College Algebra Name: Key

Unit 2 LT2.3a Applications Practice Date: _____ Period: _____

1.) Mr. Simpson decided to take up gardening and created a **rectangular** flower bed that measures 4 feet by 6 feet. He realized that it was too small and wanted to increase the length and width by the same amount to have a flower bed that was 48 square feet. What are the new **dimensions** of his flower bed?

$(x+6)(x+4) = 48$

$x^2 + 10x + 24 = 48$

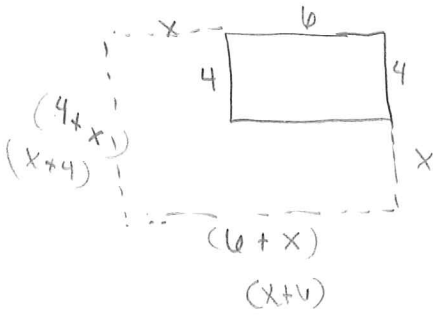
$-48 \quad -48$

$x^2 + 10x - 24 = 0$

$(x+12)(x-2) = 0$

$x = -12$ can't have a negative length/width

$x = 2$



$x+4 \quad x+6$

$2+4 \quad 2+6$

6×8

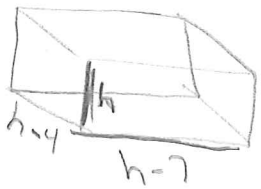
new dimensions are 6ft by 8ft

2.) The length of a FedEx 25 kg box is 7 inches less than its height. The width of the box is 4 inches less than its height. If the **volume** of the box is 308 cubic inches, find the **height** of the box.

$L = (h-7)$

$w = (h-4)$

$h = h$



$L \cdot w \cdot h = V$

$(h-7)(h-4)h = 308$

$(h^2 - 11h + 28)h =$

$h^3 - 11h^2 + 28h = 308$

$h^3 - 11h^2 + 28h - 308 = 0$

$h^2(h-11) \quad 28(h-11) = 0$

$(h-11)(h^2+28) = 0$

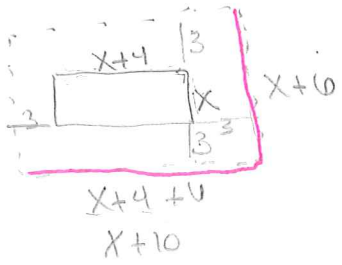
$h = 11 \quad h^2 = -28$

$h = \pm\sqrt{-28}$

$\emptyset$

height is 11 inches

3.) A photo is 4 inches longer than it is wide. A 3-inch border is placed around the photo making the total area of the photo and border 165 square inches. What are the **dimensions** of the photo?



$(X+6)(X+10) = 165$

$X^2 + 16X + 60 = 165$

$X^2 + 16X - 105 = 0$

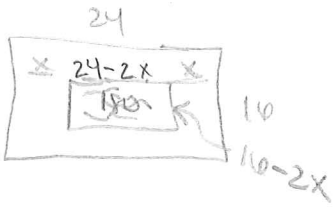
$(X+21)(X-5) = 0$

$X = -21 \quad X = 5$

X+4 = 5+4

Photo is 5" by 9"

4.) A rectangular crocodile pond is surrounded by a fenced in walkway of uniform (same) width. The dimensions of the pond plus the walkway are 16 yards by 24 yards. If the **area** of the pond is 180 square yards, find the width of the walkway.



$(24-2x)(16-2x) = 180$

$384 - 80x + 4x^2 = 180$

$-180 \qquad -180$

$4x^2 - 80x + 204 = 0$

$4(x^2 - 20x + 51) = 0$

$4(x-3)(x-17) = 0$

$x = 3 \quad x = 17$ ← can't be: $16-2x$

$16-2(17) =$ a negative length!

↑

width is 3 yds

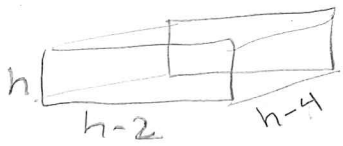
5.) Alex, Bill and Danny collect tropical fish. Alex has 8 more fish than Danny, and Bill has 2 fewer fish than Danny. The **product** of the numbers of fish Alex, Bill, and Danny have is 96. How many fish does each boy have?

Danny: x
Bill: $x-2$
Alex: $x+8$

$x(x-2)(x+8) = 96$
$x(x^2+6x-16) = 96$
$x^3+6x^2-16x-96 = 0$
$x^2(x+6) - 16(x+6) =$
$(x+6)(x^2-16) = 0$
$x = -6$ $x^2 = 16$
$x = 4$ $x = -4$

Danny has 4 fish
Bill has 2 fish
Alex has 12 fish

6.) You need to design a box to hold all of your College Algebra worksheets. The bottom of the box is a rectangle. Suppose the width of the box is 4 feet smaller than the height, h, of the box, and the length is 2 feet smaller than the height.



(a) Write an equation V, which represents the volume of this box.

$h(h-2)(h-4) = V$
$h(h^2-6h+8$
$h^3-6h^2+8h = V$

(b) What are the dimensions of the box if the volume is 48 cubic feet?

$h^3-6h^2+8h = 48$
$h^3-6h^2+8h-48 = 0$
$h^2(h-6)$ $8(h-6)$

$(h^2+8)(h-6) = 0$

$h^2 = -8$ $h = 6$
$h = \emptyset$

height is 6
width is 2
length is 4

4' x 2' x 6'