

Name: KEY  
 Date: June 2017

Complete the packet by working each question. Correct your packet using the answer key posted on class website [www.nshsdolan.weebly.com](http://www.nshsdolan.weebly.com). If a question is incorrect, go back and try to find your mistake. Make your life easier by showing all your steps!

Simplifying Expressions and Solving Equations:

Order of Operations, Combining Like Terms, Exponent Properties

1. Find the value of each expression:

P/G None  
 E None  
 M D ✓ -2·3  
 A S ✓ 9+ -6

a.)  $9 + -2 \cdot 3$   
 $9 + -6$   
 $3$

b.)  $(6 + 3) \cdot 4$   
 $9 \cdot 4$   
 $36$

c.)  $-6 + (+80)$   
 Method #1  
 $-6 + (+80)$   
 $-6 + 80$   
 $74$   
 OR  
 Method #2  
 $-6 + 1(-80)$   
 $-6 + 80$   
 $74$

d.)  $(-5)^2$   
 $(-5) \cdot (-5)$   
 $25$

2. Simplify each expression.

Combine like terms!  
 → When adding or subtracting:  
 IF ① variable is the same  
 ② exponent with variable is the same  
 Then ADD or SUBTRACT coefficients

a.)  $6x + 3y + y + 2x$   
 $6x + 2x + 3y + y$   
 $8x + 2y$

b.)  $c(4c + d)$   
 Method #1  
 $c(4c + d)$   
 $4c \cdot c + d \cdot c$   
 $4c^2 + c \cdot d$

Area / Rectangle Method  

	$4c$	$+d$
$c$	$4c \cdot c$	$c \cdot d$
	$4c^2$	

 $4c^2 + c \cdot d$

c.)  $3 \cdot 4 \cdot 5 \cdot t \cdot t$   
 $60 \cdot t^2$

d.)  $6c - (-2c)^2$   
 $6 \cdot c + 1 \cdot -2 \cdot c \cdot -2 \cdot c$   
 $6 \cdot c + 1 \cdot 4 \cdot c^2$   
 $6c + 4c^2$   
 \* PEMDAS → Multiply before Adding

★ Operations with signed numbers:  
negative • negative = positive

e.)  $5(2x+1)+3x+7$   
 $5 \cdot 2 \cdot x + 5 \cdot 1 + 3 \cdot x + 7$   
 $10 \cdot x + 5 + 3 \cdot x + 7$   
 $10x + 3x + 5 + 7$

$7x + 12$

g.)  $(-3m^4n)(2m^5n^2)$

$-3 \cdot 2 \cdot m \cdot m \cdot m \cdot m \cdot m \cdot m \cdot m \cdot n \cdot n \cdot n$

$-6m^9 \cdot n^3$  OR

Exponent Properties - Product Rule:

$z^x \cdot z^y = z^{x+y}$

$-3 \cdot 2 \cdot m^4 \cdot m^5 \cdot n^2$   
 $-6 \cdot m^{4+5} \cdot n^{1+2}$

$-6m^9n^3$

f.)  $4y - (7y - 3)$   
 $4y + 1(7y + 3)$   
 $4y + 7y + 3$

$11y + 3$

$-3y + 3$

h.)  $(2x^2y^3)^2$

Exponent Power Rule  
 $(m^a n^b)^c = m^{a \cdot c} n^{b \cdot c}$

$2 \cdot x^2 \cdot y^3 \cdot 2 \cdot x^2 \cdot y^3$

$2 \cdot 2 \cdot x^2 \cdot x^2 \cdot y^3 \cdot y^3$   
 $4 \cdot x^{2+2} \cdot y^{3+3}$

$4 \cdot x^4 \cdot y^6$

OR OR  $2^2 x^4 y^6$   
 $4x^4y^6$

3. Simplify each expression. Write your answer without negative exponents.

a.)  $\frac{72x^3y^2z}{-6x^4yz^2}$   
 $\frac{72}{-6} \cdot \frac{x \cdot x \cdot x}{x \cdot x \cdot x \cdot x} \cdot \frac{y \cdot y}{y} \cdot \frac{z}{z \cdot z}$

$-12 \cdot \frac{1}{x} \cdot \frac{y}{1} \cdot \frac{1}{z}$

$\frac{-12y}{xz}$

b.)  $\frac{3x^5y}{9y^5}$   
 $\frac{3}{9} \cdot \frac{x^5}{1} \cdot \frac{y}{y^5}$

$\frac{1}{3} \cdot \frac{x^5}{1} \cdot y^{1-5}$   
 $\frac{x^5y^{-4}}{3}$

Quotient rule:  
 $\frac{m^a}{m^b} = m^{a-b}$

Negative exponents:  
 $x^{-a} = \frac{1}{x^a}$

c.)  $\left(\frac{5x^2}{xy}\right)^{-1}$   
 $\frac{5^{1-1} \cdot x^{2-1}}{x^{1-1} \cdot y^{1-1}}$

$\frac{5^{-1} \cdot x^{-2}}{x^{-1} \cdot y^{-1}}$

$\frac{x^1 \cdot y^1}{5^1 x^2}$

d.)  $\frac{2x^3y^4}{xy^3} \cdot \frac{4x}{x^3y}$

$\frac{2 \cdot 4 \cdot x^3 \cdot x \cdot y^4}{x \cdot x^3 \cdot y^3 \cdot y}$

$\frac{8 \cdot x^{3+1} \cdot y^4}{x^4 \cdot y^4}$

$\frac{8 \cdot x^4 \cdot y^4}{x^4 \cdot y^4}$

$\frac{8 \cdot x^4 \cdot y^4}{x^4 \cdot y^4} \rightarrow 8$

$8$

$$m^0 = 1$$

e.)  $5x^{-1} \div \frac{25}{x}$   
 $5x^{-1} \div 25x^{-1}$

$$\frac{5x^{-1}}{25x^{-1}}$$

$$\frac{x^{-1} + 1}{5} \rightarrow \frac{x^0}{5} \rightarrow \frac{1}{5}$$

f.)  $(2x^2)^{-4}$   
 $\frac{1}{(2x^2)^4}$

$$\frac{1}{2^{1 \cdot 4} x^{2 \cdot 4}}$$

$$\frac{1}{2^4 x^8} \rightarrow \frac{1}{16x^8}$$

4. Solve each equation. Check your solution.

a.)  $5x - 9 = -24$

$$\begin{array}{r} 5x - 9 = -24 \\ +9 \quad +9 \\ \hline 5x = -15 \\ \frac{5x}{5} = \frac{-15}{5} \\ \hline x = -3 \end{array}$$

b.)  $3(x - 7) = -21$

$$\begin{array}{r} 3x - 7 - 3 = -21 \\ 3x - 21 = -21 \\ +21 \quad +21 \\ \hline 3x = 0 \\ \frac{3x}{3} = \frac{0}{3} \\ \hline x = 0 \end{array}$$

Check: Let  $x = -3$

$$5(-3) - 9 \stackrel{?}{=} -24$$

$$-15 - 9 \stackrel{?}{=} -24$$

$$-24 = -24 \checkmark$$

Check: Let  $x = 0$

$$3(0 - 7) \stackrel{?}{=} -21$$

$$3(-7) \stackrel{?}{=} -21$$

$$-21 = -21 \checkmark$$

5. Solve each equation. Check your solution.

a.)  $3x + 2 = x - 10$

$$\begin{array}{r} 3x + 2 = x - 10 \\ -2 \quad -2 \\ \hline 3x = x - 12 \\ -x \quad -x \\ \hline 2x = -12 \\ \frac{2x}{2} = \frac{-12}{2} \\ \hline x = -6 \end{array}$$

Check: Let  $x = -6$

$$3(-6) + 2 \stackrel{?}{=} -6 - 10$$

$$-18 + 2 \stackrel{?}{=} -16$$

$$-16 = -16 \checkmark$$

$$\begin{aligned}
 \text{b.) } & 6(2x-3) + 4 = 16 \\
 & 12x - 18 + 4 = 16 \\
 & 12x - 14 = 16 \\
 & \quad +14 \quad +14 \\
 \hline
 & 12x = 30 \\
 & \frac{12x}{12} = \frac{30}{12}
 \end{aligned}$$

$$x = \frac{5}{2}$$

$$\begin{aligned}
 \text{c.) } & -6 + \frac{x}{4} = -5 \\
 & +6 \quad +6 \\
 \hline
 & 4 \left( \frac{x}{4} \right) = (1) 4 \\
 \hline
 & x = 4
 \end{aligned}$$

$$\begin{aligned}
 \text{Check: Let } x &= \frac{5}{2} \\
 6 \left( 2 \cdot \frac{5}{2} - 3 \right) + 4 &\stackrel{?}{=} 16 \\
 6 \left( \frac{10}{2} - 3 \right) + 4 &\stackrel{?}{=} 16 \\
 6(5-3) + 4 &\stackrel{?}{=} 16 \\
 6(2) + 4 &\stackrel{?}{=} 16 \\
 12 + 4 &\stackrel{?}{=} 16 \\
 16 &= 16 \quad \checkmark
 \end{aligned}$$

$$\begin{aligned}
 \text{Check: Let } x &= 4 \\
 -6 + \frac{4}{4} &\stackrel{?}{=} -5 \\
 -6 + 1 &\stackrel{?}{=} -5 \\
 -5 &= -5 \quad \checkmark
 \end{aligned}$$

6. Simplify each radical expression.

a.  $\sqrt{49}$   
 $\sqrt{7 \cdot 7} = 7$

b.  $\sqrt{16x^2}$   
 $\sqrt{4 \cdot 4 \cdot x \cdot x} = 4x$

c.  $\sqrt{12} \cdot \sqrt{3} = \sqrt{12 \cdot 3}$   
 $= \sqrt{36}$   
 $= \sqrt{6 \cdot 6} = 6$

d.  $\sqrt{64x^2} \cdot \sqrt{4y^2}$   
 $8x \cdot 2y = 16xy$

e.  $\sqrt{\frac{75}{3}} = \sqrt{25} = 5$

f.  $\sqrt{81} + \sqrt{\frac{32}{2}} - \sqrt{9}$   
 $\sqrt{81} + \sqrt{16} - \sqrt{9}$   
 $9 + 4 - 3$   
 $10$