Direct Variation Homework

1. y varies directly as x. Find the constant of variation and write an equation of direct variation given the following information.

(A) y is 14 when x is 2
\[ k = \frac{y}{x} = \frac{14}{2} = 7 \]
\[ k = 7 \]
\[ y = 7x \]

(B) y is 5 when x is 8
\[ k = \frac{y}{x} = \frac{5}{8} \]
\[ y = \left(\frac{5}{8}\right) x \]

(C) y is 4.5 when x is 15
\[ k = \frac{y}{x} = \frac{4.5}{15} = \frac{9}{30} = \frac{3}{10} \]
\[ k = \frac{3}{10} \]
\[ y = \left(\frac{3}{10}\right) x \]

(D) y is 2 when x is 8
\[ k = \frac{y}{x} = \frac{2}{8} \]
\[ k = \frac{1}{4} \]
\[ y = \left(\frac{1}{4}\right) x \]

2. y varies directly as x. Find the missing value.

(A) y is 14 when x is 2. Find x when y is 21.
\[ k = \frac{y}{x} = \frac{14}{2} = 7 \]
\[ y = 7x \]
\[ 21 = 7x \]
\[ x = 3 \]
Or
\[ \frac{14}{2} = \frac{21}{x} \]
\[ 14x = 42 \]
\[ x = 3 \]

(B) y is 5 when x is 8. Find y when x is 28.
\[ k = \frac{y}{x} = \frac{5}{8} \]
\[ y = \frac{5}{8} x \]
\[ y = \frac{5}{8} \times 28 \]
\[ y = 17.5 \]
Or
\[ \frac{5}{8} = \frac{y}{28} \]
\[ 8y = 5 \times 28 \]
\[ y = 17.5 \]

(C) y is 27 when x is 3. Find x when y is 4.5.
\[ k = \frac{y}{x} = \frac{27}{3} = 9 \]
\[ y = 9x \]
\[ 4.5 = 9 \times x \]
\[ x = \frac{1}{2} \]
Or (see right)
3. Use the given relationships to determine the information about the application.

(A) distance = rate • time.
If a car travels 15 miles per hour, how far has it traveled after 3 hours?

Distance = 15mph • 3hours
Distance = 45 miles

(B) Force = spring constant, k • length
A certain spring (k = 3.5) has a force of 5 N applied to it. How far will it stretch?

5N = 3.5 N/m • Length
Length = 1.4 m