

**MAT 129 – 002, 003**  
**Fall 2009**  
**Review for Test Two**  
**Calculators may not be used on this test.**  
**Show all work.**

1. Determine  $f'(x)$  where  $f(x) = (x^2 + 3x + 1)^{-5/2}$ .

2. Determine  $f'(x)$  where  $f(x) = (x + x^{-1})\sqrt{x^2 + 1}$ .

3. Determine  $f'(x)$  where  $f(x) = \frac{1}{\sqrt{\cos(x^2) + 1}}$ .

4. Determine  $f'(x)$  where  $f(x) = \tan(\sin x \cos x)$ .

5. Find the slope of the tangent line to the graph of  $(x + 2)^2 - 6(2y + 3)^2 = 3$  at the point  $(1, -1)$ .

6. Water pours into a rectangular fish tank at a rate of  $3 \text{ ft}^3 / \text{min}$ . The base of the tank is a rectangle of dimensions  $2 \text{ ft} \times 3 \text{ ft}$ . How fast is the water level rising?

7. If a ball is thrown vertically upward with a velocity of 80 feet per second, then its height after  $t$  seconds is  $s(t) = 80t - 16t^2$ . What is the maximum height reached by the ball?

8.  $f(x) = \frac{1}{\sqrt{x+1}}$ . Find  $f'(x)$  and  $f''(x)$ .