

Applications of Polynomials - Part 1

In this section we will look at using polynomials to solve measurement problems.

Example 1: Expand.

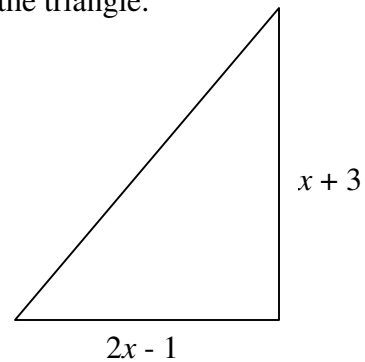
$$\begin{aligned} \text{a) } & (x+1)(x-2) \\ & = x^2 - 2x + x - 2 \\ & = x^2 - x - 2 \end{aligned}$$

$$\begin{aligned} \text{b) } & 2(x+1)(x-2) \\ & = (2x+2)(x-2) \\ & = 2x^2 - 4x + 2x - 4 \\ & = 2x^2 - 2x - 4 \end{aligned}$$

$$\begin{aligned} \text{c) } & 2(x+1)(x-2)(3x-1) \\ & = (2x+2)(x-2)(3x-1) \\ & = (2x^2 - 2x - 4)(3x-1) \\ & = 6x^3 - 2x^2 - 6x^2 + 2x - 12x + 4 \\ & = 6x^3 - 8x^2 - 10x + 4 \end{aligned}$$

Example 2: Determine a simplified expression for the area of the triangle.

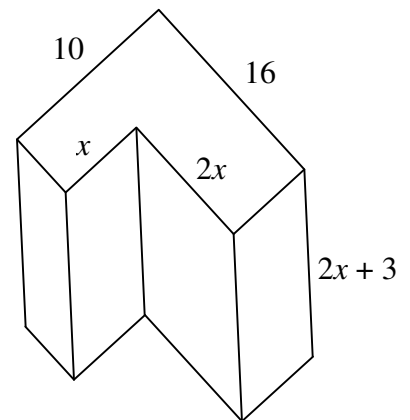
$$\begin{aligned} A &= \frac{bh}{2} \\ A &= \frac{(2x-1)(x+3)}{2} \\ A &= \frac{2x^2 + 5x - 3}{2} \\ A &= x^2 + \frac{5}{2}x - \frac{3}{2} \end{aligned}$$



Example 3: Determine a simplified expression for the volume of this prism.

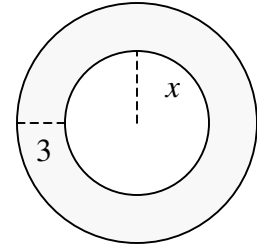
There are several ways to develop the volume – either split the shape into two pieces or pretend we have a full rectangular prism and subtract the missing part. We'll use the latter approach in this example.

$$\begin{aligned} V &= (10)(16)(2x+3) - (x)(2x)(2x+3) \\ V &= 320x + 480 - 4x^3 - 6x^2 \\ V &= -4x^3 - 6x^2 + 320x + 480 \end{aligned}$$



Example 4: Determine a simplified expression for the area of this doughnut.

$$A = \pi(x+3)^2 - \pi x^2$$
$$A = \pi[(x+3)^2 - x^2]$$
$$A = \pi(x^2 + 6x + 9 - x^2)$$
$$A = \pi(6x + 9)$$



Practice: pg. 112 # 7, 9, 10, 14, 15, 16