

Name _____

STAP 1

MA 104

3 June 2008

In class problems

1. If $y = x^3 + 2x$ and $\frac{dx}{dt} = 5$, find $\frac{dy}{dt}$ when $x = 2$.
2. A particle moves along the curve $y = \sqrt{1 + x^3}$. As it reaches the point $(2, 3)$, the y-coordinate is increasing at a rate of 4 cm/sec. How fast is the x-coordinate of the point changing at that instant?
3. The altitude of a triangle is increasing at a rate of 1 cm/min, while the area of the triangle is increasing at a rate of 2 cm²/min. At what rate is the base of the triangle changing when the altitude is 10 cm and the area is 100 cm².
4. Air is being pumped into a spherical balloon so that its volume increases at a rate of 120 cm³/sec. How fast is the radius of the balloon increasing when the diameter is 50 cm?
5. At noon, ship A is 150 nm west of ship B. Ship A is sailing east at 35 knots and ship B is sailing north at 25 knots.
 - (a) How fast is the distance between the ships changing at 4:00 PM?
 - (b) 7:00PM?
 - (c) What if the speed of ship B is increased to 35 knots?