HW #5 solutions

3.1.16

$f(x) = x^2 - 2x$

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

$= x^2 + 2x + 1 - 2x - 2$

$= x^2 - 1$ ↔ either one is acceptable

$= \boxed{(x-1)(x+1)}$

$f(x+h) = (x+h)^2 - 2(x+h)$

$= \boxed{x^2 + 2hx + h^2 - 2x - 2h}$

$$\frac{f(x+h) - f(x)}{h} = \frac{x^2 + 2hx + h^2 - 2x - 2h - (x^2 - 2x)}{h}$$

$$= \frac{2hx + h^2 - 2h}{h}$$

$$= \boxed{2x + h - 2}$$

3.1.32

$f(t) = \sqrt[3]{t-5}$

- root function
- $D = (-\infty, \infty)$

3.1.35

$g(x) = 2x - 1$

- polynomial function
- $D = (-\infty, \infty)$

3.1.36

$$h(x) = \frac{x^2+4}{x^2 + x - 42} = \frac{x^2+4}{(x-6)(x+7)}$$

- rational function
- $D = (-\infty, -7) \cup (-7, 6) \cup (6, \infty)$