

## Practice Exam 2

1. Let  $f(x) = x^2 - 3x$ .

- (a) Find  $f(0)$ .
- (b) Find  $f(1)$ .
- (c) Find  $f(a)$ .
- (d) Find  $f(b)$ .
- (e) Find  $f(a + 2b)$ .

2. The income tax in Mathland is determined by the following function:

$$T(x) \leq \begin{cases} 0.25x & \text{if } 0 \leq x \leq 16000 \\ 4000 + .5(x - 16000) & \text{if } 16000 \leq x \leq 50000 \\ 21000 + .75(x - 50000) & \text{if } x > 50000. \end{cases}$$

- (a) How much taxes would a person that made 40000 in Mathland have to pay?
- (b) How much money did a person that paid 120000 in taxes make?

3. 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.

4. Find the equation of the parabola that has a vertex at  $(-1, -2)$  and passes through the point  $(1, 2)$ .

5. 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?

6. Graph the function  $f(x) = x^2(x - 1)(x + 1)$ .