Answers to WIR 3 Review Problems

1. Not continuous at $x = -1$ because $\lim\limits_{x \to -1} f(x)$ does not exist, not continuous at $x = -5$ because $\lim\limits_{x \to -5} f(x) \neq f(-5)$, not continuous at $x = 4$ because $\lim\limits_{x \to 4} f(x)$ does not exist, or because $x = 4$ is not in the domain, continuous at $x = -2$.

2. Not continuous at $x = 1$ because $\lim\limits_{x \to 1} f(x) \neq f(1)$, not continuous at $x = 0$ because it is not in the domain.

3. Discontinuous at $x = -3$ and $x = -2$. $\lim\limits_{x \to -3} f(x) = -1$, $\lim\limits_{x \to -2^+} f(x) = \infty$, $\lim\limits_{x \to -2^-} f(x) = -\infty$, thus $\lim\limits_{x \to -2} f(x)$ does not exist.

4. A solution to the equation exists on $(-1, 0)$ by the Intermediate Value Theorem.

5. A solution to the equation exists on $(-1, 0)$ by the Intermediate Value Theorem.

6. $c = 2$, $d = -2$

7. a.) -3
   b.) $-\infty$
   c.) $-\dfrac{5}{3}$
   d.) $-\dfrac{\sqrt{3}}{4}$
   e.) $\dfrac{5}{2}$
   f.) $-\dfrac{1}{2}$

8. a.) VA: $x = 1$, $x = -1$; HA: $y = 1$
   b.) VA: None; HA: $y = 1$ and $y = -1$
   c.) VA: $x = 4$, HA: $y = 0$

9. a.) $y - 2 = \dfrac{1}{4}(x - 3)$
   b.) $y = x$

10. a.) -1 m/s
    b.) -2 m/s

11. a.) $\langle 4, 2 \rangle$
    b.) $x = 4 + 4t$, $y = 2 + 2t$
    c.) $y = \dfrac{x}{2}$