Warm-up Key

1. $m=\frac{1}{2}$, equations to this line: $y-2=\frac{1}{2}(x-1)$, or $y-3=\frac{1}{2}(x-3)$, or $y=\frac{1}{2}x+\frac{3}{2}$

2. $y=-2$
3. $x=-3$
4. $(x+4)(x-3)$, $x=-4$ and 3
5. Use the quadratic formula, $\frac{4\pm\sqrt{16-4\cdot1\cdot2}}{2}=\frac{4\pm\sqrt{8}}{2}=\frac{4\pm2\sqrt{2}}{2}=2\pm\sqrt{2}$
6. $\frac{-4\pm\sqrt{16-4\cdot2\cdot(-1)}}{4}=\frac{-4\pm\sqrt{24}}{4}=\frac{-4\pm2\sqrt{6}}{4}=\frac{-2\pm\sqrt{6}}{2}$
7. Both domain and range are all real numbers.
8. Domain: $(-\infty,\infty)$, Range: $\left(-\infty,\frac{1}{3}\right]$
9. Domain: $[-2,\infty)$, Range: $[0,\infty)$
10. Domain: $(-\infty,-2],[2,\infty)$, Range: $[0,\infty)$
11. Domain: $(-\infty,-1),(-1,1)(1,\infty)$, Range: $(-\infty,-4],(0,\infty)$
12. 3
13. $16^{3/2}=\left(16^{1/2}\right)^3=4^3=64$
14. 25
15. $(x+8)(x-4)$
16. $(x-4)(x-6)$
17. $3x^2(x-2)+4(x-2)=(x-2)\left(3x^2+4\right)$
18. $2(x-1)\left[-2(x-1)+1\right]=2(x-1)(-2x+3)$
19. $(x+2)^2\left(2+3(x+2)\right)=(x+2)^2(3x+8)$
20. $\frac{\frac{1}{x+1}-\frac{x+1}{x+1}}{x}=\frac{\frac{1-(x+1)}{x+1}}{x}=\frac{\frac{-x}{x+1}}{x}=\frac{-1}{x+1}$
21. $\frac{\frac{1}{x+3}-\frac{1}{3}}{x}=\frac{\frac{3}{3(x+3)}-\frac{(x+3)}{3(x+3)}}{x}=\frac{\frac{3-(x+3)}{3(x+3)}}{x}=\frac{\frac{-x}{3(x+3)}}{x}=\frac{-1}{3(x+3)}$
22. $\frac{\frac{1}{x+8}-\frac{1}{8}}{x}=\frac{\frac{8}{8(x+8)}-\frac{(x+8)}{8(x+8)}}{x}=\frac{\frac{8-(x+8)}{8(x+8)}}{x}=\frac{\frac{-x}{8(x+8)}}{x}=\frac{-1}{8(x+8)}$

23. $\dfrac{1}{\sqrt{x+3}+\sqrt{x}}\cdot\left(\dfrac{\sqrt{x+3}-\sqrt{x}}{\sqrt{x+3}-\sqrt{x}}\right)=\dfrac{\sqrt{x+3}-\sqrt{x}}{(x+3)-x}=\dfrac{\sqrt{x+3}-\sqrt{x}}{3}$

24. $\dfrac{10}{\sqrt{x-5}-\sqrt{x}}\cdot\left(\dfrac{\sqrt{x-5}+\sqrt{x}}{\sqrt{x-5}+\sqrt{x}}\right)=\dfrac{10\left(\sqrt{x-5}+\sqrt{x}\right)}{(x-5)-x}=\dfrac{10\left(\sqrt{x-5}+\sqrt{x}\right)}{-5}=-2\left(\sqrt{x-5}+\sqrt{x}\right)$

25. $\dfrac{1}{\sqrt{x-2}+\sqrt{x}}\cdot\left(\dfrac{\sqrt{x-2}-\sqrt{x}}{\sqrt{x-2}-\sqrt{x}}\right)=\dfrac{\sqrt{x-2}-\sqrt{x}}{(x-2)-x}=\dfrac{\sqrt{x-2}-\sqrt{x}}{-2}$

26. $\cos x=\dfrac{1}{2},\ x=\dfrac{\pi}{3}$ and $\dfrac{5\pi}{3}$

27. $\sin x=-\dfrac{\sqrt{3}}{2},\ x=\dfrac{4\pi}{3}$ and $\dfrac{5\pi}{3}$

28. $2x=\dfrac{\pi}{4}$ and $\dfrac{7\pi}{4}$, so $x=\dfrac{\pi}{8},\dfrac{9\pi}{8},\dfrac{7\pi}{8},$ and $\dfrac{15\pi}{8}$

29. a) Domain and Range for both functions are all real numbers $(-\infty,\infty)$.
    b) $f(-2)=-1,\ g(3)=-5$
    c) $x=-1$
    d) $x=1$
    e) $x=-1,\ 1,$ and 2

30. a) Domain for f is all real numbers, range is $[-4,\infty)$. Domain for g is all real numbers, range is $[-4,2]$.
    b) $f(-2)=0,\ g(3)=2$
    c) $x=-1.5$ and 2.5
    d) $x=-2.5$ and 2.5
    e) $x=-1$

31. a) -3
    b) -9
    c) $2b-3$
    d) $2x-5$

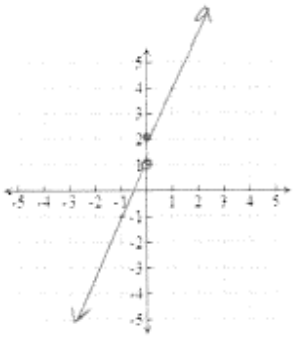
32. a) 1
    b) 3
    c) DNE
    d) $\sqrt{x^2+4}$

33. a) 3
    b) 0
    c) -1
    d) $3-(t-1)^2$

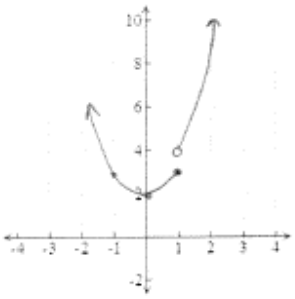
34. a) 1
b) 0
c) -0.5

35. a) 0
b) $-\frac{\sqrt{2}}{2}$
c) $\frac{\sqrt{3}}{2}$

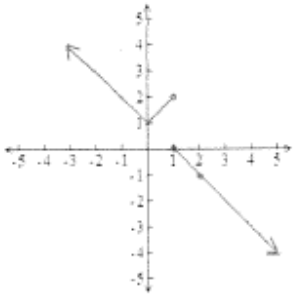
36. a) -1
b) 2
c) 6



37. a) 6
b) 2
c) 3



38. a) 4
b) 0
c) -2



39. -1.879, 0.347, and 1.532

40. 0.564 or 0.563 and 3.071

41. None

42. Even
43. Neither
44. Odd
45. Even
46. Odd
47. Neither

48. 0, 1.109, and 3.698

49. 0 and 0.876 or 0.877

50. D
51. B
52. A
53. E
54. C