

Math 155 Worksheet 6

Name:

ID:

1. Find the derivatives of the following functions.

(a) $f(x) = -\pi + \frac{x^6}{2} - 3x^4 + x.$

(b) $f(x) = \sin(x) - \pi \cos(x) + \sqrt{30}.$

(c) $f(x) = \frac{\sqrt{30}}{x^7}.$

(d) $f(u) = \sqrt{2u} + 3\sqrt{u^7}.$

2. In each of the problem below, compute the derivative of the given function, and do not simplify your answers.

(a) $f(x) = \left(\frac{1}{x^2} - \frac{3}{x^4}\right)(x + 5x^3).$

(b) $f(x) = x \csc(x) - \cot(x) + \sqrt{30}.$

(c) $f(x) = \sqrt{x^7 + \sin(x)}.$

(d) $f(x) = \frac{\sin^7(u)}{\cos(u)}.$

3. Suppose that $f(3) = 4$, $g(3) = 2$, $f'(3) = -6$ and $g'(3) = 5$. Find

$$(f + g)'(3), (fg)'(3), \text{ and } \left(\frac{f}{g}\right)'(3).$$

4. The normal line of a curve $y = f(x)$ at a point $(a, f(a))$ is the line passes through $(a, f(a))$ and is perpendicular to the tangent line to the same curve at the same point. Find an equation of the normal line of $y = f(x) = \frac{x^2}{3x^2 - 2x + 1}$ at the point $(1, \frac{1}{2})$.

5. For each function f below, find $f'''(x)$.

(a) $f(x) = \frac{x^3 - 2x\sqrt{x}}{x}$.

(b) $f(x) = \sin(x) \cos(x)$.