0.1:19 If \( f(x) = x^2 - 2x \) then \( f(a + 1) = (a + 1)^2 - 2(a + 1) = a^2 - 1 \) and \( f(a + 2) = (a + 2)^2 - 2(a + 2) = a^2 + 2a \).

0.1:42 For the function in Figure 15, we have \( f(x) \geq 0 \) if and only if \( x \geq 9 \) or \(-1 \leq x \leq 5\).

0.1:50 For the function \( g(x) = (x^2 + 4)/(x + 2) \) we have \( g\left(\frac{2}{3}\right) = \frac{5}{3} \). Therefore the point \( \left(\frac{2}{3}, \frac{5}{3}\right) \) is indeed on the graph of the function \( g(x) \).

0.2:7 For the graph of the linear function \( f(x) = 9x + 3 \), the \( y \)-intercept is the point \((0, 3)\) and the \( x \)-intercept is the point \((-\frac{1}{3}, 0)\).

0.2:16 The amount the landowner will receive for \( x \) thousand cubic feet of gas extracted from her land is given by the function \( f(x) = 5000 + x/10 \) (in dollars).

0.2:17 The total amount paid for \( t \) days in the hospital is \( g(t) = 1500 + 300t \) (in dollars).

0.2:29 The graph of the function \( f(x) \) is a horizontal line for at \( y = 3 \) for to the left of \( x = 2 \), and it becomes a line of slope one to the right of the point \((2, 5)\).

0.3:9 If \( f(x) = \frac{x}{x-8} \) and \( g(x) = \frac{-x}{x-4} \) then \( f(x) + g(x) = \frac{x(x-4)-(x-8)}{(x-8)(x-4)} = \frac{4x}{x^2-12x+32} \).

0.3:34 (graded) If \( g(t) = t^3 - 5 \) then \( \frac{g(t+h)-g(t)}{h} = \frac{(t+h)^3-5-t^3+5}{h} = 3t^2 + 3th + h^2 \).

0.3:37 The function \( h(x) = f(g(x)) = x + \frac{1}{8} \) converts from British sizes to U.S. sizes.

0.4:3 The quadratic function \( f(t) = 4t^2 - 12t + 9 \) has a double root at \( t = 3/2 \).

0.4:19 The factored form of the polynomial \( 30 - 4x - 2x^2 \) equals \(-2(x + 5)(x - 3)\).

0.4:29 The \( x \)-coordinates of the intersection points of the curve of \( f(x) = x^3 - 3x^2 + x \) with the curve of \( g(x) = x^2 - 3x \) are the zeros of the function \( f(x) - g(x) = x^3 - 4x^2 + 4x = x(x-2)^2 \). The zeros are \( x = 0 \) and \( x = 2 \). Now, the intersection points of the two curves are found to be \((0, 0)\) and \((2, -2)\).

0.4:40 (graded) The distance traveled after slamming the breaks equals \( f(x) = x + \frac{1}{20}x^2 \) (in feet). The quadratic equation \( f(x) = 175 \) has the two solutions \( x = 50 \) and \( x = -70 \). Only the first solution makes sense since the speed \( x \) (in miles per hour) was positive. Hence the car was moving fifty miles per hour.
0.5:11 We have \((0.000001)^{1/3} = (10^{-6})^{1/3} = 10^{-2} = 0.001\).

0.5:37 We have \((8/27)^{2/3} = (2^3/3^3)^{2/3} = ((2^3)^{2/3}/(3^3)^{2/3}) = 2^2/3^2 = 4/9\).

0.5:50 We have \(\sqrt{1 + x \cdot (1 + x)^{3/2}} = (1 + x)^{1/2} \cdot (1 + x)^{3/2} = (1 + x)^{1/2 + 3/2} = (1 + x)^2 = x^2 + 2x + 1\).

0.5:93 We apply the formula on top of page 44 with \(P = 1000\), \(i = 0.068\) and \(n = 18\) to see that on her 18th birthday, the investment will be worth \(1000 \cdot (1.068)^{18} = 3268\) dollars.

0.6:13 Let \(r\) be the radius of the circular side and \(h\) the height of the cylinder, all measured in inches. The volume of the cylinder equals \(\pi r^2 h = 100\) (cubic inches). The cost of the material to construct the cylinder is \(5\pi r^2 + 6\pi r^2 + 7 \cdot 2\pi rh = 11\pi r^2 + 14\pi rh\) (dollars).

0.6:19 If \(w\) is the width of the rectangle then its perimeter is \(3w + w + 3w + w = 8w = 40\) cm. Hence the width is \(w = 5\) cm. The area of the rectangle, which is height times width, is found to be \(w \cdot (3w) = 3w^2 = 75\) cm\(^2\).

0.6:20 Let \(r\) be the radius of the circular side and \(h\) the height of the cylinder. It is assumed that \(h = 2r\). The volume equals \(\pi r^2 h = 2\pi r^3 = 54\pi\) cubic inches. This implies that the radius is \(r = 3\) inches. The surface area is \(2\pi r^2 + 2\pi rh = 6\pi r^2 = 54\pi\) square inches.

0.6:39 To “find \(C(400)\)” we intersect the given blue graph with the vertical line that passes through \(x = 400\) on the \(x\)-axis. Then we draw a horizontal line through that intersection point. The value \(C(400)\) is the position on the \(y\)-axis which lies on that horizontal line.