REVIEW OF BASIC MATHEMATICAL RULES

Rules for Signed Numbers

Addition Rules:
- positive + positive = (add) positive
  Ex: 2 + 1 = 3
- negative + negative = (add) negative
  Ex: -3 + (-5) = -8
- negative + positive = (subtract) and take sign of number with largest absolute value
  Ex: 2 + (-10) = -8
  Ex: -14 + 16 = 2

Remember: –(-7) means take the opposite of -7 = 7

Subtraction Rules: Change all “subtraction” to addition and take the opposite sign of the following number then follow the addition rules.

Ex: -7 - (9) means Ex: -3 - (-10) means
-7 + (-9) = -16 -3 + (10) = 7

Ex: -8 + (-9) - (-1) - 2 -change all subtraction signs as indicated above

-8 + (-9) + (1) + (-2) - do addition and subtraction from left to right

-17 + (1) + (-2)
-16 + (-2) = -18

Multiplication/Division Rules: The rules for multiplication and division are the same.
- positive (x or ÷) positive = positive
  Ex: 10 ÷ 2 = 5
- negative (x or ÷) negative = positive
  Ex: -4 × (-3) = 12
- negative (x or ÷) positive = negative
  Ex: 18 ÷ (-2) = -9
Order of Operations:

Parenthesis;
Exponents;
Multiplication or Division from left to right;
Addition or Subtraction from left to right

P.E.M.D.A.S.

Ex: \[-7 + 20 \div (-4)(5) - 3^2 - (-8) + 4(3 - 7)\]

1. Parenthesis
\[-7 + 20 \div (-4)(5) - 3^2 - (-8) + 4(-4)\]

2. Exponents
\[-7 + 20 \div (-4)(5) - 9 - (-8) + 4\]

3. Division
\[-7 + (-5)(-5) - 9 - (-8) + 4\]

4. Multiplication
\[-7 + (-25) - 9 - (-8) + 4\]

5. Addition
\[-32 - 9 - (-8) + 4\]

6. Change subtraction signs
\[\frac{-32}{-33} + \frac{(-9)}{+4} + (8) + 4\]

\[\frac{-41}{-33} + \frac{8}{+4} + 4\]

\[-33 + 4 = -29\]

Percent Equation:

What percent of the total is the part?

\[\frac{\%}{\times} + \text{Total} = \text{Part}\]

12% of the 200 students enrolled in freshman English earned a grade of “A” in the class. How many students earned an “A”?

Ex: 12% of 200 is what

- Translate into an equation
  (“of” means “multiply”; “is” means “equal”)

\[0.12 \times 20 = x\]

- Change % to a decimal

\[24 = x\]
**Percent Decrease/Increase:**

Last year student employment jobs paid $7.25 per hour. This year student employment jobs are paying $8.45 per hour. What percent increase was given to student employment jobs?

1. Find the amount of the increase: $8.45 - $7.25 = $1.20

2. Which (hourly pay) total received an increase? The $7.25 per hour got increased.

3. What % of the total was the increase?
   
   \[
   \frac{x \times 7.25}{7.25} = \frac{1.20}{7.25}
   \]
   
   \[x = \frac{1.20}{7.25} \approx 0.1655 \]
   
   \[x = 16.6\% \text{ increase} \]

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**Place Value:**

<table>
<thead>
<tr>
<th>Exponent</th>
<th>Value</th>
<th>Exponent</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
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<td>-1</td>
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<tr>
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<td>0.001</td>
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<tr>
<td>4</td>
<td>10000</td>
<td>-4</td>
<td>0.0001</td>
</tr>
</tbody>
</table>

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**Angles:**

- **Acute Angles:** less than 90 degrees
- **Obtuse Angles:** more than 90 degrees
- **Right Angles:** 90 degrees
- **Straight Angle:** 180 degrees

**Complementary Angles:** Two angles the sum of whose measures is 90 degrees

**Supplementary Angles:** Two angles the sum of whose measures is 180 degrees
**Triangles:**

- **Triangles:** Sum of the interior angles is **180 degrees**
- **Isosceles Triangle:** Two equal sides; two equal angles
- **Equilateral Triangle:** Three equal sides; three equal angles

**Right Triangles - Pythagorean Theorem:** \( a^2 + b^2 = c^2 \), where \( a \) and \( b \) are the measures of the legs of the triangle and \( c \) is the hypotenuse.

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**Statistics:**

- **Mean (average)** = sum of all values divided by number of values
- **Median** = middle value when the values are arranged numerically
- **Mode** = the data value **that occurs most frequently**

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**Probability:** \( P(A) = \frac{\text{the frequency of } A}{\text{total sample size}} \)