ICM Applications of Derivatives   Name_____

Quiz 2 Review   Date_____ Period_____

For each problem, find the equation of the line tangent to the function at the given point. Your answer should be in slope-intercept form.

1) $y = -x^2 - 4xy - 2$ at $(1, -7)$

2) $3xy = -x^3 + 3x^2 - 3$ at $(-1, 1)$

Solve each related rate problem.

3) A spherical balloon is deflated at a rate of $\dfrac{256\pi}{3}$ cm³/sec. At what rate is the radius of the balloon changing when the radius is 5 cm?

4) A hypothetical cube shrinks so that the length of its sides are decreasing at a rate of 2 m/min. At what rate is the volume of the cube changing when the sides are 3 m each?

5) A crowd gathers around a movie star, forming a circle. The area taken up by the crowd increases at a rate of 36π ft²/sec. How fast is the radius of the crowd increasing when the radius is 2 ft?

6) A 17 ft ladder is leaning against a wall and sliding towards the floor. The top of the ladder is sliding down the wall at a rate of 9 ft/sec. How fast is the base of the ladder sliding away from the wall when the base of the ladder is 8 ft from the wall?

7) A 25 ft ladder is leaning against a wall and sliding towards the floor. The foot of the ladder is sliding away from the base of the wall at a rate of 6 ft/sec. How fast is the top of the ladder sliding down the wall when the top of the ladder is 24 ft from the ground?

8) An observer stands 500 ft away from a launch pad to observe a rocket launch. The rocket blasts off and maintains a velocity of 600 ft/sec. Assume the scenario can be modeled as a right triangle. How fast is the observer to rocket distance changing when the rocket is 1200 ft from the ground?

9) An observer stands 800 ft away from a launch pad to observe a rocket launch. The rocket blasts off and maintains a velocity of 800 ft/sec. Assume the scenario can be modeled as a right triangle. How fast is the observer to rocket distance changing when the rocket is 600 ft from the ground?