

Name _____

- You have 20 minutes
- No calculators
- Show sufficient work

1. (2 points) Let $f(x) = x^3 + 42$ and $g(x) = 6x^2 - 12x$. At one particular x -value, the line tangent to $f(x)$ and the line tangent to $g(x)$ are parallel. Determine that x -value.

2. (2 points) What is the slope of the following curve at $x = \pi/3$? Simplify your answer.

$$y = 5 \tan(x) + \cos(2 \arctan(7/24))$$

3. (2 points each) Using Leibniz notation (i.e., $\frac{dy}{dx}$, $\frac{dP}{dt}$, etc.), find derivatives for each of the following functions.

(a) $p = \left(\frac{\sqrt[4]{x}}{x\sqrt{x^3}} \right)^8$ (simplify your answer)

(b) $\theta = \frac{4t}{t^6 + 3e^t}$

(c) $Z = 5 \csc(w) + 3\sqrt{w} \sin(w)$