1. What is the degree of the polynomial \( p(x) = (x^2 - 1)^3(x^3 + 7) \)?

2. Let \( P \) denote the midpoint of the line segment joining \((2, 3)\) and \((8, 11)\). What is the distance from \( P \) to the point \((-2, 3)\)?

3. Find the (implied) domain of

\[ f(x) = \frac{\sqrt{x - 4}}{x - 7}, \]

and write your answer in interval notation.

4. Find all the \( x \)-intercepts of the function

\[ t(x) = (2x - 1)^3(x + 1)^2 - (2x - 1)^2(x + 1)^3. \]
5. The line tangent to the graph of $y = e^{2x}$ at the point $(0, 1)$ has slope 2. What is the $x$-intercept of the line?

6. Consider the rational function $k(x) = \frac{(2x+1)^2(x+5)}{3x^3-5x^2}$. Estimate the value $k(1000)$. Does $k$ have a horizontal asymptote? Discuss.

7. Find an equation for a line perpendicular to the line $3x - 4y = 7$ and which goes through the point $(-2, -3)$.

8. Let $k(x) = x^2 - x$. Evaluate and simplify $\frac{k(x+h) - k(x)}{h}$. Then find the limit of the expression as $h$ approaches 0.
9. Suppose the functions $f$ and $g$ are given completely by the table of values shown.

\[
\begin{array}{c|c|c}
  x & f(x) & g(x) \\
  \hline
  0 & 2 & 0 \\
  1 & 7 & 1 \\
  2 & 5 & 2 \\
  3 & 1 & 3 \\
  4 & 3 & 4 \\
  5 & 6 & 5 \\
  6 & 0 & 6 \\
  7 & 4 & 7 \\
\end{array}
\]

10. What is $f \circ g \circ f(2)$?

11. Solve $(f \circ g)(x) = 7$?

12. (10 points) The supply and demand curves are given below for digital cameras at XYZ Distributors, where $x$ represents the number of units and $p$ the price. Find the equilibrium quantity and price. Demand: $p = -x^2 - 2x + 100$ and Supply: $p = 10x + 55$. 


13. (40 points) Compute each of the following limits.

(a) Let \( f(x) = \begin{cases} 
  x + 2 & \text{if } x \neq 1 \\
  1 & \text{if } x = 1
\end{cases} \)

\[ \lim_{x \to 1} f(x) \]

(b) \[ \lim_{x \to 0} \frac{x^2 - 2x}{x} \]

(c) \[ \lim_{x \to 3} \frac{x^2 - 3x}{x^2 + x - 12} \]

(d) \[ \lim_{x \to 2} |x^2 - \sqrt{16x - 7}| \]

(e) \[ \lim_{x \to 1} \frac{x^2 - 1}{x^3 - 1} \]

(f) \[ \lim_{x \to 9} \frac{x - 9}{\sqrt{x} - 3} \]

(g) \[ \lim_{x \to 1} \frac{1}{x} - \frac{1}{3} \]

(h) \[ \lim_{x \to \infty} \frac{2x^2}{(1 - x)^2} \]