

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

**Directions:** Closed book, closed notes, no calculators.

1. Find the following derivatives.

(a)  $\frac{d}{dx} \left[ x \ln(x) + \sin^{-1}(x) \right] =$

(b)  $\frac{d}{dx} \left[ (\tan^{-1}(x))^3 \right] =$

(c)  $\frac{d}{dx} \left[ 4 \ln(3x^3 + 1) \right] =$

2. An object moving on a straight line is  $s(t) = 2 + t + t^3$  feet from its starting point at time  $t$  seconds. Find the object's velocity when its acceleration is 12 feet per second per second.