

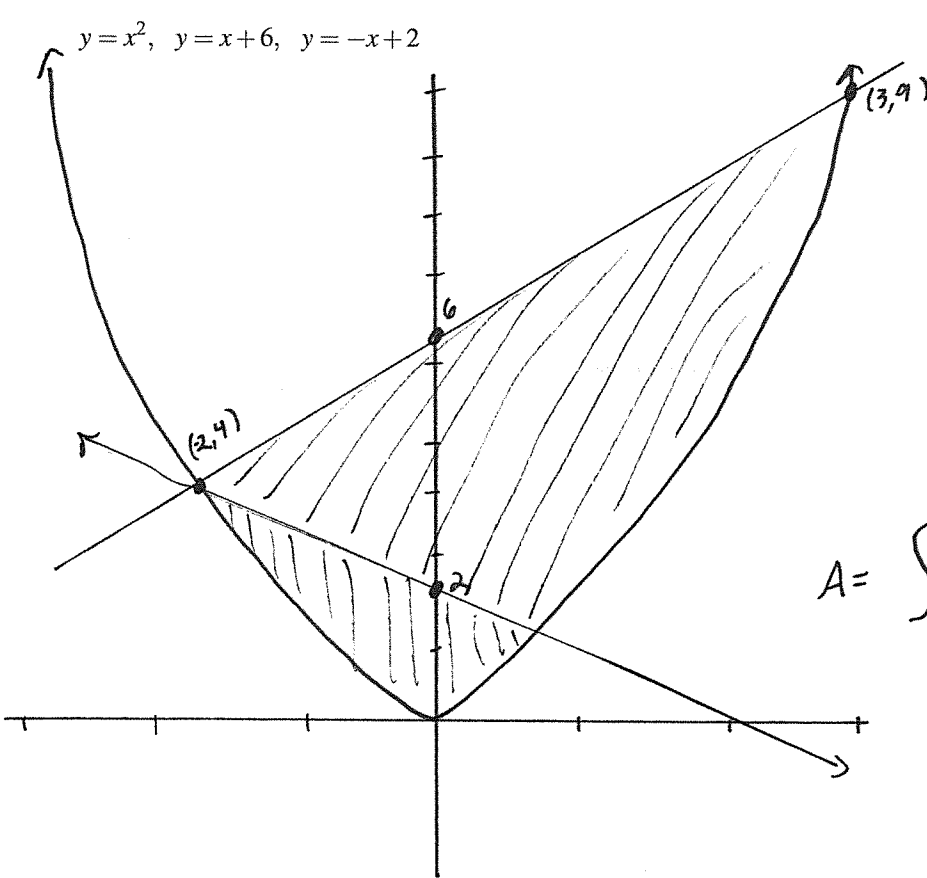
Quiz 12

This quiz is graded out of 10 marks. No books, calculators, notes or cell phones are allowed. You must show all your work, the correct answer is worth 1 mark the remaining marks are given for the work. If you need more space for your answer use the back of the page.

Question 1. (4 marks) ~~8/28/11~~ Integrate.

$$\begin{aligned}
 & \int_0^{\pi/6} \frac{1}{\cos^2 2x} dx \\
 &= \int_0^{\pi/6} \sec^2 2x dx \\
 & \quad u = 2x \\
 & \quad du = 2dx \\
 & \quad \frac{du}{2} = dx \\
 & \quad u(\pi/6) = \pi/3 \\
 & \quad u(0) = 0 \\
 &= \int_0^{\pi/3} \sec^2 u \frac{du}{2} \\
 &= \frac{1}{2} \int_0^{\pi/3} \sec^2 u du \\
 &= \frac{1}{2} \left[\tan u \right]_0^{\pi/3} \\
 &= \frac{1}{2} \left[\tan \frac{\pi}{3} - \tan 0 \right] \\
 &= \frac{1}{2} \sqrt{3} \\
 &= \frac{\sqrt{3}}{2}
 \end{aligned}$$

Question 2. (6 marks) ~~8/28/11~~ Sketch and find the areas bounded by the indicated curves.



Intersection of curves

$$\begin{aligned}
 x^2 &= x + 6 \\
 0 &= x^2 - x - 6 \\
 0 &= (x - 3)(x + 2) \\
 & \quad x = 3 \quad x = -2
 \end{aligned}$$

$$\begin{aligned}
 x^2 &= -x + 2 \\
 0 &= x^2 + x - 2 \\
 0 &= (x + 2)(x - 1) \\
 & \quad x = -2 \quad x = 1
 \end{aligned}$$

$$\begin{aligned}
 A &= \int_{-2}^3 x + 6 - x^2 dx \\
 &= \left[\frac{x^2}{2} + 6x - \frac{x^3}{3} \right]_{-2}^3 \\
 &= \frac{3^2}{2} + 6(3) - \frac{3^3}{3} - \left[\frac{(-2)^2}{2} + 6(-2) - \frac{(-2)^3}{3} \right] \\
 &= \frac{9}{2} + 18 - 9 - 2 + 12 - \frac{8}{3} \\
 &= \frac{125}{6}
 \end{aligned}$$