Correct answers accompanied by incorrect or incomplete work will not receive full credit.

1. (6 points) A portion of the graph of \( g(x) = x^3 - 3x \) is shown

   (a) Draw the line tangent to \( g(x) \) at \( x = -1.5 \).

   (b) Compute the slope of your tangent line.

2. (8 points) Let \( g(x) = x^3 - 3x \). Use the limit definition of derivative to find \( g'(1.5) \).

   (Hint: \((a + b)^3 = a^3 + 3a^2b + 3ab^2 + b^3\).)

3. (6 points) Let \( g(x) = x^3 - 3x \). Use the power rule to find \( g'(-1.5) \).
4. (4 points) Let $H(t)$ be the height (in meters) of a hot air balloon $t$ minutes after take off. What does the statement $H'(60) = -2.4$ mean in this context? Include units in your answer.

5. (4 points each) The graph of $f(x)$ is given. Evaluate the following (assume the tickmarks occur at 1, 2, etc).
   (a) $f(-4)$
   (b) $\lim_{x \to -4} f(x)$

6. (10 points) Let $k(x) = |x|$.
   (a) Find $\lim_{x \to 0} k(x)$. Justify your answer.
   (b) Find $\lim_{x \to 0} k'(x)$. Justify your answer.
7. (14 points) Let \( h(x) = 4x^7 + \frac{12}{x^7} - \sqrt{x} + \cos 12. \)

(a) Find the derivative of \( h. \)

(b) Find the antiderivative of \( h. \)

8. (14 points) Assume that \( f \) is a continuous function defined on the closed interval \([-3, 3]\) such that \( f(-3) = -1 \) and \( f(3) = 3. \) Furthermore, assume that \( f' \) and \( f'' \) are continuous on \((-3, 3)\) and that the information in the table below is known about these functions.

<table>
<thead>
<tr>
<th>( x )</th>
<th>(-3 \leq x &lt; -1)</th>
<th>(-1 \leq x &lt; 0)</th>
<th>(-1 &lt; x &lt; 1)</th>
<th>(0 \leq x &lt; 1)</th>
<th>(1 \leq x \leq 3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>( f'(x) )</td>
<td>+</td>
<td>0</td>
<td>+</td>
<td>+</td>
<td>0</td>
</tr>
<tr>
<td>( f''(x) )</td>
<td>-</td>
<td>0</td>
<td>+</td>
<td>0</td>
<td>-</td>
</tr>
</tbody>
</table>
9. (8 points) Assume \( y = \frac{1}{2}x - 3 \) is tangent to \( f(x) \) at \( x = 7 \).

(a) Find \( f(7) \). Justify your answer.

(b) Find \( f'(7) \). Justify your answer.

10. (18 points) The graph below is a graph of \( g(x) \). Let \( G(x) \) be an antiderivative of \( g(x) \).

(a) Is it possible that \( g''(1.5) = 2 \)? Justify your answer.

(b) Is \( G(0) > G(1) \)? Justify your answer.

(c) On what interval(s) is \( G(x) \) concave down? Justify your answer.

11. (4 points) Who do you think will win the World Series?
   (a) Atlanta Braves  (b) Boston Red Sox  (c) Detroit Tigers  (d) Los Angeles Dodgers
   (e) Oakland Athletics  (f) Pittsburgh Pirates  (g) St. Louis Cardinals  (h) Tampa Bay Rays