

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 limits:

(a)  $\lim_{x \rightarrow 16} \frac{4 - \sqrt{x}}{x - 16}$

(b)  $\lim_{x \rightarrow 1} \left( \frac{1}{x-1} + \frac{1}{x^2 - 3x + 2} \right)$

2. Use the definition of the derivative to compute  $f'(a)$  if  $f(x) = \sqrt{3 - 5x}$ .

3. (a) Compute the derivative of  $f(x) = 2x\sqrt{x^2 + 1}$ .

(b) Find an equation for the tangent line to the graph of  $f(x) = \frac{x^2 - 1}{x^2 + 1}$  at  $x = 2$ .

4. Compute the derivative  $\frac{dy}{dx}$  if:

(a)  $y = \sqrt{\sin(\sqrt{x})}$

(b)  $x^2 \cos y + \sin(2y) = xy$

5. Find the point(s) on the ellipse  $x^2 + 2y^2 = 1$  where the tangent line has slope 1.