Algebra 1   8.2
Multiply a polynomial by a monomial
Solve equations involving the product of a monomial and a polynomial

monomial
polynomial
distributive property
like terms

Whiteboards
5 in a row (if time)

$$3ab\left(2a + 6b - 5\right)$$

$$3ab \cdot 2a + 3ab \cdot 6b + 3ab \cdot -5$$

$$6a^2b + 18ab^2 + -15ab$$

Distributive property
Show your process

Example 1 Multiply a Polynomial by a Monomial

Find $-3x^2(7x^2 - x + 4)$.

$$-3x^2 \cdot 7x^2 - 3x^2 \cdot -1x - 3x^2 \cdot 4$$

$$-21x^4 + 3x^3 + -12x^2$$

Find each product.

1A. $5a^2(-4a^2 + 2a - 7)$

$$-20a^4 + 10a^3 - 35a^2$$

1B. $-6d^3(3d^4 - 2d^3 - d + 9)$

5 in a row (product)
(5-10 min.)

Example 2 Simplify Expressions

Simplify $2p(-4p^2 + 5p) + {}^-5(2p^2 + 20)$.

$2p \cdot {}^-4p^2 + 2p \cdot 5p + {}^-5 \cdot 2p^2 + {}^-5 \cdot 20$

$\cancel{X} - 8p^3 \boxed{+18p^2 - 10p^3} - 100$

$-8p^3 + 8p^2 - 100$

Distributive property
Combine like terms

Simplify each expression.

2A. $3(5x^2 + 2x - 4) + {}^-x(7x^2 + 2x - 3)$

$3 \cdot 5x^2 + 3 \cdot 2x + 3 \cdot {}^-4 \quad + {}^-x \cdot 7x^2 + {}^-x \cdot 2x + {}^-x \cdot {}^-3$

$15x^2 + 6x + {}^-12 + {}^-7x^3 + {}^-2x^2 + 3x$

$-7x^3 + 13x^2 + 9x + {}^-12$

2B. $15t\left(10y^3t^5 + 5y^2t\right) - 2y\left(yt^2 + 4y^2\right)$

Area of trapezoid...

GRIDDED RESPONSE The theme for a school dance is "Solid Gold." For one decoration, Kana is covering a trapezoid-shaped piece of poster board with metallic gold paper to look like a bar of gold. If the height of the poster board is 18 inches, how much metallic paper will Kana need in square inches?

$h + 1$

18

$2h + 4$
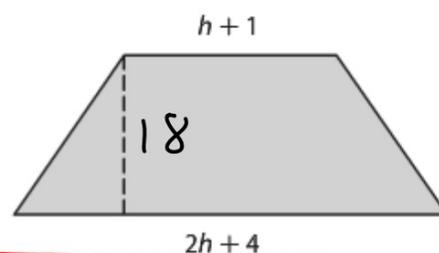
$$A = \frac{1}{2} h \left(b_1 + b_2 \right)$$

$$A = \frac{1}{2} \cdot 18 \left(h+1 + 2h+4 \right)$$

$$A = \frac{1}{2} \cdot 18 \left(3h+5 \right)$$

$$A = 9 \left(3h + 5 \right)$$

$$9 \cdot 3h + 9 \cdot 5$$

$$= 27h + 45$$

Solve means x=

Example 4 Equations with Polynomials on Both Sides

Solve $2a(5a - 2) + 3a(2a + 6) + 8 = a(4a + 1) + 2a(6a + {}^-4) + 50.$

$2a \cdot 5a + 2a \cdot {}^-2 + 3a \cdot 2a + 3a \cdot 6 = a \cdot 4a + a \cdot 1 + 2a \cdot 6a + 2a \cdot {}^-4 + 50$

$10a^2 - 4a + 6a^2 + 18a + 8 = 4a^2 + a + 12a^2 + (-8a) + 50$

Distributive property
Like terms
Zero pairs
x=

$16a^2 + 14a + 8 = 16a^2 - 7a + 50$
$-16a^2 + 7a - 8 \qquad -16a^2 + 7a - 8$

$$\frac{21a}{21} = \frac{42}{21}$$

$a = ? \quad 2$

GuidedPractice

Solve each equation.

4A. $2x(x + 4) + 7 = (x + 8) + 2x(x + 1) + 12$

$2x \cdot x + 2x \cdot 4 + 7 = x + 8 + 2x \cdot x + 2x \cdot 1 + 12$

$2x^2 + 8x + 7 = \boxed{x} + 8 + \boxed{2x^2} + \boxed{2x} + 12$

$-2x^2$

$\qquad 2x^2 + 3x + 20$

$\qquad -2x^2$

$8x + 7 = 3x + 20$

$-3x - 7 \quad -3x - 7$

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$\dfrac{8x}{5} = \dfrac{13}{5} \qquad x = 2.6$

4B. $d(d + 3) - d(d - 4) = 9d - 16$

12. $-6(11 - 2c) = 7(-2 - 2c)$

13. $t(2t + 3) + 20 = 2t(t - 3)$

P 475
19-39 odd