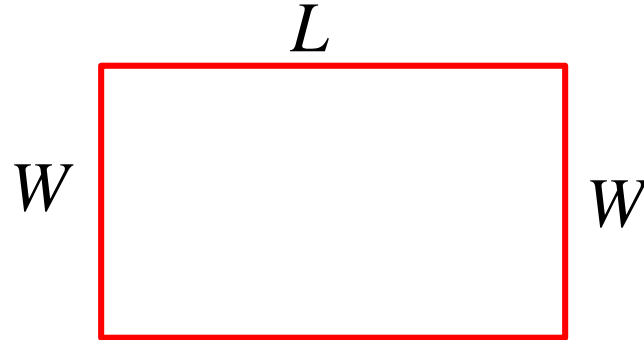


Math-2A  
Lesson 4-8  
Applications of Linear  
Equations

Quantity: A category of measurement of a real world physical property (length, width, temperature, pressure, weight, etc.).

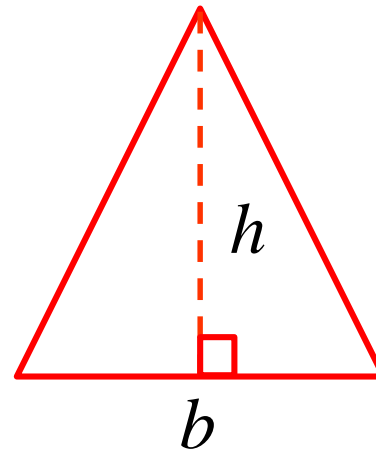
Unit of Measure: How the quantity is measured (inches, feet, square feet, etc.).

$$Area_{\text{rectangle}} = l * w$$



$$Perimeter_{\text{rectangle}} = 2L + 2w$$

$$Area_{\text{triangle}} = \frac{1}{2}bh$$



Time (min)	0	1	2	3	4
Height (ft)	36,000	32,000	28,000	24,000	20,000

(The table shows the altitude of an airplane.)

write equation:  $y = mx + b$

→ what is the slope?

$$m = \frac{\text{rise}}{\text{run}} = \frac{-4000 \text{ ft}}{\text{min}}$$

What is the y-intercept ?

$(0, b)$

$(0, 36000)$

$$y = -4000x + 36000$$

TEST your equation.

$$32,000 = -4,000(1) + 36,000$$

Equation is “true”

Time (min)	8:03 AM	8:04 AM	8:05 AM	8:06 AM	8:07 AM
Height (ft)	36,000	32,800	29,600	26,400	23,200

Notice how this date doesn't start at zero.

To write an equation, you need a y-intercept.

It is often easier to change the time to read “time since” some reference point.

Time (min) (since 8:03 AM)	0	1	2	3	4
Height (ft)	36,000	32,800	29,600	26,400	23,200

Year	1990	1992	1994	1996	1998
Imports (Billions \$)	52	55	58	61	64

(This table shows imports for various years.)

write equation:  $y = mx + b$

→ what is the slope?

$$\text{Rise} = \$55\text{B} - \$52\text{B} = \$3\text{B}$$

$$\text{Run} = 1992 - 1990 = 2 \text{ years}$$

$$m = \frac{\text{rise}}{\text{run}} = \frac{\$3 \text{ B}}{2 \text{ yrs}}$$

$$m = \frac{\$1.5 \text{ B}}{\text{yrs}}$$

What is the y-intercept ? → (0, b)

The year “zero” ???!

Change year to “years since 1990”)

Yrs. Since 1990	0	2	4	6	8
Imports (Billions \$)	52	55	58	61	64

(This table shows imports for various years.)

write equation:  $y = mx + b$

→ what is the slope?

$$\text{Rise} = \$55\text{B} - \$52\text{B} = \$3\text{B}$$

$$\text{Run} = 1992 - 1990 = 2 \text{ years}$$

$$m = \frac{\text{rise}}{\text{run}} = \frac{\$3 \text{ B}}{2 \text{ yrs}}$$

$$m = \frac{\$1.5 \text{ B}}{\text{yrs}}$$

What is the y-intercept ? → (0, b)

$$b = \$52\text{B}$$

$$y = 1.5x + 52$$

What is the equation of the line that can represent this data?

Time (min)	0	1	2	3	4
Height (ft)	500	450	400	350	300

Year	1900	1910	1920	1930	1940
Population (millions)	100	125	150	175	200

Yrs since 1900	0	10	20	30	40
Population (millions)	100	125	150	175	200

What is the equation of the line that can represent this data?

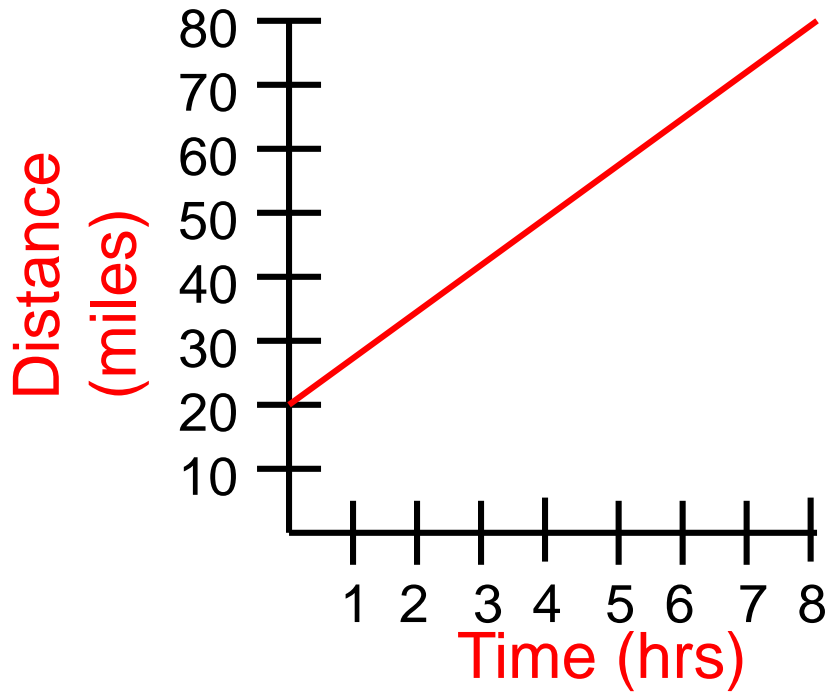
Time	11 AM	11:30 AM	12 PM	12:30 PM	1 PM
distance (miles)	50	75	100	125	150

Time (since 11 AM) (hrs)	0	0.5	1	1.5	2
distance (miles)	50	75	100	125	150



Find the equation that “models” the data.

Time (yrs)	1987	1991	1995	1999	2003
Trade deficit (Billions of \$'s)	36.0	32.8	29.6	26.4	23.2



Write the equation:  $y = mx + b$

Slope:  $(0, 20) \rightarrow (8, 80)$

$$m = \frac{\text{rise}}{\text{run}} = \frac{60 \text{ miles}}{8 \text{ hrs}}$$

$$m = 7.5 \frac{\text{miles}}{\text{hr}}$$

$$y = 7.5x + 20$$

Your parents are paying “big bucks” for your health club membership. You go to the health club 4 days/week. The time it takes to walk/run 3 miles at the end of each week has been graphed. Write an equation for the relation.

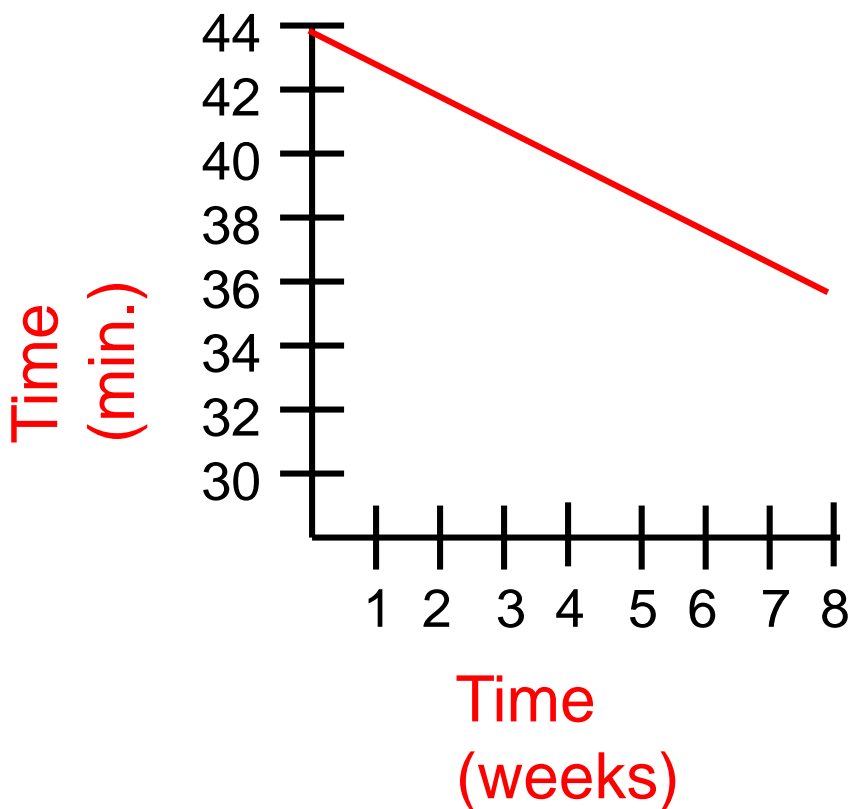
$$y = mx + b$$

Slope:  $(0, 44) \rightarrow (8, 36)$

$$m = \frac{\text{rise}}{\text{run}} = \frac{-8 \text{ min}}{8 \text{ weeks}}$$

$$m = -1 \frac{\text{min}}{\text{wk}}$$

$$y = -x + 44$$



During the first 5 weeks of your exercise program you record your weight.

End of Week, $w$	0	1	2	3	4	5
weight, $y$ (lb.)	186	183	180	177	174	171

Determine the average rate of change of your weight during the 5-week period.

Assuming your weight loss will continue at the same rate, write an equation that relates your weight to the number of weeks on the exercise program.

You decide to buy a new Honda Civic, but you are concerned about the value of the car depreciating over time. You search the Internet and obtain the following information.

Suggested Retail Price: \$20,905

Depreciation per year: \$1750 (assume constant)

1) What does this mean?

2) Complete the table.

“V” is the value of the car after “n” years of ownership

n (years)	0	1	2	3	5	8
V, (\$)	20,905	19,155	17,405	15,655	12,155	6,905

3) Write the equation that predicts the value of the car based upon its age in the year.

A car rental company charges: \$60 per day plus \$0.75 per mile

Fill in the remainder of the table.

Write the equation that predicts the cost of renting the car based upon how many miles are driven.

$$C_A(m) = 0.75m + 60$$

"m" miles	Total Cost
0	
50	
100	
150	
200	
250	
300	

How much would your bill be if you drove the car 525 miles?

Hamburgers cost \$5 and drinks cost \$2.

If you can spend a total of \$50, fill in the total number of hamburgers and drinks that you can buy.

Write an equation for this table.

$$D = \frac{-5}{2}H + 25$$

Hamburgers	drinks
0	
2	
4	
6	
8	
10	