

**Part 1: Skip** this part if you have passed part 1.  
Otherwise you must pass it for part 2 to be graded.

Name: \_\_\_\_\_

1 point

1. Find  $f'(x)$  if  $f(x) = 5(x^3 - \cos x + \sqrt{x})^{10}$

1. \_\_\_\_\_

1 point

2. Evaluate  $\lim_{x \rightarrow 0} \frac{\cos(3x)}{3x + 6}$

2. \_\_\_\_\_

1 point

3. Evaluate  $\lim_{h \rightarrow 0} \frac{3(x+h)^3 - 3x^3}{h}$ .

3. \_\_\_\_\_

1 point

4. Find  $\frac{dy}{dx}$  if  $y = \frac{5x^3 - e^4}{\pi + \ln x}$

4. \_\_\_\_\_

1 point

5. Write the equation of the line tangent to  $y = \ln x + \sin\left(\frac{\pi x}{2}\right)$  at  $x = 1$ .

5. \_\_\_\_\_

1 point

6. Compute the derivative with respect to  $t$ :  $5t^5 - \frac{2t^2}{3} + \frac{5}{t} + \sin\left(\frac{\pi}{5}\right)$

6. \_\_\_\_\_

**Part 1: Skip** this part if you have passed part 1.  
Otherwise you must pass it for part 2 to be graded.

Name: \_\_\_\_\_

1 point

7. Find the  $x$ -coordinate of the point of inflection of  $g(x) = 4x^3 + 18x^2 - 9x + 5$ .

7. \_\_\_\_\_

1 point

8. What is the largest interval on which  $f(x)$  is increasing if  $f(x) = -2x^3 - 12x^2 + 72x + 100$ ?

8. \_\_\_\_\_

1 point

9. Find  $P'(4)$  if  $P(x) = \left(3\sqrt{x} - \cot\left(\frac{\pi x}{8}\right)\right)\left(\frac{x^2}{8} - 1\right)$ .

9. \_\_\_\_\_

1 point

10. Compute  $F'(t)$  if  $F(t) = e^{\frac{10}{t}} + e^{10t}$ .

10. \_\_\_\_\_

1 point

11. Find the  $x$ -coordinate of the local minimum of  $8x^3 - 6x^2 - 12x + 5$ . If there is none, write "None".

11. \_\_\_\_\_

1 point

12. Compute the derivative of  $\frac{\cos(10x)}{7} - \arcsin(10x)$ .

12. \_\_\_\_\_