Sec. 3-3 Equations in y = mx Form

Recall that when the ratio of two variable quantities is constant, a proportional relationship exists. This relationship is called a direct variation. The constant ratio is called the constant of variation or constant of proportionality.

Direct Variation: A linear relationship is a direct variation when the ratio of y to x is a constant, m. We say y varies directly with x.

$m = \frac{y}{x} \quad or\ y = mx$ where m is the constant of variation and
m $\neq 0$.

ex. $y = 3x$ $\qquad\qquad$ $ex.\ y = \frac{3}{2}x$

The slope of the graph of $y = mx\ is\ m$. Since (0, 0) is one solution of y = mx, the graph of a direct variation ALWAYS passes through the origin.

Turn to page 190 and look over example 1.

Got it?

a) Two minutes after a skydiver opens his parachute, he has descended 1,900 feet. After 5 minutes, he descended 4,750 feet. If the distance varies directly with the time, at what rate is the skydiver moving?

Ex. 2 (p.191) Look over example 2

Got It?

b)A grocery store sells 6 oranges for $2. Assume that the cost of the oranges varies directly with the number of oranges. This situation can be represented by $y = \frac{1}{3}x$. Graph the equation. What is the cost per orange?

Compare Direct Variations: You can use tables, graphs, words, or equations to represent and compare proportional relationships.
Look over p.192 key concept, as well as example 3.

When the x value changes by an amount A, the y-value will change by the corresponding amount mA. (slope multiplied by A)

Got it?
c) Damon's earnings for four weeks from a part time job are shown in the table. Assume that his earnings vary directly with the number of hours worked.

Time Worked (h)	15	12	22	9
Total Pay ($)	112.50	90.00	165.00	67.50

He can take a job that will pay him $7.35 per hour worked. Which job has the better pay? Explain.

Ex. 4: A 3-year-old dog is often considered to be 21 in human years. Assume that the equivalent age in human years y varies directly with its age as a dog x. Write and solve a direct variation equation to find the human-years age of a dog that is 6 years old.

Got It?

d) A charter bus travels 210 miles in $3\frac{1}{2}$ hours. Assume the distance traveled is directly proportional to the time traveled. Write and solve a direct variation equation to find how far the bus will travel in 6 hours.

e) A Monarch butterfly can fly 93 miles in 15 hours. Assume the distance traveled is directly proportional to the time traveled. Write and solve a direct variation equation to find how far the Monarch butterfly will travel in 24 hours.

Homework: