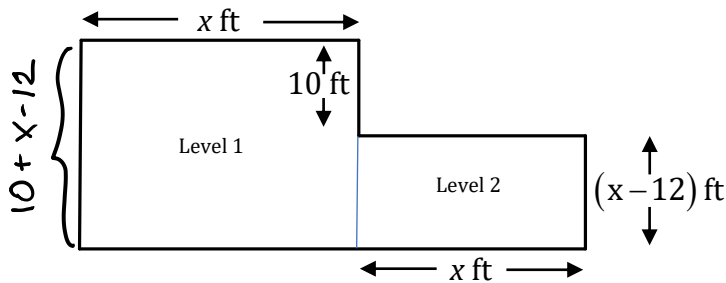**Unit 7 Day 3 HW Applications of Polynomials**

Name: _Key_

1) You are building a multilevel deck to go on the back of your house. A diagram is provided:

$10 + x - 12$ {

$\longleftarrow$ x ft $\longrightarrow$

10 ft $\updownarrow$

Level 1

Level 2

$(x-12)$ ft $\updownarrow$

$\longleftarrow$ x ft $\longrightarrow$

a) For each level, write a polynomial in standard form that represents the area of that level. Then write the polynomial in standard form that represents the total area of the deck.

LEVEL 1 $x(10+x-12)$
$x(x-2)$
$\boxed{x^2 - 2x}$

LEVEL 2 $x(x-12)$
$\boxed{x^2 - 12x}$

$\underline{TOTAL}$
$x^2 - 2x + x^2 - 12x$
$\boxed{2x^2 - 14x}$

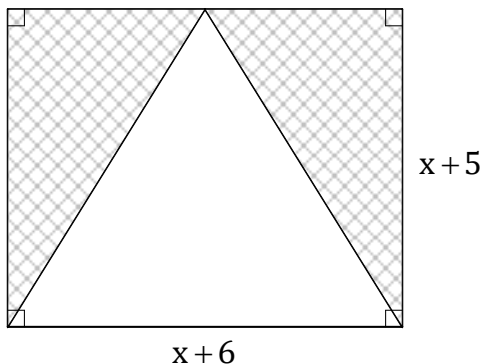b) What is the total area of the deck when $x = 20$?

Total Area: $2(20)^2 - 14(20) = 800 - 280$
$= \boxed{520 \text{ ft}^2}$

c) A gallon of deck sealant covers 400 square feet. How many gallons of sealant do you need to cover the deck in part (b) once?

1 gal $= 400$ ft^2
2 gal $= 800$ ft^2

$\boxed{\text{You would need 2 gallons}}$

2) Write a polynomial that represents the shaded area.

$b \cdot h$ $\frac{1}{2} \cdot b \cdot h$
$\square - \triangle$

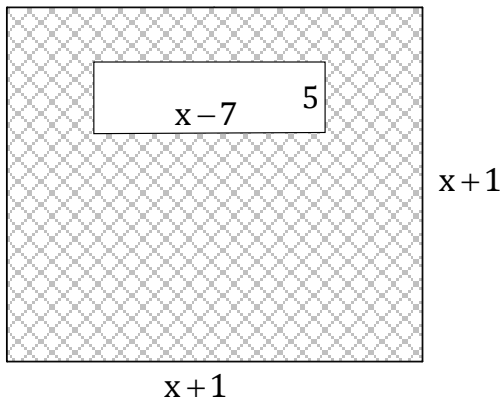$x+5$

$x+6$

$(x+6)(x+5) - \frac{1}{2}(x+6)(x+5)$

$x^2 + 11x + 30 - \frac{1}{2}(x^2 + 11x + 30)$

$x^2 + 11x + 30 - .5x^2 - 5.5x - 15$

$\boxed{.5x^2 + 5.5x + 15}$

OR

$\boxed{\frac{1}{2}x^2 + \frac{11}{2}x + \frac{30}{2}}$

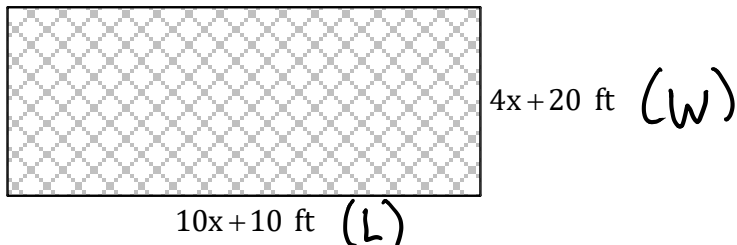3) Write a polynomial that represents the shaded area. (Assume right angles)

$x-7$ 5

$x+1$

$x+1$

$(x+1)(x+1) - 5(x-7)$

$x^2 + 2x + 1 - 5x + 35$

$$\boxed{x^2 - 3x + 36}$$

Find the product.

4) $(t-2)(t^2-5t+1)$

$t^3 - 5t^2 + t - 2t^2 + 10t - 2$

$$\boxed{t^3 - 7t^2 + 11t - 2}$$

5) $(6v^2 + 2v - 9)(4-5v)$

$24v^2 - 30v^3 + 8v - 10v^2 - 36 + 45v$

$$\boxed{-30v^3 + 14v^2 + 53v - 36}$$

6)

$4x+20$ ft (W)

$10x+10$ ft (L)

a) Write a polynomial that represents the area of the rectangular field.

$(10x + 10)(4x + 20)$

$40x^2 + 200x + 40x + 200 \rightarrow \boxed{40x^2 + 240x + 200}$

b) Find the area when the width is 160 ft.

$W = 160$

$4x + 20 = 160$

$4x = 140$

$x = 35$

$\rightarrow 40(35)^2 + 240(35) + 200$

$$\boxed{57,600 \ ft^2}$$

7) You design a frame to surround a rectangular photo. The width of the frame is the same on every side, as shown.

| X |

$\frac{}{X}$

20 in $\}$ $2x + 20$

X

22 in
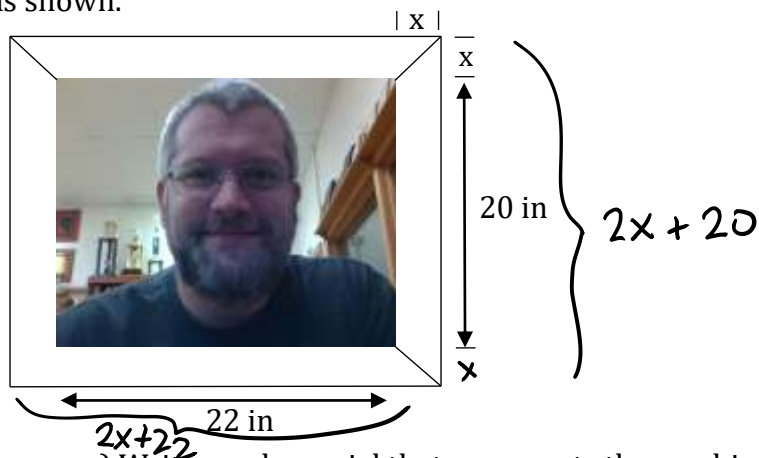
$2x + 22$

a) Write a polynomial that represents the combined area of the photo and frame.

$(2x + 20)(2x + 22)$

$4x^2 + 44x + 40x + 440$

$\boxed{4x^2 + 84x + 440}$

b) Find the combined area of the photo and frame when the width of the frame is 4 inches.

$4(4)^2 + 84(4) + 440$ $x = 4$

$\boxed{840 \text{ in.}^2}$

✶ CHALLENGE!

8) Write two polynomials that are not monomials whose product is a trinomial of degree 3.

Example: $(x^2 + x)(x + 1)$

$x^3 + x^2 + x^2 + x$

$x^3 + 2x^2 + x$ / cubic trinomial