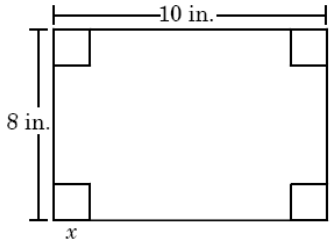
Honors Math III Polynomial Word Problems Name _____

1. The "BOX Problem" :



An open box is made from an 8-by-10-inch rectangular piece of cardboard by cutting squares from each corner and folding up the sides.

a) If *x* represents the side length of the squares, write an expression for the length, width, and height of the box.

ℓ = _____ w = _____ h = _____

b) Write an expression in standard form for the Volume of the box in terms if *x*, the length of the square.

V = ℓwh

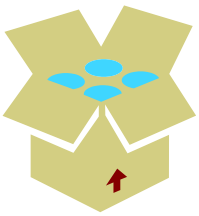
c) What is the maximum volume? _____

d) What size squares should be cut to produce this volume? _____

e) If the volume of the box is 48 in^3, what is the side length for the square that should be cut? _____
(Note: The amount of cardboard waste must be minimized.)

2. A box is to be mailed. The volume in cubic feet of the box can be expressed as:

$V(x) = x^3 - 6x^2 + 3x + 10$



What is the maximum volume? _____

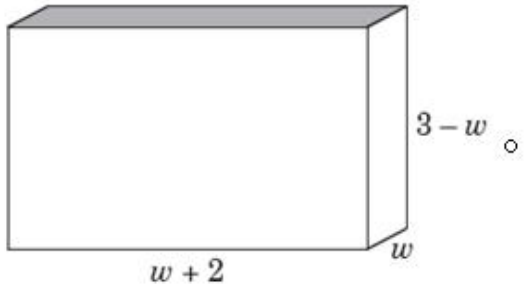
3. The length of a swimming pool is 3 times its width. The depth of the pool is one less than twice the width.

a) Express the volume of the pool as a polynomial in factored form.

b) Find the depth of the pool if the volume is 135 ft^3. _____

4. The product of **three** consecutive integers is -336. Find the numbers. _____

5. The dimensions of this rectangular prism are given algebraically.



What is the ***approximate*** width (w) that will maximize the volume?

A 1 unit

B $1\frac{1}{2}$ units

C $1\frac{3}{4}$ units

D 2 units

6. Anthony is making an open-top box out of an 8-inch by 14-inch piece of cardboard. He will cut a small square from each corner of the cardboard and fold the edges up to make the box. Let x represent the length of the side of each square removed.

What function $V(x)$, correctly gives the volume of the box in terms of x?

A $V(x) = 4x^2 – 44x + 112x$

B $V(x) = 4x^2 – 22x + 112$

C $V(x) = 4x^3 – 22x^2 + 112x$

D $V(x) = 4x^3 – 44x^2 + 112x$

7. The dimensions ***in inches*** of a doghouse can be expressed as width x, length $x + 4$, and height $x – 3$. The volume is 15.9 ft^3. Find the dimensions of the doghouse.

(Hint: Convert the volume to cubic inches!)

8. The width of a box is 2 m less than the length. The height is 1 m less than the length. The volume is 60m^3. Find the length of the box. _____

9. Suppose a 2-in. thick slice is cut from the block of cheese as shown. The remaining block has a volume of 224 $in.^3$.

Find the dimensions of the original block. _____