

YOUR NAME: _____

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Read each problem **very carefully** before starting to solve it. Each problem is worth 10 points. It is necessary to show **all** your work. Correct answers without explanations are worth 0 points. GOOD LUCK!!

1. Compute the following derivatives

(a) $\left(5\sqrt[5]{x^2} + \frac{18}{\sqrt[3]{x}}\right)' =$

(b) $\left(\frac{x-7}{x^2+5}\right)' =$

(c) $[x^8(x^5-7x)^3]' =$

2. Find an equation for the tangent line to the graph of $f(x) = \sqrt{x^3 - 2x - 5}$ at $x = 3$.

3. A moving object has displacement function $s(t) = \frac{t^2 - 3t + 5}{t}$ meters, where time t is measured in seconds.

(a) Find the velocity of the object at $t = 2$ seconds.

(b) Find the acceleration of the object at $t = 1$ second.

4. Let $f(x) = 2x^4 - 8x^3 + 10$.

(a) Compute f' and find the critical points.

(b) Create the sign table for f' filling all the information about f in the last line.

(c) Use all information gathered to plot the graph of $y = f(x)$. Show and label all important points clearly.

5. Let $f(x) = x^3 - 9x^2 + 15x + 25$.

(a) Compute f' and find the critical points.

(b) Compute f'' and find its zeros.

(c) Create the combined sign table for f' and f'' filling all the information about f in the last line.