Mathematics 9
Unit 4: Multiplying and Dividing Polynomials (Ch 7)

Lesson #1: Multiplying and Dividing Monomials (Sec. 7.1)

Learning Targets:

1. **Multiply a monomial with another monomial.**
2. **Divide a monomial by another monomial.**
3. **Applications: area of a rectangle; area of a triangle**

Multiplying Two Monomials with the Same Variable:

$(\boldsymbol{4a})(\boldsymbol{3a})$ Monomials are made up of a coefficient and variable(s) or variable power. When we multiply two monomials we multiply both of the coefficients together, and both of the variables together.

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= The answer is another **monomial**.

Practice:

1. (2x)(-8x)
2. (-4m)(-m)
3. (-10p)(3p)

Multiplying Two Monomials with Different Variables:

$(\boldsymbol{5x})(\boldsymbol{2y})$ When we multiply two monomials with different variables, we multiply both of the coefficients together, and write both of the variables in the answer (in alphabetical order).

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Practice:

1. (-5m)(4n)
2. (-8x)(-6y)
3. (-25b)(3a)

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Multiplying Two Monomials when one is a Constant:

$(\mathbf{11}\boldsymbol{n})(\mathbf{3})$ When we multiply two monomials and one of them is a constant, we multiply both of the coefficients and the constant together, and write the variable in the answer without it changing.

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Practice:

1. (-9)(3x)
2. (-8n)(-1)
3. (-2a)(6)

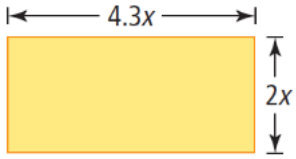
Practice – all types (fractions and decimals):

1. $(3.6y)(-3b)$
2. $\left(\frac{2}{3}m\right)\left(\frac{9}{2}m\right)$
3. $(-3x)\left(\frac{5}{6}\right)$

Application: area of a rectangle

Area = (L)(W)

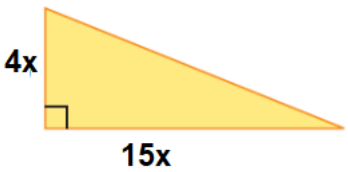
What expression would represent the area of this rectangle?



Application: area of a triangle

Area = (0.5)(b)(h)

What expression would represent the area of this triangle?



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Dividing Two Monomials with the Same Variable:

$\frac{16x^2}{8x}$ When we divide two monomials that have the same variable, we divide the coefficients together, and simplify the variables by using the exponent law for quotients.

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Practice:

1. $\frac{24a^2}{-4a}$
2. $-45m^2 \div 9m$
3. $\frac{-5b}{-10b}$

Dividing Two Monomials with Different Variables:

$\frac{25x}{5y}$ When we divide two monomials with different variables, we divide the coefficients together, and leave the variables in the same positions.

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Practice:

1. $\frac{-8k}{4n}$
2. $-12a \div -6b$
3. $\frac{15y}{12x}$

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Dividing Two Monomials with Variables that are the Same and Different:

$\frac{28mn}{4m}$ We divide the coefficients together, use the exponent law on the variables that are the same, and leave the different variable in its same position.

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Practice:

1. $\frac{4xy}{-2x}$
2. $-6mn \div -3m$
3. $\frac{3ab}{12b}$

Dividing a Monomial by a Constant:

$\frac{30x}{5}$ When we divide a monomial by a constant, we divide the coefficient by the constant, and write the variable in the answer, without it changing.

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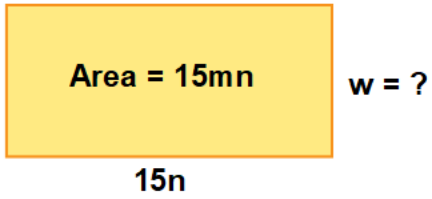
Practice:

1. $\frac{27ab}{-9}$
2. $\frac{-35m}{-7}$
3. $-18p^2 \div 3$

Application: area of a rectangle

The area of a rectangle is **75mn**. If its length is **15n**, what is its width?

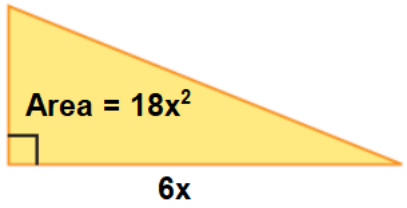
Area = (L)(W) → ***Width = $\frac{Area}{Length}$*** ***Length = $\frac{Area}{Width}$***



Application: area of a triangle

The area of a rectangle is **$18x^2$**. If the base of the triangle is **6x**, what is its height?

Area = (0.5)(b)(h) → ***height = $\frac{2 \times Area}{base}$*** ***base = $\frac{2 \times Area}{height}$***



Check your understanding: pg. 260 – 262, #7, 8, 9, 10, 15, 16, 17, 18, 19