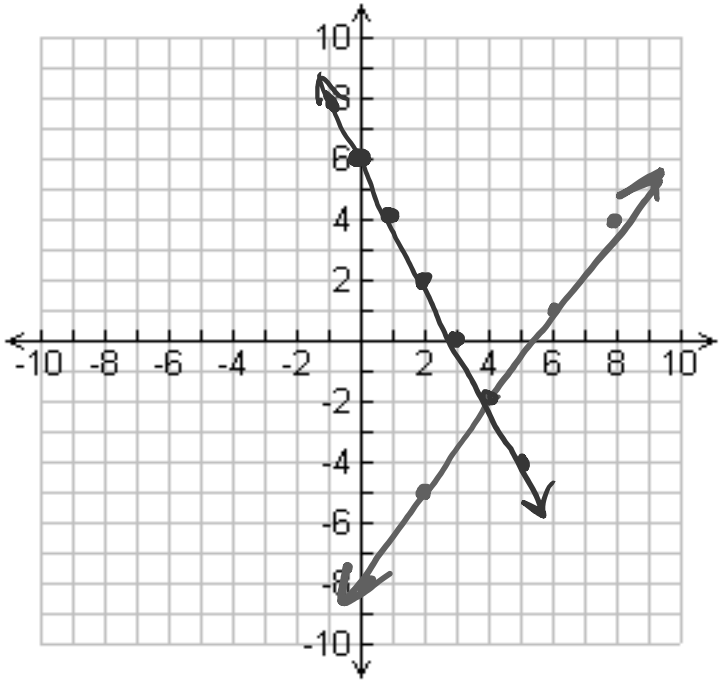
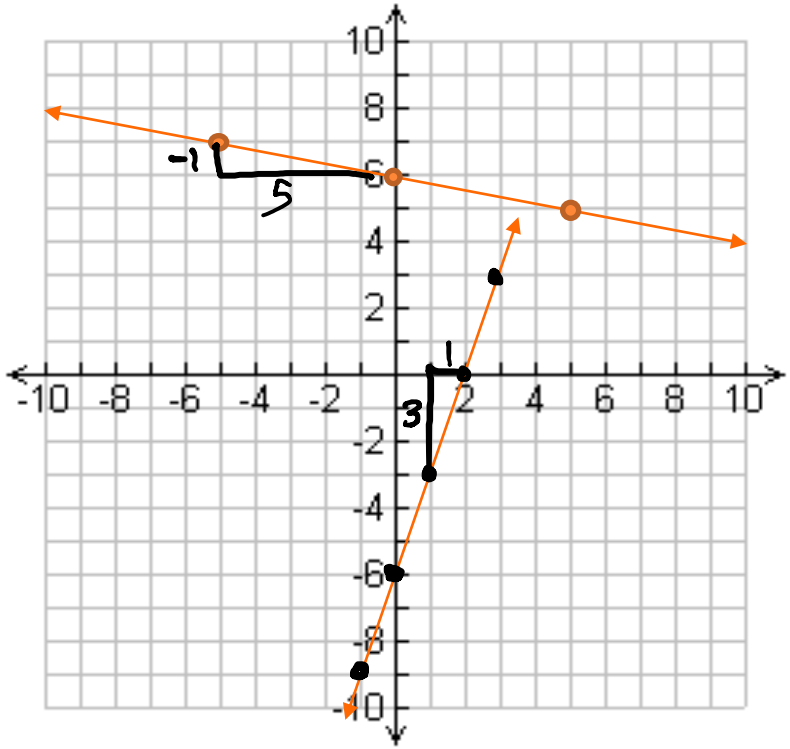
Created by Jacob Creekmore

# WARMUP 1/$\left(\frac{7\cdot7\cdot7\cdot7\cdot2}{7\cdot7\cdot7}\right)$

**Graph both on the same coordinate plane.**

1. $y = \frac{3}{2}x - 8$
2. $y = 6 - 2x$




3) $y = -\frac{1}{5}x + 6$

4) $y = 3x - 6$

$$6^{-4}$$

$$6.$$

$$.0006$$

**Why doesn't this work?**

# DO NOT do this:

›

$$6\times10^{-4}$$

$$6.$$

$$.0006$$

$$6\times10^{-4}$$

$$=6\times\frac{1}{10^4}$$

$$=\frac{6}{10^4}$$

**Why does the "move the decimal" trick work here???**

**...which means you're starting with 6 and you're dividing by ten 4 times!**

# Table of Contents (2nd Semester)



# Multiplying & Dividing Powers

**Objective:**

**Use exponent rules to simplify expressions**

# What do you think this answer would be???

- $8^5 \cdot 8^2$

$8^3$?

$8^7$?

$8^{10}$?

$8^{25}$?

Something else???

**The exponent just "keeps track" of how many 8's you're multiplying. First you were multiplying five 8's. Then you have two more. Altogether, you are multiplying seven 8's.**

# What do you think this answer would be???

- $\frac{2^{10}}{2^5}$

$2^2$?

The five 2's from the denominator will divide with five 2's from the numerator to equal 1. There will be five 2's remaining in the numerator.

$2^5$?

$2^{15}$?

Something else???

# The Rules…

**Multiplying Powers with the same base**

- Keep the base, add the exponents

**Dividing Powers with the same base**

- Keep the base, subtract the exponents

# Try it with numbers…

$2^3 \cdot 2^2$

$8 \cdot 4$ **=32 which is $2^5$**

$\frac{2^6}{2^3}$ $\frac{64}{8}$ **=8 which is $2^3$**

$2^1 = 2$
$2^2 = 4$
$2^3 = 8$
$2^4 = 16$
$2^5 = 32$
$2^6 = 64$
$2^7 = 128$
$2^8 = 256$

# Examples: Multiplying

1. $a^{45} \cdot a^{22}$ $\quad a^{67}$

2. $6^{5} \cdot 6^{3}$ $\quad 6^{8}$

3. $x^{3} \cdot y^{5} \cdot y^{2} \cdot x$ $\quad x^{4} \cdot y^{7}$

4. $12j^{5} \cdot 3j^{2}$ $\quad 12 \cdot j \cdot j \cdot j \cdot j \cdot j \cdot 3 \cdot j \cdot j = 36j^{7}$

# Examples: Dividing

1. $\frac{a^{45}}{a^{22}}$ $a^{23}$

2. $\frac{6^5}{6^3}$ $6^2$

3. $\frac{x^3y^5}{xy^2}$ $x^2y^3$

4. $\frac{12j^5}{3j^2}$ $\frac{12 \cdot j \cdot j \cdot j \cdot j \cdot j}{3 \cdot j \cdot j}$

$= 4j^3$

- ***WHEN YOU HAVE COEFFICIENTS, MULTIPLY OR DIVIDE THEM JUST LIKE NORMAL NUMBERS!!!***

# CAREFUL…

$$\frac{7x^5}{7x^3}$$

Here the 7's are coefficients. There is 1 of each. The 7's would "divide away."

$$\frac{7^5}{7^3}$$

Here the 7's are the actual base. There are five 7's in the numerator and three 7's in the denominator. There would be two 2's remaining in the denominator.

**THESE 7'S DO NOT CANCEL OUT!!!**

# Helpful Hint

- **WHEN IN DOUBT, EXPAND IT OUT!!!**

# Examples with Negatives

- ***Never leave a zero or negative exponent in your answer! If you have one, you need to rewrite it.

1) $x^3 \cdot x^{-5}$

$= x^{3+(-5)} = x^{-2} = \boxed{\frac{1}{x^2}}$

2) $\frac{g^4}{g^{10}} = g^{4-10} = g^{-6} = \boxed{\frac{1}{g^6}}$

3) $\frac{q^3 q^2}{q^5} = \frac{q^5}{q^5} = q^{5-5} = q^0 = \boxed{1}$

4) $5p^{-4} \cdot 3p^{-2}$

$= 15p^{-6} = 15 \cdot \frac{1}{p^6} = \boxed{\frac{15}{p^6}}$

# A LITTLE HARDER…

**TIP:**
**Go step by step. Do the coefficients, then one variable, then the other.**

1. $4a^2b^3 \cdot 7a \cdot 2b^5$

$= 4 \cdot a \cdot a \cdot b \cdot b \cdot b \cdot 7 \cdot a \cdot 2 \cdot b \cdot b \cdot b \cdot b \cdot b$

$$= 56a^3b^8$$

2. $\dfrac{6c^5 \cdot 3d^7}{9cd^4}$

$$= \frac{6 \cdot c \cdot c \cdot c \cdot c \cdot \cancel{c}^{1} \cdot 3 \cdot \cancel{d}^{1} \cdot \cancel{d}^{1} \cdot \cancel{d}^{1} \cdot \cancel{d}^{1} \cdot d \cdot d \cdot d}{9 \cdot \cancel{c} \cdot \cancel{d} \cdot \cancel{d} \cdot \cancel{d} \cdot \cancel{d}}$$

$$= \frac{18 \cdot c^4 \cdot d^3}{9}$$

$$= 2c^4d^3$$

# HOMEWORK

- Textbook p. 27 (1 – 6, 8, 14 – 20)