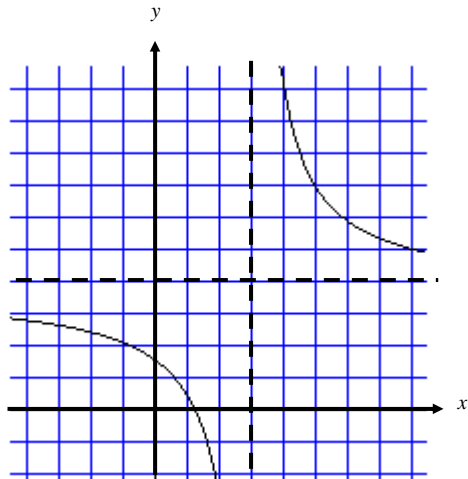
37. VA:  $x = 3$  HA:  $y = 4$

$x$ -int: 1.25  $y$ -int:  $5/3$

Domain:  $(-\infty, 3) \cup (3, \infty)$



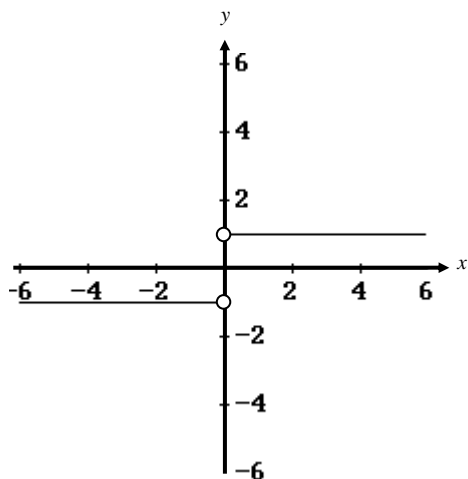
38. VA:  $x = 3, -2$  HA:  $y = 2$   
 $x$ -int: 0  $y$ -int: 0  
 Domain:  $(-\infty, -2) \cup (-2, 3) \cup (3, \infty)$



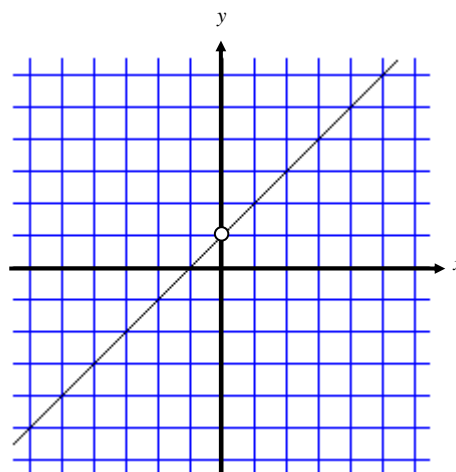
39. (a) 4 (b) 0 (c) -1  
 (d)  $\frac{1}{4}$  (e)  $\frac{-3}{2}$  (g) 7

40.  $\approx 1.4$   
 41. -3, 1

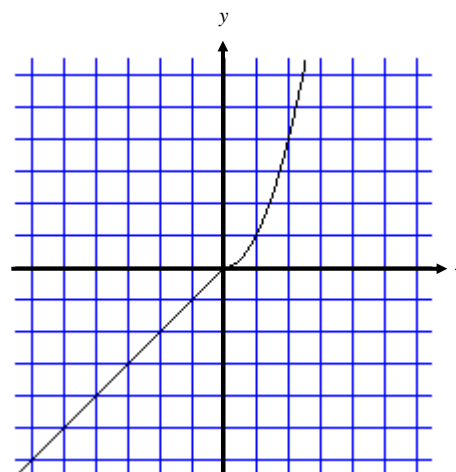
42.  $\max(-2.23, 12.24)$   $\min(0.9, -3.05)$   
 inc:  $(-\infty, -2.23)$  &  $(0.9, \infty)$   
 dec:  $(-2.23, 0.9)$   
 43. yes, non-removable  
 (jump discontinuity)



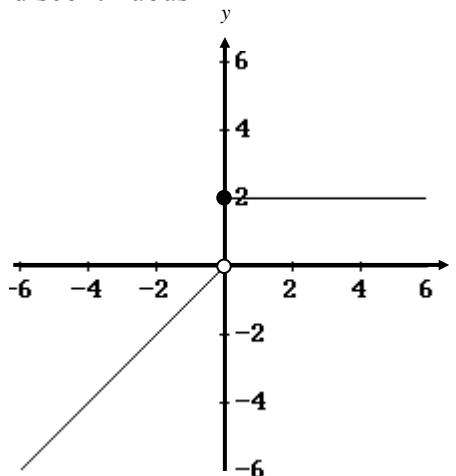
44. yes, removable, hole @  $x = 0$



45. continuous



46. discontinuous



47. \$7310 @ 7.8%  
 \$2690 @ 3.6%  
 48. \$29,000  
 49. 15 L @ 20%  
 10 L @ 35%

50.  $6x + 7y + 32 = 0$
51.  $R = \frac{kl}{D^2}$ ;  $R = 3.6$
52. (a)  $y = 231.2x^{-0.3}$   
 (b)  $\approx 110$  beats/min
53.  $(2x + 1)(3x^2 - 4x + 2) + 7$   
 $= 6x^3 - 5x^2 + 9$ ; no
54.  $(x - 5)(x^2 + x - 2)$   
 $= x^3 - 4x^2 - 7x + 10$ ; yes
55.  $f(x) = 3x^3 - 10x^2 - 27x + 10$
56. a)  $f(x) = x^3 - 3x^2 + x + 5$   
 b)  $f(x) = x^3 - 3x^2 + 16x - 48$
57.  $-\frac{2}{13} + \frac{16i}{13}$
58.  $\approx 19.8$  years
59.  $\approx 22.76$  days
60. (a) \$3645.49  
 (b) \$3645.93
61. (a)  $2\log_3 a + \log_3 b$   
 (b)  $\frac{1}{2}\log_3 a - \log_3 b - \log_3 c$
62. (a)  $\log\left(\frac{r^2 w^3}{q}\right)$   
 (b)  $\log\left(\frac{3}{16}\right)$
63.  $\approx 1.59$
64.  $\frac{1}{100}$
65.  $\approx 0.53$
66.  $x = -\frac{79}{3}$
67.  $x = 4, -25$
68. no solution (reject:  $x = -\frac{5}{3}$ )

...