Write domain in interval notation.
K. (a) \( f(t) = t^2 - 8t + 15 \).
   There are no divisions by 0, no square roots of negative numbers. Hence \( f(t) \) is defined everywhere.
   Answer: Domain \( (-\infty, \infty) \).

(b) \( g(t) = \frac{1}{(t^2 - 8t + 15)} \).
   Factoring gives
   \[ g(t) = \frac{1}{(t-3)(t-5)} \]. Thus \( g(t) \) is undefined at \( t=3,5 \).
   Answer: Domain \( (-\infty, 3) \cup (3,5) \cup (5, \infty) \).

(c) \( h(t) = \sqrt{t^2 - 8t + 15} \).
   This is defined provided \( t^2 - 8t + 15 \geq 0 \).
   By part (b), the key numbers are 3, 5.
   The key intervals are \( (-\infty, 3), [3,5), [5, \infty) \).
   We use \([ \) since the inequality is \( \geq \) rather than \( > \).
   Now evaluate \( t^2 - 8t + 15 \) at a point in each interval.
   \( 0 \in (-\infty, 3), 0^2 - 8 \cdot 0 + 15 = 15 = + \)
   \( 4 \in [3,5), 4^2 - 8 \cdot 4 + 15 = -1 = - \)
   \( 10 \in [5, \infty), 10^2 - 8 \cdot 10 + 15 = 35 = + \)
   Hence \( h(t) \) is undefined between 3 and 5.
   Answer: (c) Domain = \( (-\infty, 3] \cup [3,5) \).

(d) \( k(t) = \sqrt{t^2 - 8t + 15} \).
   You can't take the square root of a negative number but you can take the cube root of any number. Hence \( k(t) \) is defined everywhere.
   Answer: Domain = \( (-\infty, \infty) \).

L. Let \( f(x) = 3x^2 \). Find the following.
   (c) \( f(x^2) \).
   \[ f(x^2) = 3(x^2)^2 = 3x^4 \] Answer: \( 3x^4 \).

(d) \( f(x)^2 \).
   \[ [f(x)]^2 = [3x^2]^2 = 9x^4 \] Answer: \( 9x^4 \).

(e) \( f(x/2) \).
   \[ f(x/2) = 3(x/2)^2 = 3x^2/4 \] Answer: \( \frac{3}{4}x^2 \).

M. Let \( H(x) = x - 2x^2 \). Find the following.
   (f) \( H(x + h) \).
   \[ H(x+h) = 1 - 2(x+h)^2 = 1 - 2(x^2 + 2xh + h^2) \]
   Answer: \( -4x^2 - 4xh - 2h^2 \).

(h) \( \frac{H(x+h) - H(x)}{h} \).
   \[ \frac{H(x+h) - H(x)}{h} = \frac{[1 - 2x^2 - 4xh - 2h^2] - [1 - 2x^2]}{h} = \frac{1 - 2x^2 - 4xh - 2h^2 - 1 + 2x^2}{h} = \frac{-4xh - 2h^2}{h} = -4x - 2h \]
   Answer: \( -4x - 2h \).

O. Find the quotient \( \frac{g(x) - g(a)}{x-a} \).
   \[ g(x) = 4x^2 \]
   \[ \frac{g(x) - g(a)}{x-a} = \frac{4x^2 - 4a^2}{x-a} = 4(x-a) \]
   Answer: \( 4x + 4a \)