Algebra 1 3.4

Solve and graph direct variation equations

Use direct variation in context

direct variation $y = kx$

COV (k)

directly proportional (0, 0)

whiteboards

matching activ.

Whiteboards

$y = k \cdot x$

$15 = k \cdot 12$

Suppose y varies directly as x. Write a direct variation equation that relates x and y. Then solve.

$(12, 15)$ $1.25 = k$

$y = 1.25x$

$y = 1.25(32)$

$y = 40$

7. If $y = 15$ when $x = 12$, find y when $x = 32$.

8. If $y = -11$ when $x = 6$, find x when $y = 44$.

$(6, -11)$

$y = kx$

$-\frac{11}{6} = k \cdot \frac{6}{6}$

$k = \frac{-11}{6}$

$k = -1.833$

$y = -\frac{11}{6}x$

$44 = -\frac{11}{6} \cdot x$

$-24 = x$ 11

$y = -1.833x$

$44 = -1.833x$

$x = -24.004$

11

What is this problem about?

Real-World Example 4 Estimate Using Direct Variation

TRAVEL The distance a jet travels varies directly as the number of hours it flies. A jet traveled 3420 miles in 6 hours.

a. Write a direct variation equation for the distance d flown in time t.

$d = 570t$

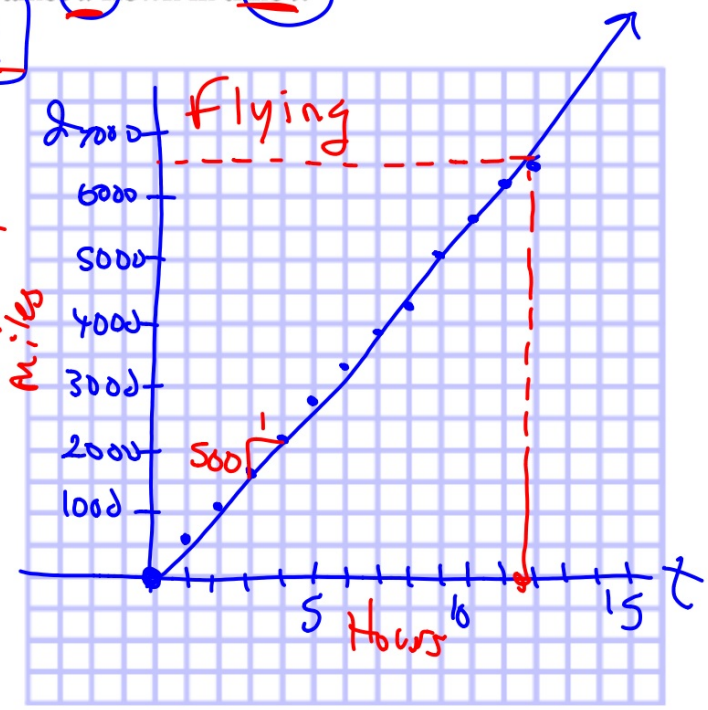
b. Graph the equation.

c. Estimate how many hours it will take for an airliner to fly 6500 miles.

$d = k \cdot t$ $\quad 6500 = 570t$

$\frac{3420}{6} = \frac{k \cdot 6}{6}$ $\quad t = 11.4$ hrs.

$k = 570$



What is this problem about?

4. HOT-AIR BALLOONS A hot-air balloon's height varies directly as the balloon's ascent time in minutes.

h

m

15 min

$h = k \cdot m$

$\frac{350}{5} = \frac{k \cdot 5}{5}$

$70 = k$

$h = 70m$

$70 \cdot 15 = 1050$ ft.

9. CCSS **REASONING** You find that the number of messages you receive on your message board varies directly as the number of messages you post. When you post 5 messages, you receive 12 messages in return.

R

P

$R = K \cdot P$

$12 = K \cdot 5$

$\frac{12}{5} = \frac{K \cdot 5}{5}$

$K = 2.4$

$R = 2.4P$

$96 = 2.4P$

$\frac{96}{2.4} = \frac{2.4P}{2.4}$

$40 = P$

Your equation should reflect what the problem is about.

Find the number of messages you need to post to receive 96 messages.

Matching activity
Match each graph with its equation