

PROPORTIONAL REASONING

Morning Session

Feb 8-4:43 PM

- ① The amount of money earned, y , varies directly with the number of hours worked, x . Determine the constant of proportionality for the direct variation.

Hours worked	2	4	6	8
Money earned	15	30	45	60

$$k = \frac{y}{x} = \frac{15}{2} = \frac{30}{4} = \frac{45}{6} = \frac{60}{8} = 7.5$$

$$k = 7.5$$

- ② In the table below what is the dependent variable?

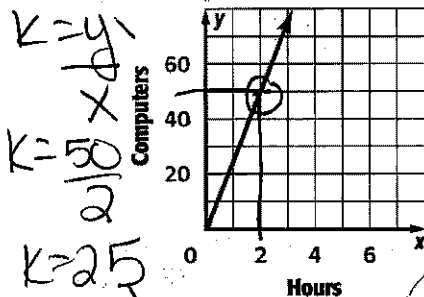
Hours of Babysitting (h)	Amount Earned (e)
3	\$27
5	\$45
6	\$54

time - always independent
\$ - dependent

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proportional

- ③ The number of computers built varies directly as the number of hours the production line operates. Write an equation to represent the direct variation shown in the graph at the below.



$$k = \frac{y}{x} = \frac{50}{2} = 25$$

$$y = kx$$

$$y = 25x$$

Mar 5-9:07 PM

- ④ A Nissan Titan gets 13.5 miles per gallon of gasoline. Gasoline costs \$2.39 per gallon. Find the cost of gasoline required for a 189-mile trip.

$$\frac{mi}{gal} \times \frac{13.5}{1} = \frac{189}{x}$$

$$14 \text{ gal} \times 2.39 = \$33.46$$

- ⑤ Ginger is traveling to Sunset Beach 176 miles away from her house. On Ginger's map, her house and the beach are 4 inches apart. What is the scale used for Ginger's map?

$$\frac{m}{A} = \frac{4 \text{ in}}{176 \text{ mi}} \div 4$$

$$\frac{1 \text{ in}}{44 \text{ mi}}$$

$$1 \text{ in} = 44 \text{ mi}$$

Mar 5-8:09 PM

- ⑥ Pixie drew a scale drawing of her bedroom with a length of 8 inches. The actual length of her room is $12\frac{3}{4}$ ft. The actual length of her bed is $6\frac{1}{4}$ ft. Approximately, what is the length of the bed in the drawing? Round your answer to the nearest whole number.

$$\frac{m}{A} = \frac{8 \text{ in}}{12\frac{3}{4} \text{ ft}} = \frac{6\frac{1}{4} \text{ ft}}{x \text{ in}}$$

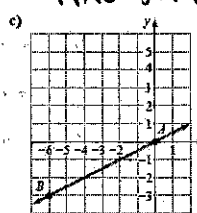
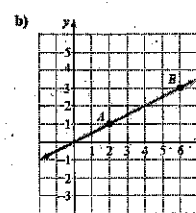
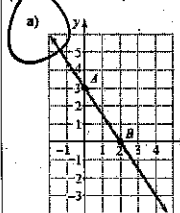
- ⑦ A blueprint for a new house was drawn using a scale of 1 inch = 12.5 feet. What is the scale factor?

$$\frac{1 \text{ in}}{12.5 \text{ ft}} \times 12 \text{ in} = 150 \text{ in}$$

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$$\frac{1}{150}$$

- ⑧ Which graph does not show an example of direct variation?



Not through origin

must be straight line through (0,0)

Mar 5-9:22 PM

- 9 Which product has the lowest unit price?
- Product A 8 oz \$1.38 $\frac{\$1.38}{8} = .1725$
- Product B 12 oz \$1.69 $\frac{1.69}{12} = .1408$
- Product C 16 oz \$2.05 $\frac{2.05}{16} = .128125$
- Product D 20 oz \$2.49 $\frac{2.49}{20} = .1245$

- 10 The concession stand has 144 drinks to sell during the basketball game. If three dozen drinks are sold in the first half of the game, what percent of the drinks have been sold?

part % $36 = x$

total = 100 $144 = 100$

Mar 5-8:31 PM 25%

- 11 A Boeing 747 airplane is 232 feet long. Billy's drawing of the 747 is 8 inches long. What is the scale used for Billy's drawing?

$\frac{8 \text{ in}}{232 \text{ ft}} = \frac{1 \text{ in}}{29 \text{ ft}}$

- 12 Which table shows a direct variation between the variables?

Table 1: x (3, 5, 8, 9), y (1, 3, 6, 7) $K = \frac{y}{x}$

Table 2: x (1, 3, 4, 6), y (5, 15, 8, 30) $K = 5$

Table 3: x (8, 16, 32, 56), y (1, 2, 4, 7) $K = \frac{1}{8}$

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all $\frac{y}{x} = \frac{1}{8}$ so it's proportional

- 13 Which equation DOES NOT represent a direct variation?

a. $y = 3x$

b. $y = -4x + 2$

c. $y = \frac{1}{8}x$

d. $x = y$

in the form $y = Kx$

can't have constant at end

- 14 The table shows the profit, y , for recycling x pounds of aluminum. Write an equation to represent the relationship shown in table.

Aluminum, x	10	20	30	40
Profit, y	\$4.50	\$9.00	\$13.50	\$18

$K = \frac{y}{x} = \frac{4.50}{10} = .45$

$y = .45x$

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- 15 An action figure was created using a scale of 1 inch = 2.5 feet. What is the scale factor that was used?

$\frac{1 \text{ in}}{2.5 \text{ ft}} \times 12 \text{ in} = \frac{1}{30}$

Hints:

Scale can compare different units see question #5 & #11

Scale factor must be converted to same units.

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- 16 Which set of ordered pairs represents a proportional relationship?

a. (1, 2), (3, 4), (5, 6), (7, 8) $\frac{2}{1} = 2, \frac{4}{3} = 1.33, \frac{6}{5} = 1.2, \frac{8}{7} = 1.14$

b. (0, 0), (1, 2), (2, 4), (3, 9) $\frac{2}{1} = 2, \frac{4}{2} = 2, \frac{9}{3} = 3$

c. (3, 1), (6, 2), (0, 0), (9, 3) $\frac{1}{3} = .33, \frac{2}{6} = .33, \frac{3}{9} = .33$

d. (0, 0), (1, 3), (2, 4), (4, 6) $\frac{3}{1} = 3, \frac{4}{2} = 2, \frac{6}{4} = 1.5$

0, 0 is allowed to not equal K

all order pairs have a $K = \frac{1}{3}$

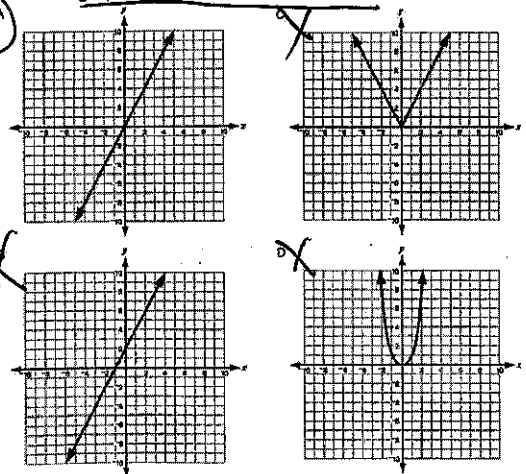
- 17 Two dozen flowers cost \$18.96, and four dozen flowers cost \$37.92.

How much would $1\frac{1}{2}$ dozen cost? $\frac{18.96}{2} = 9.48$

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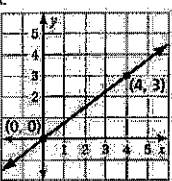
\$14.22

- 18 Which graph shows a direct relationship between x and y ?



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19 Which relationship(s) below are NOT examples of a proportional relationship?

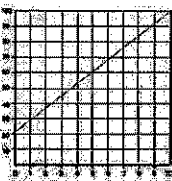
A. 

B.

x	1	2	3	4
y	-4	-6	-12	-16

C.

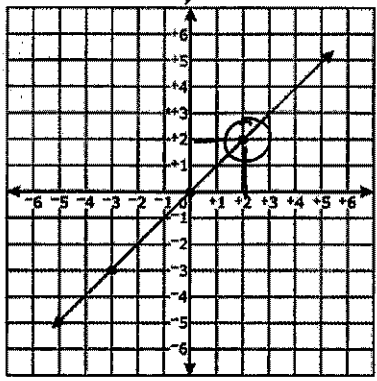
Cookies	Total Cost
1	20¢
2	40¢
3	60¢
4	80¢
5	\$1.00

D. 

Handwritten calculations for C: $20/1 = 20$, $40/2 = 20$, $60/3 = 20$, $80/4 = 20$, $100/5 = 20$.
 Handwritten calculations for B: $\frac{-4}{1} = -4$, $\frac{-6}{2} = -3$, $\frac{-12}{3} = -4$, $\frac{-16}{4} = -4$.
 Conclusion: not constant.

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20 Write an equation to match the proportional relationship shown in the graph.



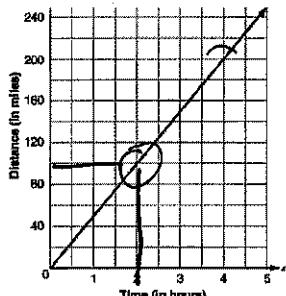
Handwritten calculations: $k = \frac{y}{x} = \frac{2}{2} = 1$, $k = 1$, $y = 1x$ or $y = x$.

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21 What equation do you use to determine k, the constant, in a proportional relationship?

22 Write an equation that could be used to show a proportional relationship.

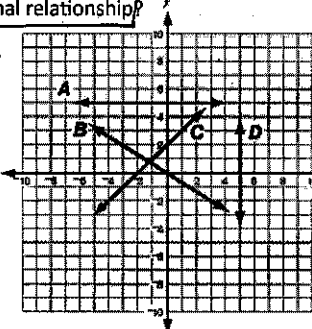
23 How fast is the train traveling according to the graph below.



Handwritten calculations: $k = \frac{y}{x} = \frac{100}{2} = 50$.
 Conclusion: 50mph.

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24 Look at the lines in the grid below. Which line represents a proportional relationship?



Handwritten notes: "Straight through origin".
 Conclusion: B.

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25 The Stratton family rented 3 DVDs for \$10.47. The next weekend, they rented 5 DVDs for \$17.45. What is the rental fee for a DVD?

26 Ten minutes after a submarine is launched from a research ship, it is 25 meters below the surface. After 30 minutes, the submarine has descended 75 meters. How many minutes would it take the diver to descend 87.5 meters?

Handwritten calculations for 25: $\frac{10.47}{3} = x$, $x = 3.49$.
 Handwritten calculations for 26: $\frac{25}{10} = \frac{87.5}{x}$, $x = 35$.
 Conclusion: 35min.

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27 A grocery store sells 3 pounds of grapes for \$3.45. Another grocery store sells 5 pounds of grapes for \$5.75. If the price for grapes varies directly with the number of pounds purchased, how much would you expect to pay for 7 pounds of grapes?

Handwritten calculations: $\frac{3.45}{3} = \frac{x}{7}$, $x = 8.05$.
 Conclusion: \$8.05.

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28

The Rawlins family has travelled 600 km on their vacation. This has taken them 8 hours. If they plan to travel a total of 2100 km, which proportion could be used to find x, the number of hours the total trip will take?

a. $\frac{600}{8} = \frac{x}{2100}$

b. $\frac{600}{8} = \frac{2100}{x}$

c. $\frac{x}{8} = \frac{600}{2100}$

d. $\frac{600}{x} = \frac{2100}{8}$

$\frac{\text{km}}{\text{hr}} \frac{600}{8} = \frac{2100}{x}$

29

The produce department of a grocery store sold 288 pounds of tomatoes. The weight represented 72% of the shipment the store received. The rest spoiled and had to be discarded. How many pounds of tomatoes were originally received?

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$\frac{\text{part}}{\text{total}} = \frac{\%}{100}$

$\frac{\text{part sold} \rightarrow 288}{\text{total shipment} \rightarrow x} = \frac{72}{100}$

400 lbs

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