Mu A Individual

1. What is $f'(0)$ if $f(x) = \begin{cases} e^x, & x \leq 0 \\ e^{-x}, & x > 0 \end{cases}$?

2. Mariza is a professional stunt driver, and is filming for a scene where she drives on a straight track. She drives in reverse for the first five minutes of filming. Her position is represented by the function: $S(t) = -0.005t^3$ where t is minutes after filming begins, and S is her position in meters. What is Mariza's speed after 2 minutes of filming?

3. After driving in reverse for 5 minutes, Mariza decides to accelerate forward at 0.03 meters/min^2 for 5 minutes. Is the function for her position differentiable on the interval between 1 minute and 10 minutes of filming?

4. Find $d^6/dx^6\, f(x)$ *if* $f(x) = xe^x$.

5. The absolute value of $f'(x)$ is $12x^3$. What are two of the possible functions of $f(x)$ if the $y-$intercept of $f(x)$ is 2?

6. Find

$$\lim_{h \to 0} \frac{\cos\left(\frac{\pi}{3} + h\right) - \frac{1}{2}}{h}$$

7. Find the derivative of the following polynomial: $e^5 + 7$.

8. Find the limit:

$$\lim_{x \to 1} \frac{x}{ln(x)}$$

9. Find the equation of the line tangent to $y = -3x^2 + 2$ at $(2, -10)$

10. Find

$$\frac{d}{dx} sin^{-1}(3x)$$

11. Find $\lim_{h \to 0} \frac{f(x+h) - f(x)}{h}$ for $f(x) = \pi^x, x > 0$

12. For what values of x on the interval $[0, 2\pi]$ is the line tangent to $f(x) = x - 2cos(x)$ horizontal?

13. Find the second derivative of $f(x) = 2e^{-6x}$

14. Calculate $\frac{d}{dx}\sqrt{5x^2 + 1}$ when $x = 1$

Mu A Individual

15. Find the tangent line at $(1,1)$ of $x^2 + xy + y^2 = 3$.

16. Find $\lim_{x\to\pi} \frac{\cos(x)+\sin(x)}{\cos(-x)}$.

17. Find $\frac{d^2y}{dx^2}$ of $y = 4\sin(3x)$

18. $\lim_{x\to\infty} \frac{1-x}{\cos(x)}$