

Calculus BC CW 2.5 – 2.6

1. In the following assume that x , y , and z are all functions of t . Given $x = 4$, $y = -2$, $z = 1$, $x' = 9$ and $y' = -3$, determine z' for the following equation: $x(1 - y) + 5z^3 = y^2z^2 + x^2 - 3$.
2. For a certain rectangle the length of one side is always three times the length of the other side.
 - (a) If the shorter side is decreasing at a rate of 2 in / min, at what rate is the longer side decreasing?
 - (b) At what rate is the enclosed area decreasing when the shorter side is 6 inches long and is decreasing at a rate of 2 in / min ?
3. A person is standing 350 feet away from a model rocket that is fired straight up into the air at a rate of 15 ft / sec. At what rate is the distance between the person and the rocket increasing 1 minute after liftoff ?
4. Two people are at an elevator. At the same time one person starts to walk away from the elevator at a rate of 2 ft / sec, and the other person starts going up in the elevator at a rate of 7 ft / sec. At what rate is the distance between the two people changing 15 seconds later?
5. The angle of elevation is the angle formed by a horizontal line and a line joining the observer's eye to an object above the horizontal line. A person is 500 feet away from the launch point of of a hot air balloon. The hot air balloon is starting to come back down at a rate of 15 ft / sec. At what rate is the angle of elevation, θ , changing when the hot air balloon is 200 feet above the ground?

