Sec. 3-1 Constant Rate of Change

Relationships that have straight-line graphs are called linear relationships.

Number of songs, y	0	2	4	6	8
Time (minutes), x	0	1	2	3	4

Notice that as the number of songs increases by 2, the time in minutes increases by 1.

The *rate of change* between any two points in a linear relationship is the same or *constant.* A linear relationship has a constant rate of change.

ex. The balance in an account after several transactions is shown. Is the relationship between the balance and number of transactions linear? If so, find the constant rate of change. If not, explain your reasoning.

number of transactions	Balance ($)
5	170
10	140
15	110
20	80

ex.

Time (min)	Temperature
5	95
10	90
15	86
20	82

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Proportional Linear Relationships

-two quantities a and b have a proportional linear relationship if they have a constant ratio and a constant rate of change.

$\frac{b}{a}$ *is constant and* $\frac{\text{change in b}}{\text{change in a}}$ is constant.

-to determine if two quantities are proportional, compare the ratio of $\frac{b}{a}$ for several pairs of points to determine if there is a constant ratio.

ex. Use the table to determine if there is a proportional linear relationship between a temperature in degrees Fahrenheit and a temperature in degrees Celsius. Explain your reasoning.

Degrees Celsius	0	5	10	15	20
Degrees Fahrenheit	32	41	50	59	68

Use the table to determine if there is a proportional linear relationship between mass of an object in kilograms and the weight of the object in pounds. Explain your reasoning.

Weight (lb.)	20	40	60	80
Mass (kg)	9	18	27	36

Turn to page 174. Do #1-4 at your seats

Homework: Sec. 3-1 pg. 175-176 #1-12