Let's extend our understanding of the distributive property by learning how to multiply polynomials.

Let's Practice!

1. Two polynomial functions are given.

$$f(x) = -8x^2$$

$$g(x) = 3x^2 - 20$$

Find $f(x) \cdot g(x)$ and write an equivalent expression.

$-8x^2(3x^2 - 20)$

$-24x^4 + 160x^2$

2. Two polynomial functions are given.

$$h(m) = \frac{2}{3}m^4 - 2$$

$$g(m) = \frac{1}{2}m^2 - 9$$

Find $h(m) \cdot g(m)$ and write an equivalent expression.

$\frac{2}{3} \cdot 9$

$\frac{2}{3} \cdot \frac{9}{1}$

$\left(\frac{2}{3}m^4 - 2\right)\left(\frac{1}{2}m^2 - 9\right)$

$\frac{2}{6}m^6 - \frac{18}{3}m^4 - \frac{2}{2}m^2 + 18$

$\frac{1}{3}m^6 - 6m^4 - m^2 + 18$

3. Two polynomial functions are given.

$$r(x) = 3x^2 + 4x - 4$$
$$l(x) = 3x + 6$$

Find $r(x) \cdot l(x)$ and write an equivalent expression.

$(3x^2+4x-4)(3x+6)$

$9x^3+18x^2+12x^2+24x-12x-24$

$9x^3+30x^2+12x-24$

4. A polynomial function is given.

$$n(a) = 2a^2 - a + 1$$

Find $(n(a))^2$ and write an equivalent expression.

$(2a^2 - a + 1)(2a^2 - a + 1)$

$4a^4 - 2a^3 + 2a^2 - 2a^3 + a^2 - a + 2a^2 - a + 1$

$4a^4 - 4a^3 + 5a^2 - 2a + 1$

Try It!

5. Two polynomial functions are given.

$$b(y) = 7y^4 - 9y^2 + 5y$$
$$a(x) = x^2 - 6x$$

Find $-2b(y) \cdot a(x)$ and write an equivalent expression.

$(-14y^4 + 18y^2 - 10y)(x^2 - 6x)$

$-14x^2y^4 + 84xy^4 + 18x^2y^2 - 108xy^2 - 10x^2y + 60xy$

6. A polynomial function is given.

$$c(b) = 2b^2 - 5b$$

Find $(c(b))^3$ and write an equivalent expression.

$(2b^2-5b)(2b^2-5b)(2b^2-5b)$

$4b^4-10b^3-10b^3+25b^2$ ↓

$(4b^4-20b^3+25b^2)(2b^2-5b)$

$8b^6-20b^5-40b^5+100b^4+50b^4-125b^3$

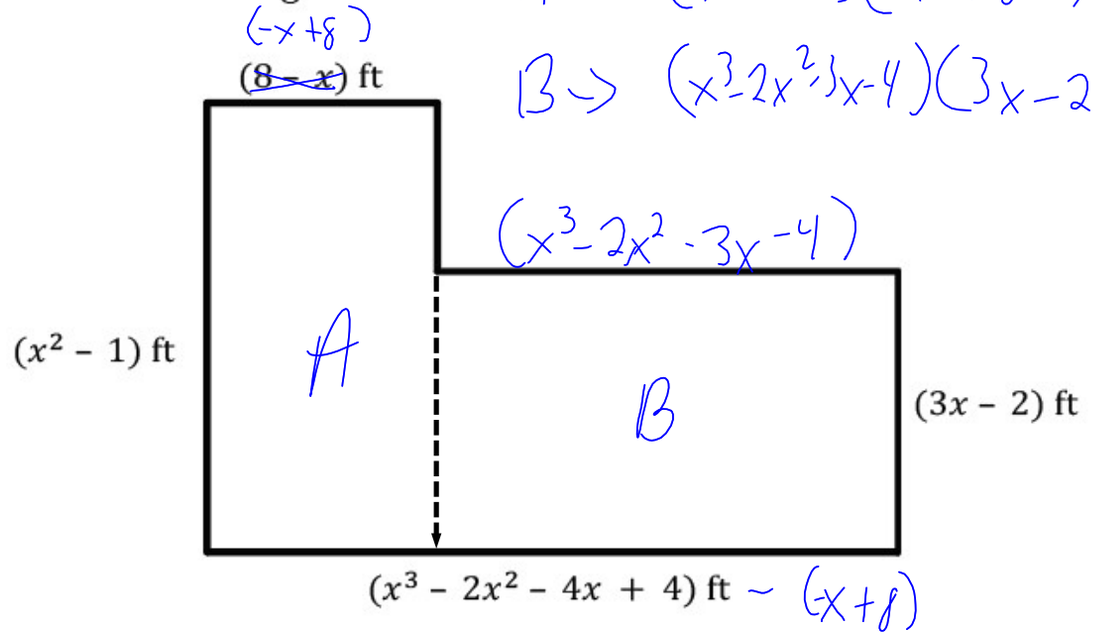
$8b^6-60b^5+150b^4-125b^3$

BEAT THE TEST!

1. Consider the figure below.

A → $(x^2-1)(-x+8)$

B → $(x^3-2x^2-3x-4)(3x-2)$



Write a function to represent the total area, in square feet, of the above figure.

A → $(x^2-1)(-x+8)$

B → $(x^3-2x^2+3x-4)(3x-2)$

(A)

$(x^2-1)(-x+8)$

$-x^3+8x^2+x-8$ (+)

(B)

$3x^4-2x^3-6x^3+4x^2-9x^2+6x-12x+8$

$3x^4-8x^3-5x^2-6x+8$

$3x^4-9x^3+3x^2-5x$ units^2