

1. Let $P(x) = x^3 + 2x^2 - 7x + 4$

a. $x = 1$ is a root of $P(x)$. Completely factor $P(x)$.

b. Graph $P(x)$, clearly label all zeros and the y-intercept. You will not be able to accurately find the exact maximum or minimum without the calculator.



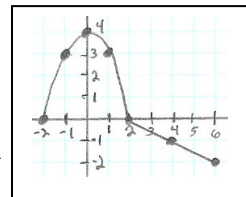
c. Where is $P(x) > 0$?

d. Find the three values where $P(x)$ intersects the line $Q(x) = 4 - 4x$. Set $P(x) = Q(x)$.

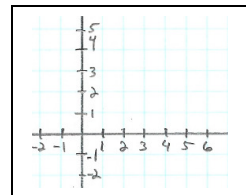
1. The graph of $f(x)$ (shown below) for the given domain is $f(x) = \begin{cases} 4 - x^2, & -2 \leq x < 2 \\ -\frac{1}{2}x + 1, & 2 \leq x \leq 6 \end{cases}$

a. List the domain and range of $f(x)$.

Domain _____ Range _____



b. Sketch a graph of $|f(x)|$.



c. If $g(x) = x^3 - 7x + 5$, then find $g(f(2))$.

d. Tell why this function is not a one to one function and give specific set of points to illustrate your answer.

3. Free Response-Calculator Allowed

A box is to be made from a 20" x 30" rectangular piece of cardboard by cutting squares from the corners and folding up the sides.



a. Find the volume of the box created by cutting squares with sides of 2".

b. Write the height, length, width and volume of the box as functions of x as the side of the corner square.

$h =$ _____

$w =$ _____

$l =$ _____

$V(x) =$ _____

c. Sketch the graph of $V(x)$ over an appropriate domain and range. Label the coordinates of the maximum volume.



d. List the dimensions and volume of the largest box possible.