

Practice Exam 2

1. Suppose that the demand and price for a certain brand of shampoo are related by

$$p = 16 - \frac{5}{4}q,$$

where p is price in dollars and q is demand.

- (a) What is the price if the demand is 4 units?
- (b) What is the demand for the shampoo at a price of \$16.

Suppose the price and supply of the shampoo are related by

$$p = \frac{3}{4}q,$$

where q represents the supply and p the price.

- (c) Find the supply when the price is \$10.
 - (d) Find the equilibrium quantity.
 - (e) Find the equilibrium price.
2. Find the equation of the parabola that has a vertex at $(-1, -2)$ and passes through the point $(1, 2)$.
3. Suppose you are the manager of a firm. The accounting department has determined that the cost estimate for a new product is $C(x) = 65x + 7000$. The sales department expects a revenue of $R(x) = 300x - x^2$. You know that you can only product at most 150 units. How many units must the firm sell to break even?
4. Graph the function $f(x) = x^2(x - 1)(x + 1)$.
5. Let $f(x) = a^x$ for some number a . Suppose $f(2) = 5$.
- (a) Find $f(0)$.
 - (b) Find $f(2)$.
 - (c) Find $f(4)$.
 - (d) Find $f(6)$.
 - (e) Find $f(8)$.
6. Calculate the following logarithms:
- (a) Find $\log_3(1)$.
 - (b) Find $\log_2((8))$.
 - (c) Find $\log(10^{10})$.
 - (d) Find $\ln(10)$.
 - (e) Find $\ln(10^{10})$.
7. Solve the following equations:

- (a) $2^x = 128$.
 - (b) $100(1.02)^x = 256$.
 - (c) $x^7 = 2187$.
8. Suppose that Patricia deposited \$1000 into an account with an annual interest rate of 3% to gain interest over the next five years. Find the money she has in that account after five years if
- (a) the interest is a simple interest.
 - (b) the interest is compounded annually.
 - (c) the interest is compounded monthly.
 - (d) the interest is compounded continuously.
9. Suppose Alice deposited \$1000 dollars into an account compounded annually. After five years, Alice finds out she has \$1503 in her account. She forgot what the annual interest rate in her account was. Find the interest rate.