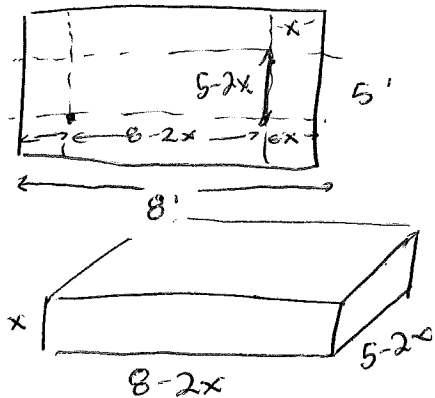


Welding
Maximizing Volume Worksheet

Name KEY

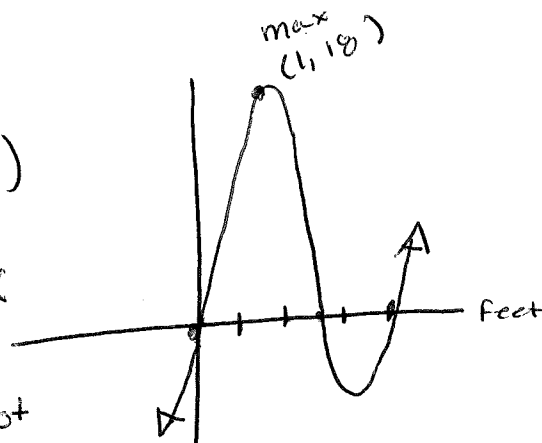
1. Using a 5' x 8' sheet of metal, make a container with the largest volume possible. Convert the volume to gallons using 1 cubic foot (fluid) = 7.4805 gallons.



$$\begin{aligned} V &= lwh \\ V &= (8-2x)(5-2x)(x) \\ V &= (40-26x+4x^2)(x) \\ V &= 40x-26x^2+4x^3 \\ V &= 4x^3-26x^2+40x \end{aligned}$$

Max Volume at $x = 1$ foot
is 10 ft^3

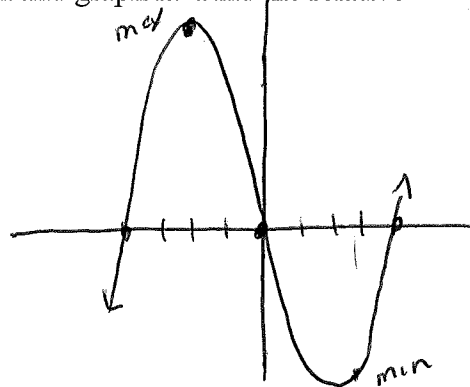
$$10 \text{ ft}^3 \times \frac{7.4805 \text{ gal}}{1 \text{ ft}^3} = 134.65 \text{ gal}$$



2. Express the polynomial $y = x(x-4)(x+4)$ in standard form and graph it. Find the relative maximum, relative minimum, and zeros.

$$\begin{aligned} y &= x(x-4)(x+4) \\ y &= x(x^2-4x+4x-16) \\ y &= x(x^2-16) \\ y &= x^3-16x \\ \text{Max } (-2.3, 24.6) \\ \text{min } (2.3, -24.6) \end{aligned}$$

zeros $x = -4, 0, x = 4$



3. Graph the polynomial $y = x^3 - 3x^2 - x + 3$. Find the relative maximum, relative minimum, and zeros.

$$\begin{aligned} \text{max } (-1.55, 3.08) \\ \text{min } (2.15, -3.08) \\ \text{zeros } x = -1, x = 1, x = 3 \end{aligned}$$

