

### Polynomial Word Problem homework

1. A picture is 4 inches longer than it is wide. It is surrounded by a mat that is 2 inches wide. The total area of the mat is 112 square inches. Find the dimensions of the picture.

length =  $4 + w$   
width =  $w$

Area of mat + area of picture = total area

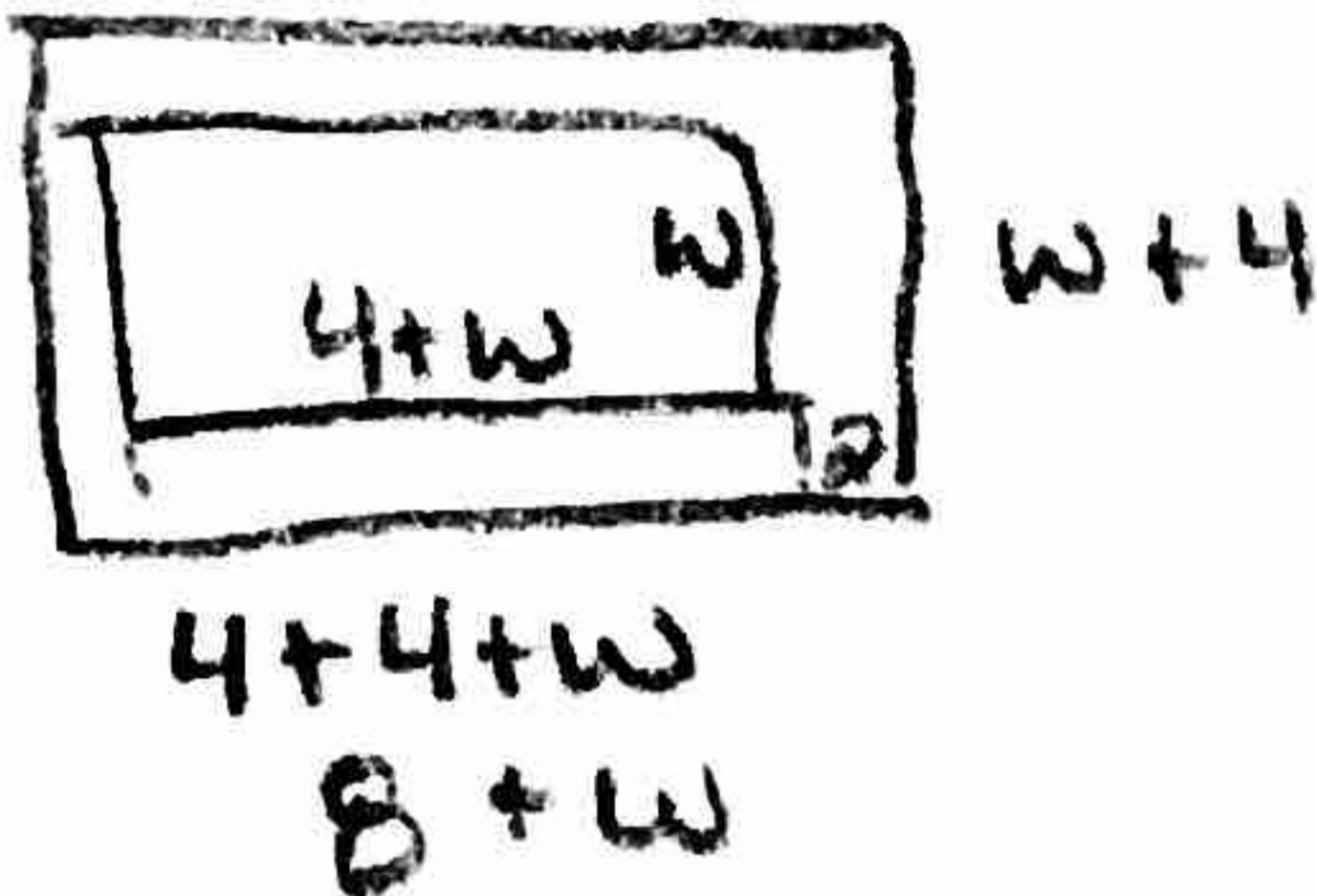
$$112 + (4+w)w = (w+8)(w+4)$$

$$112 + 4w + w^2 = w^2 + 12w + 32$$

$$\begin{array}{r} 112 + 4w + w^2 \\ -32 \quad -4w \\ \hline 80 = 8w \end{array}$$

$80 = 8w$   
 $10 = w$     $l = 14$

width = 10 in  
length = 14 in



2. The side of a cube is represented by  $x + 1$ . What polynomial represents the volume of the cube?

$V = s^3$   
 $V = (x+1)^3$

$$V = (x+1)(x+1)(x+1)$$

$$V = (x^2 + 2x + 1)(x+1)$$

$$V = x^3 + x^2 + 2x^2 + 2x + x + 1$$

$$V = x^3 + 3x^2 + 3x + 1 \text{ units}^3$$

3. Think of a number. Subtract 7. Multiply by 3. Add 30. Divide by 3. Subtract the original number. The result is always 3. Use polynomials to illustrate this number trick.

$x = \text{the \#}$

$$\frac{(x-7) * 3 + 30}{3} - x = 3$$

\*order of operations

4. The length of a rectangular window is 5 feet more than its width. The area of the window is 36 square feet. Write an equation to find the dimensions of the window. (~~We do not know how to solve this equation.~~)

\* NOT a # answer

length =  $5 + x$

width =  $x$

$$A = l \cdot w$$

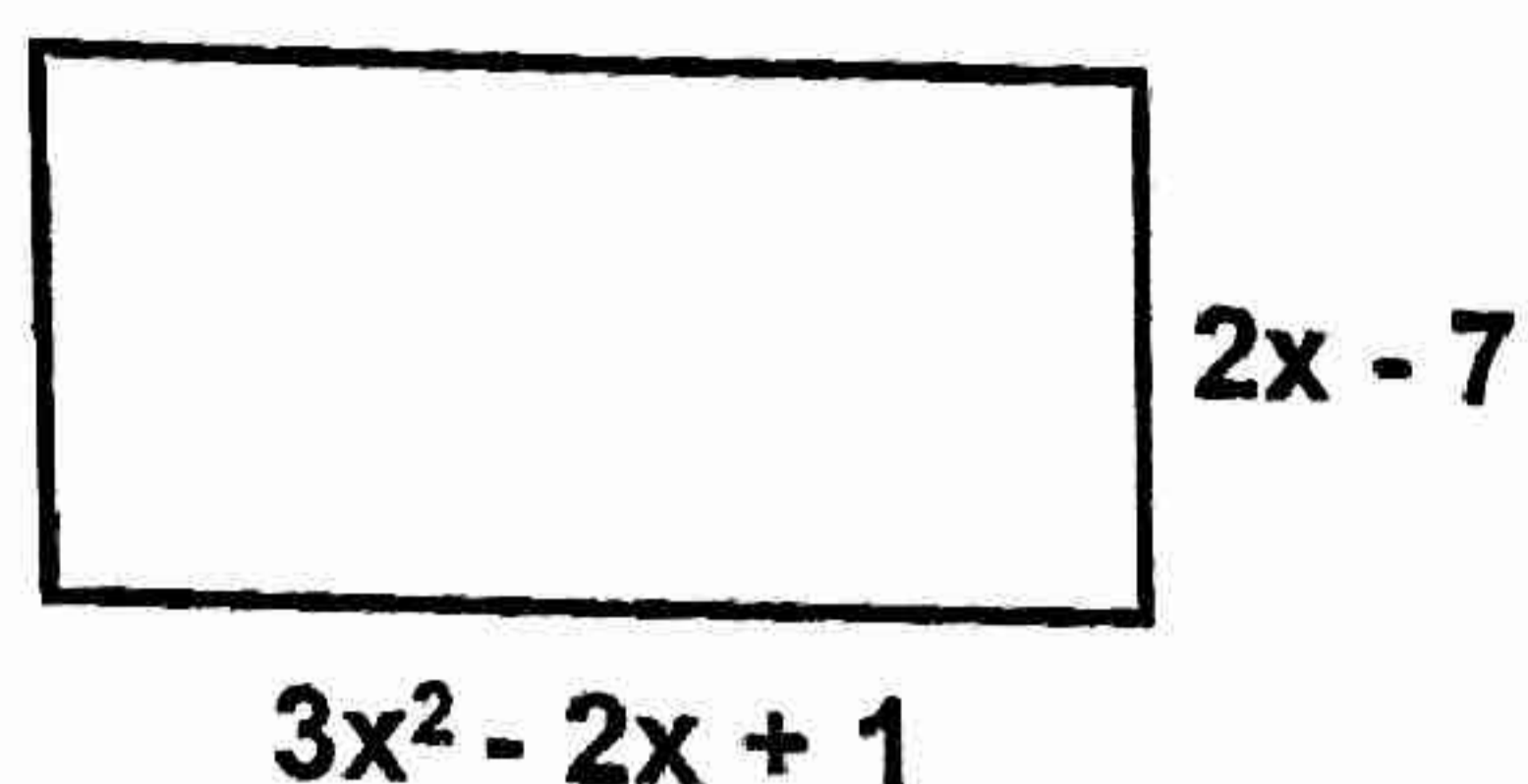
$$36 = (5+x)x$$

$$36 = 5x + x^2$$

or  $0 = -36 + 5x + x^2$

\* Will solve these equations in Intermediate Alg.

5. What is the area of the rectangle below? What is the perimeter?



A = Area

$$A = b \cdot h$$

$$A = (3x^2 - 2x + 1)(2x - 7)$$

$$A = 6x^3 - 21x^2 - 4x^2 + 14x + 2x - 7$$

$$A = 6x^3 - 25x^2 + 16x - 7 \text{ units}^2$$

P = perimeter

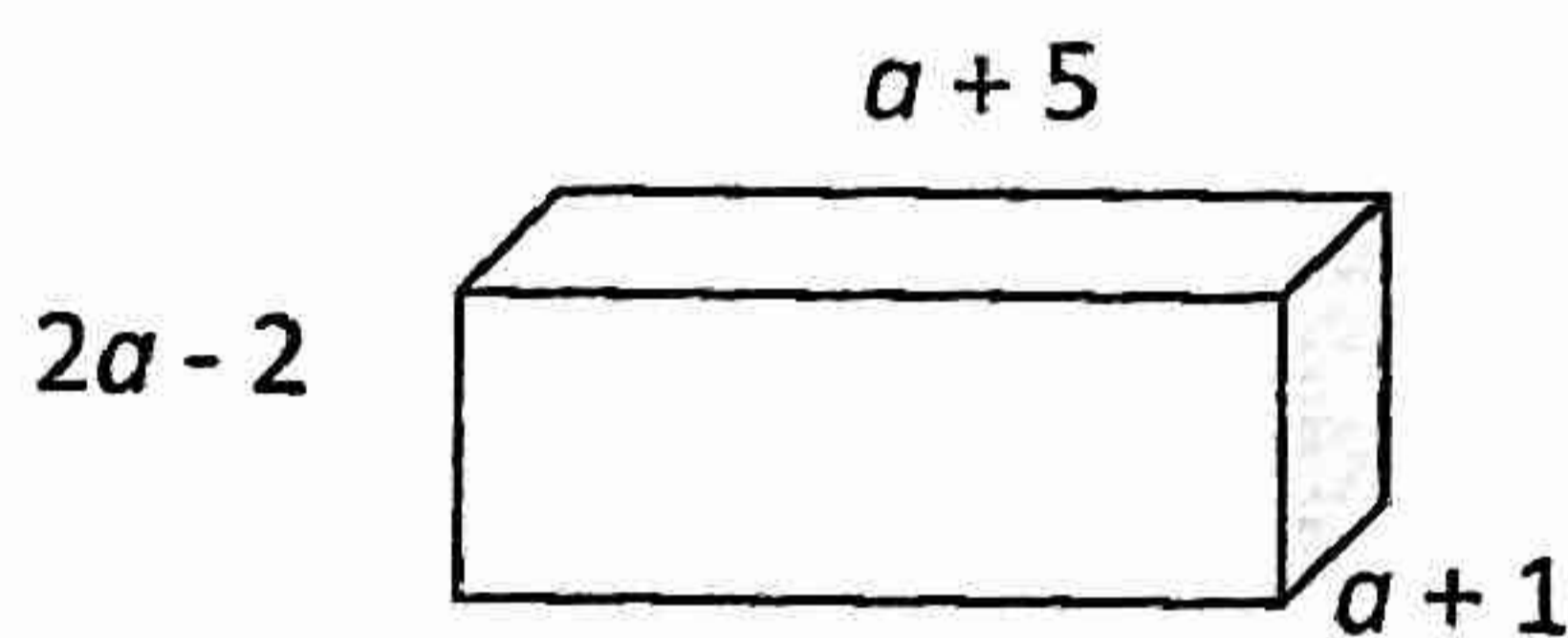
$$P = 2(b) + 2(h)$$

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

$$P = 6x^2 - 4x + 2 + 4x - 14$$

$$P = 6x^2 - 12 \text{ units}$$

6. Find the volume of the prism. ( $V = l \cdot w \cdot h$ )



V = volume

$$V = l \cdot w \cdot h$$

$$V = (a+5)(a+1)(2a-2)$$

$$V = (a^2 + a + 5a + 5)(2a-2)$$

$$V = (a^2 + 6a + 5)(2a-2)$$

$$V = 2a^3 - 2a^2 + 12a^2 - 12a + 10a - 10$$

$$V = 2a^3 + 10a^2 - 2a - 10 \text{ units}^3$$

\* work may differ but should get same final answer