# 4.3 Multiplying & Dividing Monomials

October 23, 2018 1:49 PM

Unit Notes 4.3-4.5 + REVIEW

## 4.3 MULTIPLYING & DIVIDING MONOMIALS

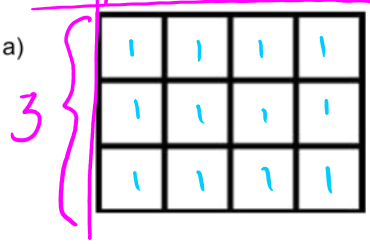
Name:_____ Block_____

**Review: What is a monomial?**

**PRACTICE** Determine the *area of each rectangle*.

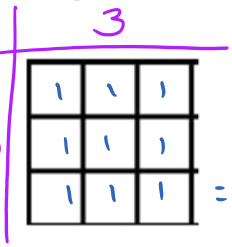
$A = l \cdot w$

a)



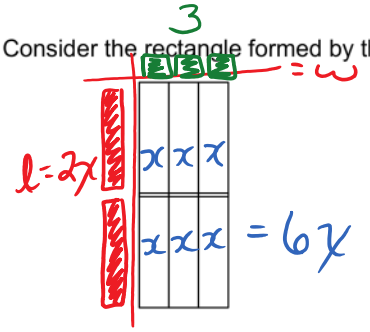

$3 \times 4 = 12$ 12 boxes

b)




$3 \times 3 = 9$ = 9 boxes

Consider the rectangle formed by the *algebra tiles* below.



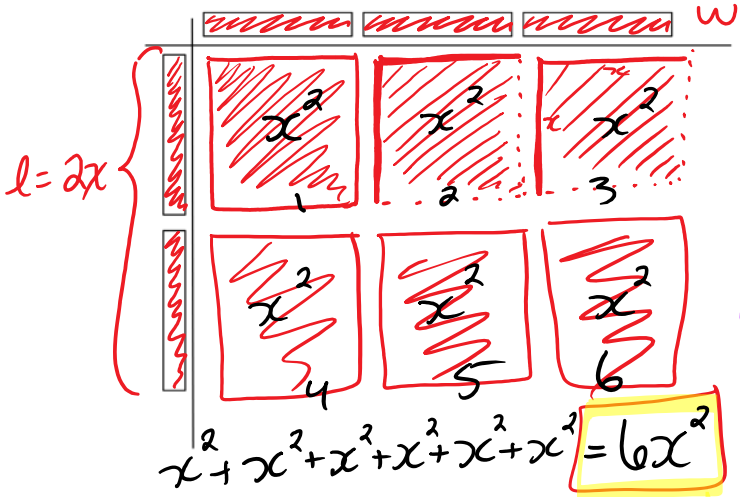

a) What is the area? $A = l \cdot w$

$A = 2x \cdot 3 = 6x$

*work backwards to see that an area = 6x must have been $2x \cdot 3$

**Multiplying Monomials**

Use algebra tiles to represent the **monomial product (3x)(2x)**




Algebraically: $A = l \cdot w$

$A = (2x) \cdot (3x)$

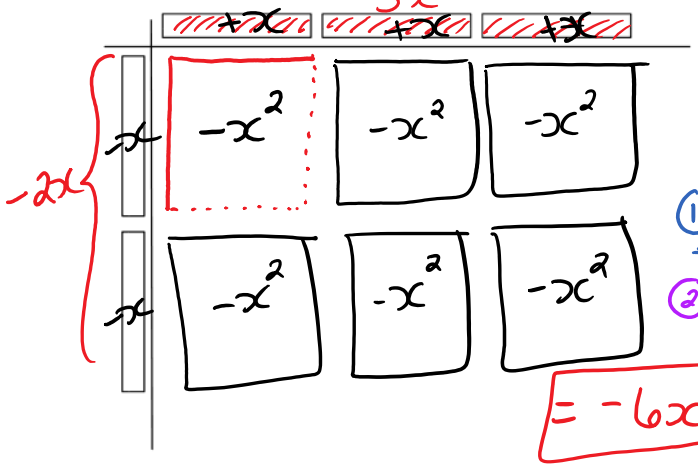
① Expand + drop brackets $A = 2 \cdot x \cdot 3 \cdot x$

② collect like terms $(2 \cdot 3) \cdot (x \cdot x)$

③ solve (simplify) $6 \cdot x^2 = 6x^2$

Remember:
$\ominus \cdot \ominus = \oplus$
$\ominus \cdot \oplus = \ominus$

Use algebra tiles to represent the **monomial product** (3x)(-2x)




Algebraically:

$A = l \cdot w$

$A = (-2x) \cdot (3x)$

① Drop brackets + expand: $(-2) \cdot x \cdot 3 \cdot x$

② Collect Like terms: $(-2 \cdot 3) \cdot (x \cdot x)$

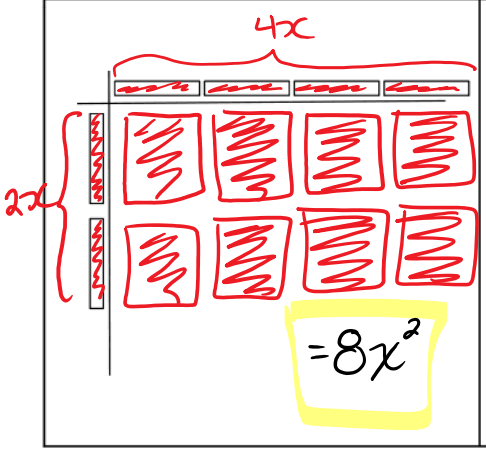
③ Simplify: $-6 \cdot x^2$

$= -6x^2$

$= -6x^2$

**Example #1:** Multiply (4x)(2x)

**a)**

| Method #1: Algebra Tiles | Method #2: Solve Algebraically |
|---|---|
|  | $(4x) \cdot (2x)$<br>$4 \cdot x \cdot 2 \cdot x$<br>$4 \cdot 2 \cdot x \cdot x$<br>$8 \cdot x^2$<br>$= 8x^2$ |



① Drop brackets + expand.

② collect Like terms

③ Simplify.

**Example #2:** Multiply.

a) (5x)(4y)

$5 \cdot x \cdot 4 \cdot y$

$5 \cdot 4 \cdot x \cdot y$

$= 20xy$

b) (-6m)(5m)

$-6 \cdot m \cdot 5 \cdot m$

$-6 \cdot 5 \cdot m \cdot m$

$= -30m^2$

c) $(\frac{1}{2}x)(3x)$

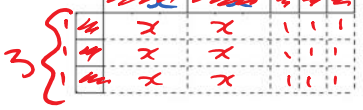
$\frac{1}{2} \cdot x \cdot 3 \cdot x$

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

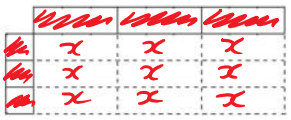
$= \frac{3}{2}x^2$

## PRACTICE

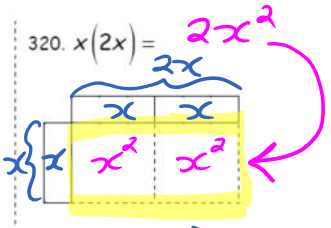
318. $3(2x+3) = 6x+9$



319. $3(3x) = 9x$



320. $x(2x) = 2x^2$



Multiply two monomials. (solve algebraically)

337. $2(5x)$

$2 \cdot 5 \cdot x$

$= 10x$

338. $-3(2x)$

$-3 \cdot 2 \cdot x$

$= -6x$

339. $8y(2x)$

$8 \cdot y \cdot 2 \cdot x$

$8 \cdot 2 \cdot y \cdot x$

$= 16yx$

340. $-2x(-9y)$

$-2 \cdot x \cdot -9 \cdot y$

$-2 \cdot -9 \cdot x \cdot y = 18xy$

Correct any errors if applicable.

341. $-1.9x(-2x)$ error $-3.8x^2$

$\ominus \times \ominus = \oplus$

342. $3xy(-2x)$

$3 \cdot x \cdot y \cdot -2 \cdot x$

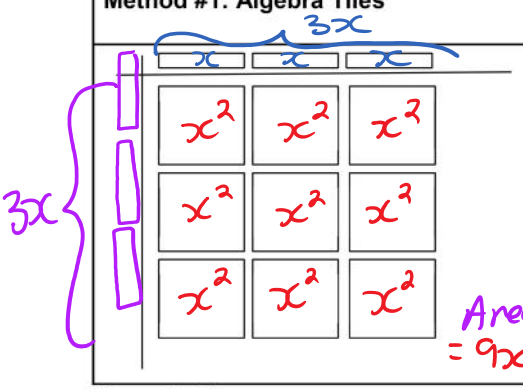
$3 \cdot -2 \cdot x \cdot x \cdot y$

$= -6x^2y$

## Dividing Monomials

**Example #1:**

Divide the pair of monomials: $9x^2 \div 3x$ = answer = other side = one side

| Method #1: Algebra Tiles | Method #2: Algebraically |
|---|---|
|  | 2 ways to show your work!<br>$9x^2 \div 3x$<br>$(9 \div 3)(x^2 \div x)$<br>$= 3x$ ✓<br>#1<br>$\frac{9x^2}{3x}$<br>#2<br>$\frac{3}{\cancel{9} \cdot x \cdot x}{\cancel{3} \cdot x}$<br>how many times does 3 go into 9<br>$= 3x$<br>*cancel what appears on top + bottom |

Area $= 9x^2$

$\frac{x^2}{x} = \frac{x \cdot x}{x}$

**Example #2:**

Divide each pair of monomials.

a) $(6x^2) \div (-2x)$

#1 $(6 \div -2)(x^2 \div x)$

$= -3x$

#2 $\frac{3}{\cancel{6} \cdot x \cdot x}{-\cancel{2} \cdot x} = -3x$

b) $\frac{2}{\cancel{10}xy}{\cancel{5}y} = 2x$

c) $\frac{4}{\cancel{12}xy}{\cancel{3}x} = 4y$

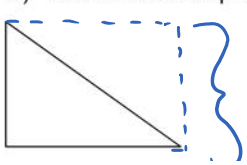
$\ominus \div \ominus = \oplus$

*answer is anything NOT crossed out

3

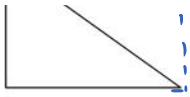
**Example #3:**

a) Determine an expression for the area in the figure below:



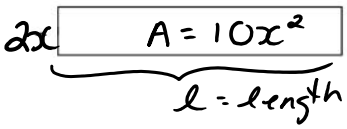
$\square = x$ and if $\triangle$ is $\frac{1}{2}$ rectangle

$x \div 2 = \frac{1}{2}x$ or $\frac{x}{2}$



$x \div 2 = \frac{1}{2}x$ or $\frac{x}{2}$

b) What is the length of the missing side in the figure below?



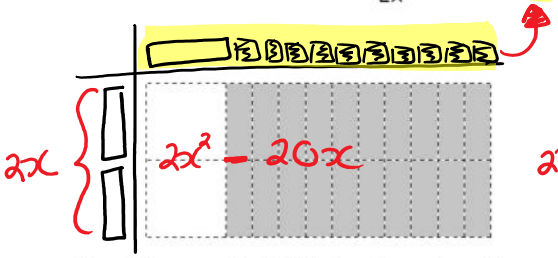

$A = \ell \cdot w$ so $\ell = \frac{A}{w} = \frac{10x^2}{2x} = \frac{10 \cdot x \cdot x}{2x} = 5x$

check: $A = \ell \cdot w$, $(5x)(2x)$, $10x^2$ ✓

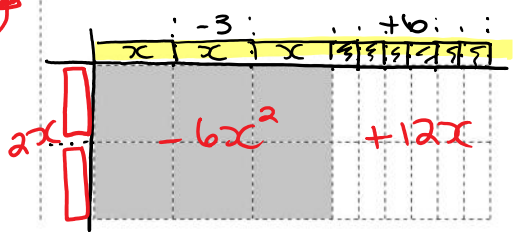
## PRACTICE

Use algebra tiles to simplify the polynomial.

369. Use the tiles to show $\frac{2x^2 - 20x}{2x}$ = $x - 10$




370. Use the tiles to show $\frac{-6x^2 + 12x}{-3x + 6}$ = $2x$




Simplify or write "AR"(already reduced).

| | | |
|---|---|---|
| 371. $-\frac{35x^2}{5}$ | 372. $\frac{14x^2}{x}$ | 373. $\frac{-34x}{7}$ |
| 374. $\frac{55x^2}{-11x}$ | 375. $\frac{4x^2z}{xz}$ | 376. $\frac{24y^2z}{-4y^2z}$ |

## Homework

ASSIGNMENT #3
Section 4.3 pg 132-135

| Required questions | Extra practice | Extension |
|---|---|---|
| 2-4, 6-7, 11, 12, 13abcd, 14, 16-17 | 5, 8, 9, 13ef, 15 | 10, 18, 22, 23 |

4