This workshop reviews the basics of algebra through pre-calculus to help prepare you for college calculus.

**We will discuss:**
- Graphing
  - Lines
  - Quadratics
  - Domain & Range
  - Exponential Functions
  - Trigonometry

### Assessment Set 1:

1. **Lines:** Write the equation for a line through (-2, 1) and (4, -7)
   - \[ m = \frac{(-7) - (1)}{4 - (-2)} = \frac{-8}{6} = -\frac{1}{3} \]
   - \[ y = -\frac{8}{6} (x - (-2)) + 1 \]
   - \[ y = -\frac{8}{6} (x + 2) + 1 \]
   - \[ y = -\frac{8}{6} x - \frac{16}{6} + 1 \]
   - \[ y = -\frac{8}{6} x - \frac{5}{3} \]

2. **Quadratics:** Find the vertex and intercepts, then graph: \( y = x^2 - x - 12 \)
   - \[ y \text{ intercept: } y = (0)^2 - (0) - 12 = 0 - 0 - 12 = -12 \]
   - \[ x \text{ intercept: } 0 = x^2 - x - 12 \]
     - \[ 0 = (x - 4)(x + 3) \]
     - \[ x = 4 \text{ AND } x = -3 \]
   - \[ \text{vertex: } h = -(-1)/2(1) \text{ and } k = (4(1)(-12) - (-1)^2)/4(1) \]
     - \[ h = \frac{1}{2} = 0.5 \text{ and } k = -\frac{49}{4} = -12.25 \]

3. **Domain & Range:** Find the domain and range of: \( y = -\sqrt{-2x + 3} \)
   - **Domain:**
     - \(-2x + 3 > 0\)
     - \(-2x > -3\)
     - \(2x \leq 3\)
     - \(x \leq 3/2\)
   - **Range:** \( y \leq 0 \)
4. Exponential Functions: Evaluate and graph: \( f(x) = 2^x + 4 \), at \( x = -3, -2, -1, 0, 1, 2, \) and 3.

<table>
<thead>
<tr>
<th>( x )</th>
<th>( f(x) = 2^x + 4 )</th>
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</thead>
<tbody>
<tr>
<td>-3</td>
<td>( 2^{-3} + 4 = 1/8 + 4 = 4.125 )</td>
</tr>
<tr>
<td>-2</td>
<td>( 2^{-2} + 4 = 1/4 + 4 = 4.25 )</td>
</tr>
<tr>
<td>-1</td>
<td>( 2^{-1} + 4 = 1/2 + 4 = 4.5 )</td>
</tr>
<tr>
<td>0</td>
<td>( 2^0 + 4 = 1 + 4 = 5 )</td>
</tr>
<tr>
<td>1</td>
<td>( 2^1 + 4 = 2 + 4 = 6 )</td>
</tr>
<tr>
<td>2</td>
<td>( 2^2 + 4 = 4 + 4 = 8 )</td>
</tr>
<tr>
<td>3</td>
<td>( 2^3 + 4 = 8 + 4 = 12 )</td>
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</tbody>
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5. Trigonometry: Graph two periods of: \( y = 3 \sin(2x - \pi) - 1 \)

- A = 3
- B = \((2\pi)/2 \rightarrow \pi = 3.14\)
- C = 2x - \pi \rightarrow 2(x - \pi/2) \div (\pi/2) = 1.57
- D = -1

Assessment Set 2:

6. Lines: What is the correct slope and equation for a line that passes through \((-2, 7)\) and \((4, -2)\)?

- \( m = \frac{((-2) - (7))}{(4 - (-2))} = \frac{-9}{6} = -1\frac{1}{2} \)
- \( y = -\frac{9}{6} (x - (-2)) + 7 \)
- \( y = -\frac{9}{6} (x + 2) + 7 \)
- \( y = -\frac{9}{6} x - \frac{18}{6} + 7 \)
- \( y = -\frac{9}{6} x + 4 \)

7. Quadratics: Find the vertex and intercepts, then graph: \( y = 4x^2 \)

- y intercept: \( y = 4(0)^2 = 0 \)
- x intercept: \( 0 = 4x^2 \), \( x = 0 \)
- vertex: \( h = -0/2(4) \) and \( k = (4(4)(0) - (0)^2)/4(4) \)
  \( h = 0 \) and \( k = 0/16 = 0 \)
8. Domain & Range: Find the domain and range of: \( y = \frac{1}{x^2 - 4} \)

- **Domain:**
  \[ x^2 - 4 \neq 0 \]
  \[ x^2 \neq 4 \]
  \[ x \neq \pm 2 \]

- **Range:** \( y = \) any real number

9. Exponential Functions: Evaluate and graph: \( f(x) = 5^{x-2} - 3 \), at \( x = -3, -1, 0, 1, 2, 3, 3.5 \).

<table>
<thead>
<tr>
<th>( x )</th>
<th>( f(x) = 5^{x-2} - 3 )</th>
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<tbody>
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<td>3.5</td>
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10. Trigonometry: Graph two periods of: \( y = -4 \cos \left( -3x + \frac{5\pi}{6} \right) + 2 \)

- **A = 4**
- **B = (2\pi)/-3 = - 2.09**
- **C = -3x + \frac{5\pi}{6} \rightarrow -3(x - \frac{5\pi}{6(-3)}) \Rightarrow (5\pi/18)/-3 = 5\pi/54 = 0.29**
- **D = 2**