

Review Exercise Set 1

Exercise 1: Determine whether the given equation is a linear function. If it is then write in slope-intercept form ($y = mx + b$).

$$\frac{3}{8}x + y = -1$$

Exercise 2: Identify the given function as linear, polynomial, rational, or other. If it is a polynomial function state its degree. If it is a rational function state its domain restriction.

$$g(x) = 12x^3 - 10x^2 - 12x$$

Exercise 3: Identify the given function as linear, polynomial, rational, or other. If it is a polynomial function state its degree. If it is a rational function state its domain restriction.

$$g(x) = 2\sqrt{x} - 3x^{-2} - .5x$$

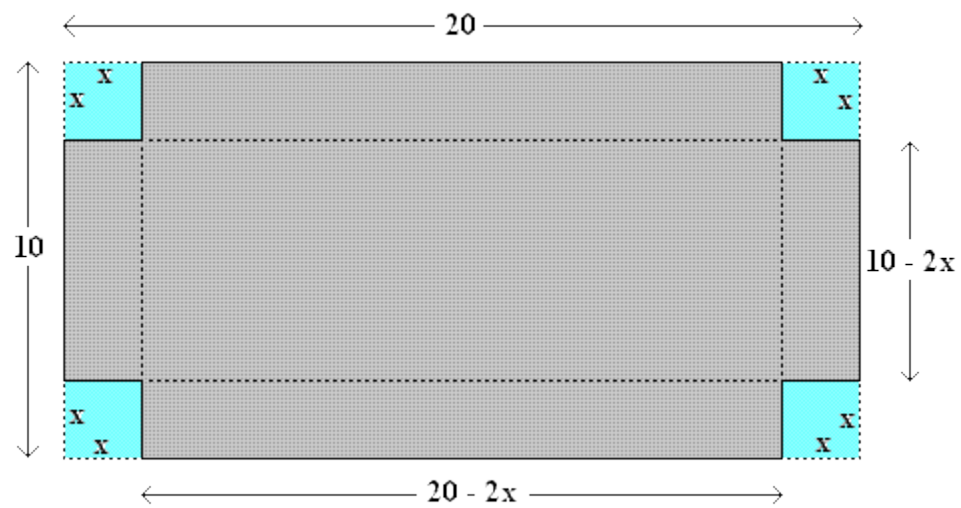
Exercise 4: Write a linear cost function to represent the following situation.

A taxicab company is charging \$5 plus 45 cents per mile.

Exercise 5: A company's supply and demand for their product is related by the following equations. Find the equilibrium price and quantity.

$$\text{Supply: } 15p = 4q; \quad \text{Demand: } 5p = -2q + 250$$

Exercise 6: An open box (no top lid) will be made by cutting away identical squares from each corner of a 20×10 rectangular piece of cardboard and folding up the flaps. Write a function that will give the volume of the box.



Review Exercise Set 1 Answer Key

Exercise 1: Determine whether the given equation is a linear function. If it is then write in slope-intercept form ($y = mx + b$).

$$\frac{3}{8}x + y = -1$$

The exponents on the variables x and y are understood to be 1 so this is a linear function.

$$\begin{aligned}\frac{3}{8}x + y &= -1 \\ y &= -\frac{3}{8}x - 1\end{aligned}$$

Exercise 2: Identify the given function as linear, polynomial, rational, or other. If it is a polynomial function state its degree. If it is a rational function state its domain restriction.

$$g(x) = 12x^3 - 10x^2 - 12x$$

The coefficients are all real numbers and the exponents are all nonnegative integers, so this is a polynomial function.

The degree of the polynomial is 3 (which is the exponent of the leading term $12x^3$).

Exercise 3: Identify the given function as linear, polynomial, rational, or other. If it is a polynomial function state its degree. If it is a rational function state its domain restriction.

$$g(x) = 2\sqrt{x} - 3x^{-2} - .5x$$

This is some other type of function because one of the terms has a negative exponent and another has a radical on x .

Exercise 4: Write a linear cost function to represent the following situation.

A taxicab company is charging \$5 plus 45 cents per mile.

The base charge of \$5 is the fixed cost and will be the y-intercept of the linear cost function, so $b = 5$.

The charge per mile is the variable cost which will be the slope of the linear cost function, so $m = 0.45$

$$C(x) = mx + b$$

$$C(x) = 0.45x + b$$

Exercise 5: A company's supply and demand for their product is related by the following equations. Find the equilibrium price and quantity.

$$\text{Supply: } 15p = 4q; \text{ Demand: } 5p = -2q + 250$$

Solve both equations for one of the variables

$$15p = 4q$$

$$3.75p = q$$

$$5p = -2q + 250$$

$$-2.5p + 125 = q$$

Set the two equations equal to each other and solve for the other variable

$$3.75p = -2.5p + 125$$

$$6.25p = 125$$

$$p = 20$$

Substitute the value into one of the two equations to find the remaining variable

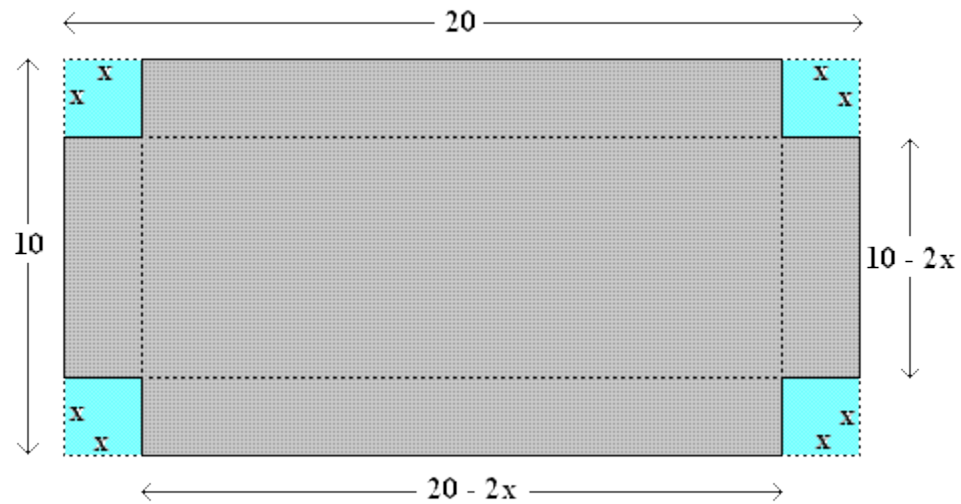
$$3.75p = q$$

$$3.75(20) = q$$

$$75 = q$$

The equilibrium price is \$20 and the equilibrium quantity is 75.

Exercise 6: An open box (no top lid) will be made by cutting away identical squares from each corner of a 20x10 rectangular piece of cardboard and folding up the flaps. Write a function that will give the volume of the box.



The volume of a box would be equal to the product of its length, width, and height. So we must first identify these parts.

$$\text{length} = 20 - 2x$$

$$\text{width} = 10 - 2x$$

$$\text{height} = x$$

Now, substitute the measurements into the volume formula to find our function.

$$V(x) = L * W * H$$

$$V(x) = (20 - 2x)(10 - 2x)(x)$$

$$V(x) = (20 - 2x)(10x - 2x^2)$$

$$V(x) = 4x^3 - 60x^2 + 200x$$