

2.2 Multiply Polynomials

Feb 23

Distributive property

$$a(b+c+d)$$

$$= ab + ac + ad$$

ex. Expand and simplify

$$\begin{aligned} & -7x(2x^2 - xy + 7x - 3) \\ & = -14x^3 + 7x^2y - 49x^2 + 21x \end{aligned}$$

Multiple Distributive Property

$$(a+b)(c+d+e)$$

$$= ac + ad + ae + bc + bd + be$$

ex. Expand and simplify

$$\begin{aligned} & (-10x+5)(-5x^2+5x+1) \\ & = 50x^3 - 50x^2 - 10x - 25x^2 + 25x + 5 \\ & = 50x^3 - 75x^2 + 15x + 5 \end{aligned}$$

FOIL

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

Diagram illustrating FOIL for $(2x+3)(3x-4)$:
 - **OUTSIDE**: $2x \cdot 3x = 6x^2$
 - **FIRST**: $2x \cdot -4 = -8x$
 - **INSIDE**: $3 \cdot 3x = 9x$
 - **LAST**: $3 \cdot -4 = -12$

$$\begin{aligned} & = 6x^2 - 8x + 9x - 12 \\ & = 6x^2 + x - 12 \end{aligned}$$

$$\begin{pmatrix} F \\ O \\ I \\ L \end{pmatrix} \begin{pmatrix} F \\ I \\ I \\ L \end{pmatrix}$$

Perfect squares

$$\begin{aligned} & (3x-4)^2 \\ & = 9x^2 - 24x + 16 \end{aligned}$$

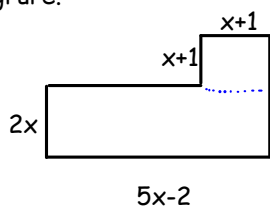
Difference of Squares

$$\begin{aligned} & (3x-4)(3x+4) \\ & = 9x^2 - 16 \end{aligned}$$

ex. Expand and simplify each expression

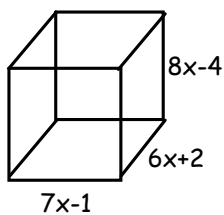
$$\begin{aligned}
 & (x+1)(x+2)(x+3) \\
 &= (x^2 + 2x + 1x + 2)(x+3) \\
 &= (x^2 + 3x + 2)(x+3) \\
 &= x^3 + 3x^2 + 2x + 3x^2 + 9x + 6 \\
 &= x^3 + 6x^2 + 11x + 6 \\
 \\
 & (2x+3y+4z)^2 = (2x+3y+4z)(2x+3y+4z) \\
 &= 4x^2 + 6xy + 8xz + 6xy + 9y^2 + 12yz + 8xz + 12yz + 16z^2 \\
 &= 4x^2 + 9y^2 + 16z^2 + 12xy + 16xz + 24yz \\
 \\
 & (2x-y)(2x+y)(4x^2+y^2) \\
 &= (4x^2 - y^2)(4x^2 + y^2) \\
 &= 16x^4 - y^4
 \end{aligned}$$

ex. Determine an expression for the area of the following figure.



$$\begin{aligned}
 A &= (x+1)^2 + 2x(5x-2) \\
 &= x^2 + 2x + 1 + 10x^2 - 4x \\
 A &= 11x^2 - 2x + 1
 \end{aligned}$$

ex. Determine an expression for the volume of the following prism



$$\begin{aligned}
 V &= lwh \\
 &= (7x-1)(6x+2)(8x-4) \\
 &= (42x^2 + 14x - 6x - 2)(8x-4) \\
 &= (42x^2 + 8x - 2)(8x-4) \\
 &= 336x^3 + 64x^2 - 16x - 168x^2 - 32x + 8 \\
 V &= 336x^3 - 104x^2 - 48x + 8
 \end{aligned}$$

Homework p 96 #1,4-6,9,11