

## Review Quiz

**Directions:** Pick one of the following three problems to write up and turn in for a quiz score.

1. A police helicopter is flying at 200 kilometers per hour at a constant altitude of 1 km above a straight road. The pilot uses radar to determine that an oncoming car is at a distance of exactly 2 kilometers from the helicopter, and that this distance is decreasing at 250 kph. Find the speed of the car.
2. The strength of a rectangular beam is proportional to the product of its width  $w$  times the square of its depth  $d$ . Find the dimensions of the strongest beam that can be cut from a cylindrical log of radius  $r$ .
3. Evaluate the following integrals:

(a)

$$\int_{-3}^0 x(1-x)^{3/2} dx$$

(b)

$$\int \sin^6 2x dx$$

(c)

$$\int_{-1}^1 \frac{x^2}{\sqrt[3]{1-x^3}} dx$$