1. The remainder when you divide \( \frac{x^4 - 3x^3 + 2}{x - 1} \) is: (5 pts)
   a. 0 
   b. 1 
   c. 2 
   d. 3 
   e. None of the above

2. The minimum degree of this polynomial is: (5 pts)
   a. 2 
   b. 3 
   c. 4 
   d. 5 
   e. None of the above

3. The y-intercept of the degree four polynomial with zeros of multiplicity 2 at \( x = 2 \) and \( x = -1 \) that passes through the point \((3, 64)\) is: (5 pts)
   a. 4 
   b. 8 
   c. -4 
   d. 16 
   e. None of the above

4. Which of the following is a factor of \( 6x^4 + 29x^3 - 24x^2 - 101x - 30 \): (5 pts)
   a. \( x + 8 \) 
   b. \( x + 5 \) 
   c. \( 2x - 7 \) 
   d. \( 3x + 4 \) 
   e. None of the above
5. For the quadratic function \( f(x) = x^2 - 4x - 5 \), answer the following: (3 pts each)

   a. Find the \( y \)-intercept of \( f(x) \) ________________

   b. Find the \( x \)-intercept(s) of \( f(x) \) __________________

   c. Find the axis of symmetry of \( f(x) \) ________________

   d. Find the vertex of \( f(x) \) ________________

6. Some values of the polynomial \( P(x) \) are given in the following table. Based on this information, answer the following questions: (5 pts each)

\[
\begin{array}{c|c|c|c|c|c|c|c|c}
   x & P(x) \\
   \hline
   -2 & -3 \\
   -1 & 0 \\
   0 & 4 \\
   1 & 2 \\
   2 & 3 \\
\end{array}
\]

   a. Find the remainder when you divide \( \frac{P(x)}{x - 2} \)

   b. Is \( x - 1 \) a factor of \( P(x) \)? Explain why or why not.
7. Find the remainder of \( \frac{x^4 - 2x^2 - 8}{x^2 + 2} \) (5 pts)

a. 0
b. -8
c. -4
d. 2
e. None of the above

8. Are the following statements TRUE or FALSE? Circle the correct choice. (2 pts each)

<table>
<thead>
<tr>
<th>Statement</th>
<th>TRUE / FALSE</th>
</tr>
</thead>
<tbody>
<tr>
<td>( x - 1 ) is a factor of ( x^{200} - 3x^{48} - 2x + 4 )</td>
<td></td>
</tr>
<tr>
<td>( x = 1 ) is a zero of ((x - 1)(x^2 + x - 2)) of multiplicity 1.</td>
<td></td>
</tr>
<tr>
<td>( 2x^5 + 3x^4 - 2x^2 + 5x - 7 ) factors into ((x - 1)^3(x + 7))</td>
<td></td>
</tr>
</tbody>
</table>

9. Find the equation of a degree three polynomial with zeros at \( x = 2 \) and \( x = 3 - 2i \). Write your answer as a product of linear and quadratic factors with real coefficients. (10 pts)
10. Find the domain of the following functions. Write your answers in interval notation.

a. \( f(x) = \sqrt{(x-1)(x-3)} \) (7 pts) ________________________________

b. \( f(x) = \frac{1}{(x-1)} \) (5 pts) ________________________________

11. Where is \( f(x) = \frac{x}{x-3} \leq 0 \) ? Write your answer in interval notation. (10 pts)

______________________________
12. For the function \( R(x) = \frac{(x - 3)(2x + 1)}{(3x - 2)(x + 2)} \), find the following: (3 pts each)

a. The vertical asymptotes

b. The horizontal asymptote

c. The zeros

13. The following sign chart applies to a rational function.
   - The function has zeros at \( x = -2 \) and \( x = 1 \),
   - The function has a vertical asymptote at \( x = -1 \)
   - The function has a horizontal asymptote \( y = 1 \).

Sketch a graph of the rational function on the axes below. (6 pts)