

## MATH 122 WORKSHEET 10

Show all work for full credit.

1. Find the area enclosed by the curves  $y = 9x^2 - 16$  and  $y = x^2 - 8x$ .

2. A particle is moving so that its velocity is

$$v(t) = t^2 - 22t + 112 \text{ meters/min,}$$

where  $t$  is time in minutes.

a. Find the displacement (change in position) of the particle over the first 15 minutes. Give units.

b. Find the total distance traveled by the particle in the first 15 minutes. Give units.

3. A company's marginal cost function is

$$C'(q) = \frac{9}{2}\sqrt{12q + 100} \text{ dollars/item,}$$

where  $q$  is the number of items. If the fixed costs are \$2500,

a. Find the total cost of producing 25 items.

b. Find the additional cost of increasing production from 25 items to 40 items.

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4. In 1994, a tree is 5 feet tall and growing at a rate of

$$r(t) = 1 + 3\sqrt{t} \text{ inches/year,}$$

where  $t$  is time in years since 1994. How tall will this tree be in 2010? Give units.

5. The promoters of a county fair estimate that  $t$  hours after the gates open at 9AM, visitors will be entering the fair at a rate of

$$r(t) = -3(t + 3)^2(t - 12) \text{ people/hour.}$$

If tickets sell for \$6 per person, how much money does the fair bring in between 10AM and noon?

6. Evaluate the integrals. Reduce coefficients.

a.  $\int 12x^3 dx$

b.  $\int \frac{6}{x^4} dx$

c.  $\int 3^x dx$

d.  $\int \frac{5}{x} dx$

e.  $\int 2 dx$