

Pre-Algebra 2009 Summer Math Packet

In preparation for your Pre-Algebra class this fall, you will need to complete this packet by the first day of school, **August 17, 2009**. Your Pre-Algebra teacher will be collecting it on the first day of school. If you lose the packet during the summer, you must pick up a new one in the main office after August 3, 2009, or check the Hoover Website to download a copy. You will be tested on this material by the end of the first week of school. All of the materials in this math packet are math skills that you have learned in your previous math classes.

On a separate piece of paper, copy the problems and show all the steps when working out the solutions. There are example boxes before each problem set to remind you how to do the problems. You will not be given credit for this packet if no work is shown, or if it is not on a separate piece of paper.

Points awarded for completion of this assignment:

Monday, August 17	50 pts.	A
Tuesday, August 18	40 pts.	B
Wednesday, August 19	35 pts.	C
Thursday, August 20	30 pts.	D

Test covering this material: Friday, August 21 50 pts.

Have a great summer.

-The Hoover Middle School Math Department

Powers and Exponents

Powers are short-hand notation for repeated multiplication.
A power has two parts: a **base** and an **exponent**.



<u>Power</u>	<u>Verbal Phrase</u>	<u>Meaning</u>	<u>Evaluate</u>
6^2	“Six to the second power”	$6 \cdot 6$	36
x^4	“x to the fourth power”	$x \cdot x \cdot x \cdot x$	

Example:

Evaluate x^4 when $x = 2$
 $x^4 \Rightarrow 2^4 \rightarrow 2 \cdot 2 \cdot 2 \cdot 2 \rightarrow 16$

Write the expression as a power.

1. $7 \cdot 7 \cdot 7 \cdot 7$

Evaluate.

2. 10^3

3. 2^6

Evaluate when $m = 3$.

4. m^4

5. $4m^2$

6. $6m$

Order of Operations

The “rules of the road” for solving mathematical expressions.

P	1. P arenthesis. Evaluate expressions inside grouping symbols.	$() [] \{ \}$
E	2. E xponents. Evaluate all powers.	$2^4 \ 5^3$
MD	3. M ultiply and D ivide. Do all multiplication and/or division operations from left to right.	$\bullet \times \div /$
AS	4. A ddition and S ubtraction. Do all addition and/or subtraction operations from left to right.	$+ -$

Please Excuse My Dear Aunt Sally

Evaluate the expressions.

7. $15 - 3 \times 4$

8. $14 - 8 + 3 \cdot 2^3$

9. $3^3 - 8 \cdot 3 \div 12$

Evaluate the expression when $a = 2$ and $b = 6$.

10. $6ab$

11. $b + a$

12. ab

Evaluate the expressions when $x = 5$ and $y = 8$.

13. $2y + 3x + y$

14. $\frac{xy}{10}$

15. $2(x + y) - 19$

Integers I

To add integers with the **same sign** (both positive or both negative):

- Add their absolute values and keep the sign
 $-6 + (-5) = -11$ $8 + 4 = 12$

To add integers with opposite signs:

1. Find the difference of their absolute values, then
2. The answer takes the sign of the number with the larger absolute value.
 $-8 + 3 = -5$ $5 + (-12) = -7$

To subtract integers, change the number to be subtracted to its additive inverse (opposite) and then add.

For example: $6 - 11 = a$

becomes $6 + (-11) = a$
 $-5 = a$

Evaluate.

16. $6 + (-7) =$

18. $6 + (-9) =$

20. $6 - (-6) =$

17. $(-4) + (-5) =$

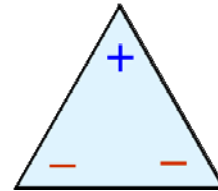
19. $(-6) - 7 =$

21. $7 - (-9) =$

Integers II

Rules for **multiplying integers** are:

Same Signs	+	$(+)(+) = +$	$(-)(-) = +$
Different Signs	-	$(+)(-) = -$	$(-)(+) = -$



Rules for **dividing integers** are the same for multiplying integers.

Evaluate.

22. $4 \cdot (-3) =$

23. $(-12) \cdot (-4) =$

24. $(-8)(-3) =$

25. $\frac{72}{-8} =$

26. $\frac{-49}{-7} =$

27. $\frac{-45}{5} =$

Simple Equations

Solve by doing the inverse (opposite) operation.

$x + 5 = -9$

$n - 13 = 37$

$5y = 42$

$\frac{d}{4} = 14$

Solve:

$$\begin{array}{r|l} x + 5 = -9 & \\ \hline -5 & -5 \\ \hline x & = -14 \end{array}$$

$$\begin{array}{r|l} n - 13 = 37 & \\ \hline +13 & +13 \\ \hline n & = 50 \end{array}$$

$$\begin{array}{r|l} 5y = 42 & \\ \hline \frac{5y}{5} = \frac{42}{5} & \\ \hline y & = 8.4 \end{array}$$

$$\begin{array}{r|l} 4 \cdot \frac{d}{4} = 14 \cdot 4 & \\ \hline d & = 56 \end{array}$$

Solve the equations.

28. $j + 17 = 8$

29. $-11 = m - 5$

30. $6c = 54$

31. $\frac{k}{4} = 12.5$

32. $5n = 75$

33. $r - 13 = 6$

Expressions and Variables

Operations

Addition

Subtraction

Multiplication

Division

Words and Symbols

$5 + 3 = 8$

$8 - m = 3$

$4(6) = 24$

$\frac{28}{7} = 4$

Verbal Phrases

"The sum of 5 and 3 is 8."

"The difference of 8 and m is 3."

"The product of 4 and 6 is 8."

"The quotient of 28 and 7 is 4."

Write a verbal phrase for each expression.

34. $6x$

35. $k - 19 = 23$

36. $\frac{48}{8} = 6$

Rename Fractions, Decimals, and Percents

To convert between fractions and percents, first convert fractions into decimals. **Divide** the numerator (the top number of a fraction) by the denominator (the bottom number of a fraction). So:

$$\frac{3}{5} \longrightarrow \begin{array}{r} 0.6 \\ 5 \overline{)3.00} \\ \underline{30} \\ 0 \end{array} \quad \frac{3}{5} \text{ is equivalent to } 0.6$$

To convert a decimal to a percent, **multiply** the decimal by 100 (percent means a ratio of a number compared to 100). A short-cut is sometimes used by moving the decimal two places to the right (which is equivalent to multiplying by 100), so:

$$0.60 \times 100 = 0.60 \rightarrow 60\% \quad \frac{3}{5} = 0.6 = 60\%$$

To convert a percent to a decimal, **divide** the percent by 100,

$$60\% \div 100 = 0.60 \quad 60\% = 0.6$$

To change a percent to a fraction, write the number as the numerator and 100 and the denominator; then simplify.

$$35\% = \frac{35}{100} = \frac{7}{20}$$

Rewrite each fraction as a decimal and then as a percent.

Fraction	Decimal	Percent
37. $\frac{4}{5}$		
38. $\frac{3}{4}$		
39. $\frac{1}{2}$		
40. $\frac{1}{3}$		

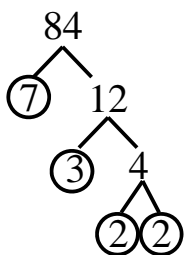
Rewrite each percent as a decimal and a fraction (simplified).

Percent	Decimal	Fraction
41. 8%		
42. 200%		
43. 11%		
44. 85%		

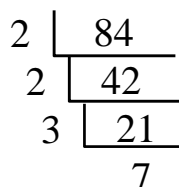
Prime Factorization

The process of breaking down a whole number into its product of prime numbers (prime factors).

Example: Find the prime factorization of 84.



or



Prime Factorization of 84 is $2^2 \cdot 3 \cdot 7$

45. Find the prime factorization of 48.

46. Find the prime factorization of 140.

LCM

Least Common Multiple – the smallest (least) number that is shared by two or more numbers.

Example:

Find the least common multiple of 6 and 14.

List method:

6		6, 12, 18, 24, 30, 36, 42 , 48
14		14, 28, 42 , 56

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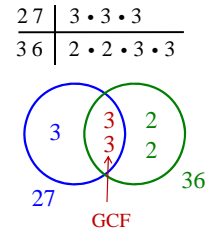
Greatest Common Factor – the largest number that is a factor shared by two or more numbers.

Example: Find the greatest common factor of 27 and 36.

List method:

27		1, 3 , 9 , 27
36		1, 2, 3, 4, 6 , 9, 12, 18, 36

Prime Factorization Method:



The greatest common factor of 27 and 36 is 9.

47. Find the least common multiple of 7 and 14.

48. Find the least common multiple of 6 and 9.

49. Find the greatest common factor of 12 and 30.

50. Find the greatest common factor of 32 and 72.