Graphs aren't shown here because you can just graph w/ a calculator or Desmos.com

36. infinite discontinuity at x=6. $\lim_{x\to 6+} f(x) = \infty$

39. infinite discontinuities at x=2 and x=-2. $\lim_{x\to 2+} f(x) = -\infty$ and $\lim_{x\to -2-} f(x) = -\infty$

42. continuous everywhere

45. continuous everywhere

48. removable discontinuity at x=-2. $\lim_{x\to -2} \frac{1}{x-3} = -\frac{1}{5}$ infinite discontinuity at x=3. $\lim_{x\to 3+} \frac{1}{x-3} = \infty$

51. continuous everywhere. Check at x=1 using definition of continuity:

1. $f(1) = 1$
2. $\left.\begin{aligned} \lim_{x\to 1^-} f(x) &= \lim_{x\to 1^-} x = 1 \\ \lim_{x\to 1^+} f(x) &= \lim_{x\to 1^+} x^2 = 1 \end{aligned}\right\} \lim_{x\to 1} f(x) = 1$
3. $f(-1) = \lim_{x\to 1} f(x)$

54. jump discontinuity at x=2

1. $f(2) = -2(2) = -4$
2. $\left.\begin{aligned} \lim_{x\to 2^-} f(x) &= \lim_{x\to 2^-} (-2x) = -4 \\ \lim_{x\to 2^+} f(x) &= \lim_{x\to 2^+} (x^2 - 4x + 1) = -3 \end{aligned}\right\} \lim_{x\to 2} f(x)$ does not exist.

57. rewrite as $\frac{1}{\sin(2x)}$. sin(2x)=0 at multiples of $\frac{\pi}{2}$. Infinite discontinuities there

60. jump discontinuities at every integer (don't worry if you don't get this, I didn't realize it was part of this set. Step functions aren't a major focus of this class.]