

1.(1 pt) The slope of the tangent line to the parabola  $y = 2x^2 + 4x + 2$  at the point  $(-3, 8)$  is: \_\_\_\_\_  
 The equation of this tangent line can be written in the form  $y = mx + b$  where  $m$  is: \_\_\_\_\_  
 and where  $b$  is: \_\_\_\_\_

2.(1 pt) The slope of the tangent line to the curve  $y = 4x^3$  at the point  $(-4, -256)$  is: \_\_\_\_\_  
 The equation of this tangent line can be written in the form  $y = mx + b$  where  $m$  is: \_\_\_\_\_  
 and where  $b$  is: \_\_\_\_\_

3.(1 pt) The slope of the tangent line to the curve  $y = 4\sqrt{x}$  at the point  $(6, 9.7980)$  is: \_\_\_\_\_  
 The equation of this tangent line can be written in the form  $y = mx + b$  where  $m$  is: \_\_\_\_\_  
 and where  $b$  is: \_\_\_\_\_

4.(1 pt) The slope of the tangent line to the curve  $y = \frac{4}{x}$  at the point  $(5, 0.8000)$  is: \_\_\_\_\_  
 The equation of this tangent line can be written in the form  $y = mx + b$  where  $m$  is: \_\_\_\_\_  
 and where  $b$  is: \_\_\_\_\_

5.(1 pt) The slope of the tangent line to the parabola  $y = 3x^2 - 6x + 5$  at the point where  $x = -3$  is: \_\_\_\_\_  
 The equation of this tangent line can be written in the form  $y = mx + b$  where  $m$  is: \_\_\_\_\_  
 and where  $b$  is: \_\_\_\_\_

6.(1 pt) If a rock is thrown into the air on small planet with a velocity of 21 m/s, its height (in meters) after  $t$  seconds is given by  $y = 21t - 4.9t^2$ . Find the velocity of the rock when  $t = 3$ .

7.(1 pt) If an arrow is shot straight upward on the moon with a velocity of 63 m/s, its height (in meters) after  $t$  seconds is given by  $s(t) = 63t - 0.83t^2$ .  
 What is the velocity of the arrow (in m/s) after 10 seconds? \_\_\_\_\_

After how many seconds will the arrow hit the moon? \_\_\_\_\_  
 With what velocity (in m/s) will the arrow hit the moon? \_\_\_\_\_

8.(1 pt) The displacement (in meters) of a particle moving in a straight line is given by  $s = 2t^3$  where  $t$  is measured in seconds. Find the average velocity of the particle over the time interval  $[9, 11]$ . \_\_\_\_\_  
 Find the (instantaneous) velocity of the particle when  $t = 9$ . \_\_\_\_\_

9.(1 pt) Let  $p(x) = 5.6x^{1.70000}$ . Use a calculator or a graphing program to find the slope of the tangent line to the point  $(x, p(x))$  when  $x = 1.5$ . Give the answer to 3 places.

10.(1 pt)  
 A rock is thrown off of a 100 foot cliff with an upward velocity of 30 m/s. As a result its height after  $t$  seconds is given by the formula:  
 $h(t) = 100 + 30t - 5t^2$

What is its height after 4 seconds? \_\_\_\_\_  
 What is its velocity after 4 seconds? \_\_\_\_\_  
 (Positive velocity means it is on the way up, negative velocity means it is on the way down.)

11.(1 pt)  
 The following chart shows "living wage" jobs in Rochester per 1000 working age adults over a 5 year period.

Year	1997	1998	1999	2000	2001
Jobs	630	675	715	750	780

What is the average rate of change in the number of living wage jobs from 1997 to 1999? \_\_\_\_\_ Jobs/Year  
 What is the average rate of change in the number of living wage jobs from 1999 to 2001? \_\_\_\_\_ Jobs/Year  
 Based on these two answers, should the mayor from the last two years be reelected?  
 (These numbers are made up. Please do not actually hold the mayor accountable.)