

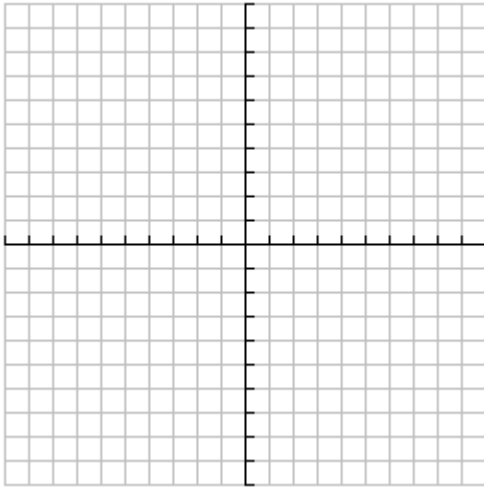
Math 131 Week in Review
Sections 6.1, 6.5, 6.7
4/25/2010

1. Find the area of the region bounded by the given curves.

$$y = e^{-2x}$$

$$y = 1 + x$$

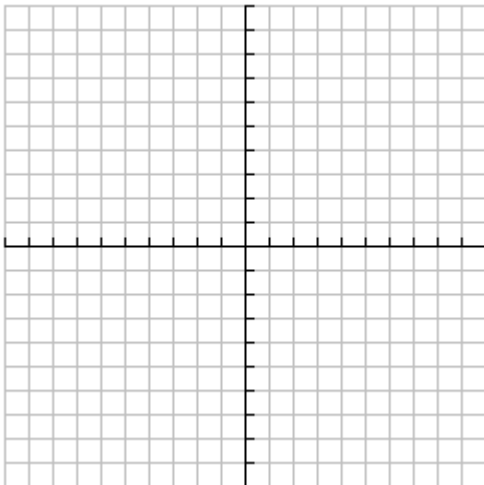
$$x = 1$$



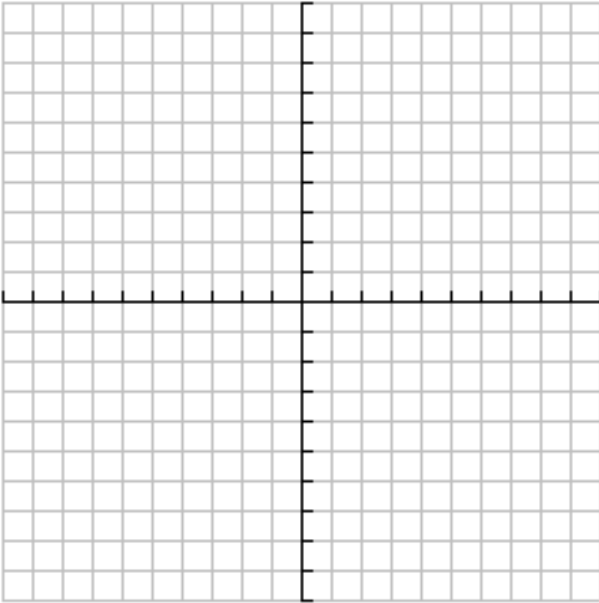
2. Find the area of the region bounded by the given curves.

$$2x - y = 0$$

$$x = 3y - y^2$$



3. Find the area of the region bounded by the curves $y = x^3$ and $y = 2x - x^2$ and $y = 0$.



4. Find the average value of the function $f(x) = 3x^2\sqrt{1-x^3}$ on the interval $[-2, 1]$.

5. Find the average value of the function $g(x) = \sin(2x)$ over the interval $[0, \pi/2]$.

6. Find the number(s) a such that the average value of $f(x) = 3 - x^2$ on the interval $[0, a]$ is equal to 0.

7. If a cup of hot chocolate has temperature 90°C in a room where the temperature is 25°C , then according to Newton's Law of Cooling, the temperature of the hot chocolate after t minutes is $T(t) = 25 + 65e^{-t/50}$. What is the average temperature of the hot chocolate the first hour?

8. Use Poiseuille's Law to calculate the rate of flow in a small human artery when $\eta = .026$, $R = .0085$, $l = 2$ cm, and $P = 3800$ dynes/cm².

$$F = \frac{\pi PR^4}{8\eta l}$$

9. The marginal cost function $C'(x)$ was defined to be the derivative of the cost function. The marginal cost of manufacturing x feet of pipe is $C'(x) = 3 - .002x + .0009x^2$ dollars per foot, and the fixed start-up cost is $C(0) = \$40,000$. Use the Net Change Theorem to find the cost of producing the first 1000 feet.

10. The marginal revenue from the sale of x units of a product is $R'(x) = 32 - .003x$. If the revenue from the sale of the first 1000 units is \$12,500, find the revenue from the sale of the first 8,000 units.