1 What is the value of $5x^3y^2$ when $x = 2$ and $y = 4$?

a 240
b 320
c 480
d 640

$5(2)^3(4)^2$
$5 \cdot 8 \cdot 16$

2 What exponent goes in the box to make the following equation true?

$$\frac{x^{\square}x^6}{x^2} = x^{12}$$

a 9
b 8
c 4
d 3

$\square + 4 = 12$

3 Mario is making fruit punch by mixing orange juice and pineapple juice in a ratio of 1:3.

How much pineapple juice should he use to make 3 L of fruit punch?

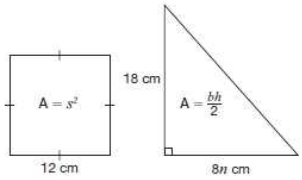
a 0.75 L
b 2 L
c 2.25 L
d 4 L

$\frac{1}{3} = \frac{3}{x}$
$1x = 9$
$\frac{1x}{1} = \frac{9}{1}$
$x = 9$

4 Which of the following is a simplified form of the expression $4(5x - 8) - 3(2x - 7)$?

a $14x - 11$
b $14x - 53$
c $26x - 11$
d $26x - 53$

5 The square and the triangle below have the same area.

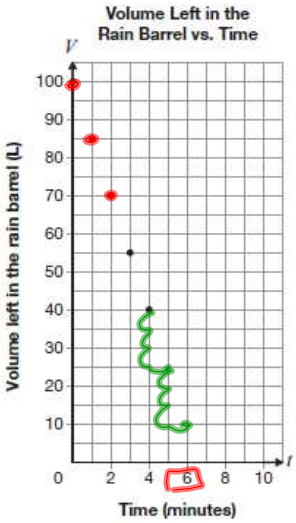


What is the value of n?

a 1
b 2
c 8
d 16

$144 = \frac{bh}{2}$
$144 = \frac{b(8)}{2}$
$144 = \frac{8b}{2}$
$\frac{144}{9} = \frac{8b}{9}$

7 A rain barrel full of water is drained at a constant rate. Data for the first few minutes of draining is shown on the grid below.



After 6 minutes, the draining is stopped.

How much water is needed to refill the rain barrel?

a 90 L
b 75 L
c 25 L
d 10 L

8 Luisa chooses a cellphone plan that charges a flat fee of \$20 per month and \$0.25 for each text message sent.

Which equation best represents the cost of Luisa's cellphone plan, C, in dollars, where n is the number of text messages sent?

a $C = 20.25n$
b $C = 20(0.25n)$
c $C = 20n + 0.25$
d $C = 0.25n + 20$

9 There is a linear relationship between the total cost of renting a costume and the number of hours the costume is rented.

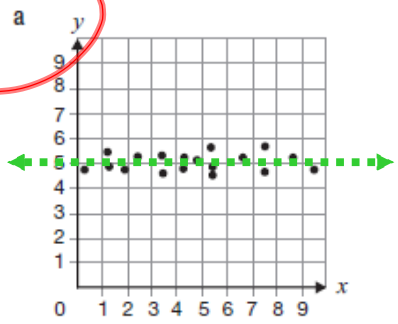
- For 3 hours, the total cost is \$60.
- For 5 hours, the total cost is \$80.

What type of variation is this relationship, and what is its initial value?

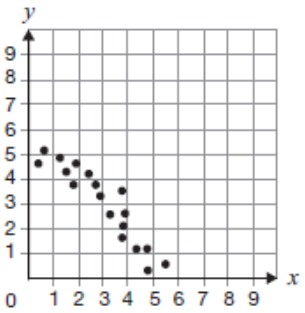
a a partial variation with an initial value of \$30
b a partial variation with an initial value of \$20
c a direct variation with an initial value of \$30
d a direct variation with an initial value of \$20

10 For which scatter plot could the line $y = 5$ be the line of best fit?

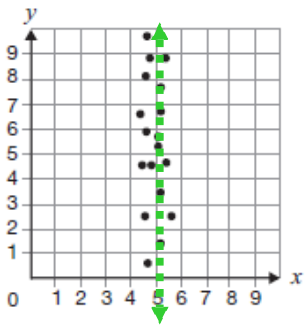
a



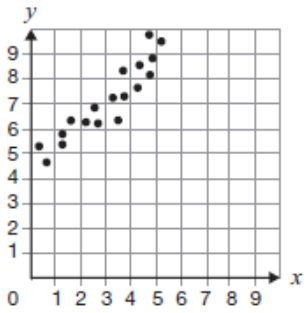
b



c



d

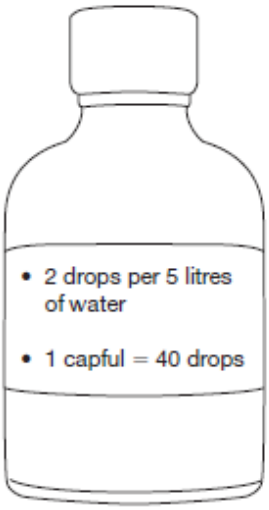


6 Healthy Fish

James adds vitamin drops to his fish tank to keep his fish healthy.

If James follows the instructions on the bottle of vitamins, how many capfuls should he add to his 350-litre fish tank?

Show your work.



350 ÷ 5 = 70

70 x 2 = 140 drops

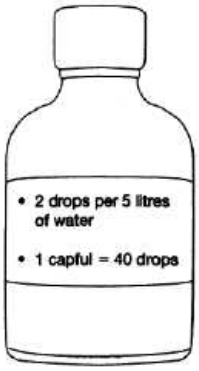
140 ÷ 40 = 3.5 caps

Healthy Fish

James adds vitamin drops to his fish tank to keep his fish healthy.

If James follows the instructions on the bottle of vitamins, how many capfuls should he add to his 350-litre fish tank?

Show your work.



5L = 2 drops
1 cap = 40 drops

5L x 70L = 350L
2 drops x 70 = 140 drops

1 cap = 40 drops
2 caps = 80 drops
3 caps = 120 drops
4 caps = 160 drops

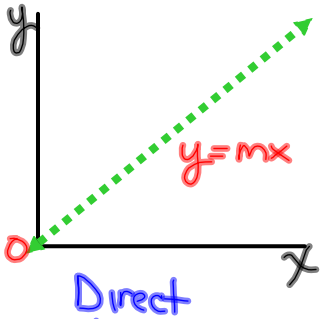
∴ James should add 3 ½ caps of the vitamin drops to keep his fish happy. I know this because per 350L there should be 140 drops, and per 1 capful = 40 drops so 3 ½ cap fulls would satisfy his 350L fish tank.

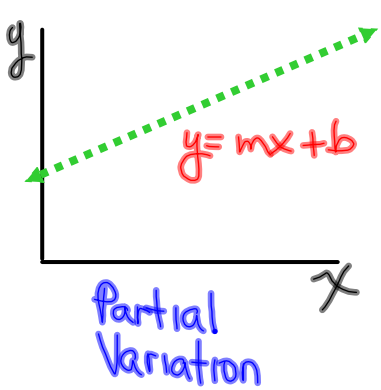
Chapter 3 and 4 Exam Review

Section 3.1

Direct Variation	Partial Variation
(0, 0) is an ordered pair in the table of values.	(0, 0) is not an ordered pair in the table of values.
The initial value is 0, so the graph passes through (0, 0).	The initial value is some number, b, so the graph passes through (0, b).
The equation looks like $y = mx$.	The equation looks like $y = mx + b$.

* See p. 151 of textbook





Example One

Determine the slope of the line that passes through the points (4, 0) and (6, 18).

$x_1\ y_1 \qquad x_2\ y_2$

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

$$= \frac{18 - 0}{6 - 4}$$

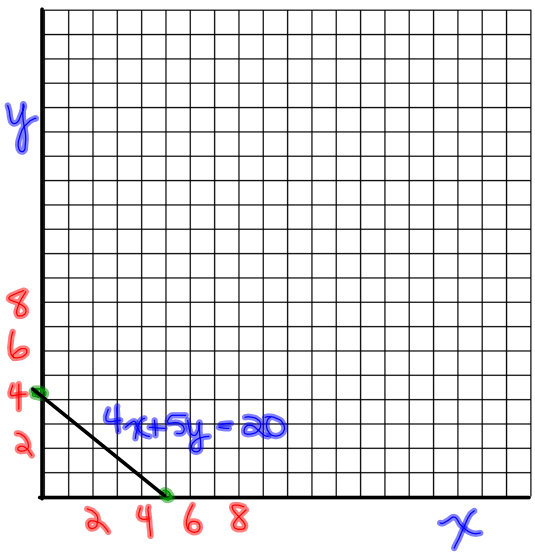
$$= \frac{18}{2}$$

$$= 9$$

Example Two

Graph the relation using the x- and y-intercepts.

$$4x + 5y = 20$$



X-intercept

let $y = 0$ & solve for x.

$4x + 5(0) = 20$

$\frac{4x}{4} = \frac{20}{4}$

$x = 5$

Y-intercept

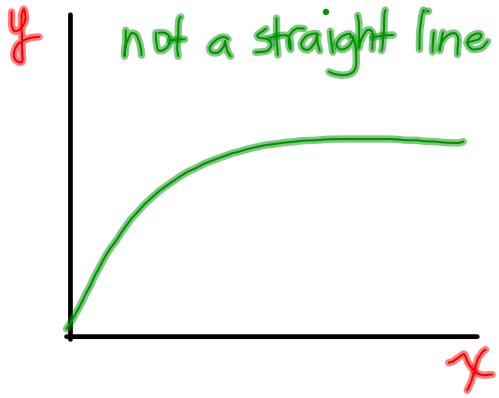
let $x = 0$ & solve for for y.

$4(0) + 5y = 20$

$\frac{5y}{5} = \frac{20}{5}$

$y = 4$

- If a relation is nonlinear, then the following are true:
  - The graph is not a straight line.
  - The first differences are not constant.
  - The degree of its equation is not 1.



Not degree 1.

$y = 2x^2 + 7$

Example Three

Solve each equation.

$-4x - 1 = -3x + 5$

+1

+3x

$-4x + 3x = 5 + 1$

$\frac{-1x}{-1} = \frac{6}{-1}$, $x = -6$

$4(x - 2) = -3(2x + 6)$

$4x - 8 = -6x - 18$ +8

+6x

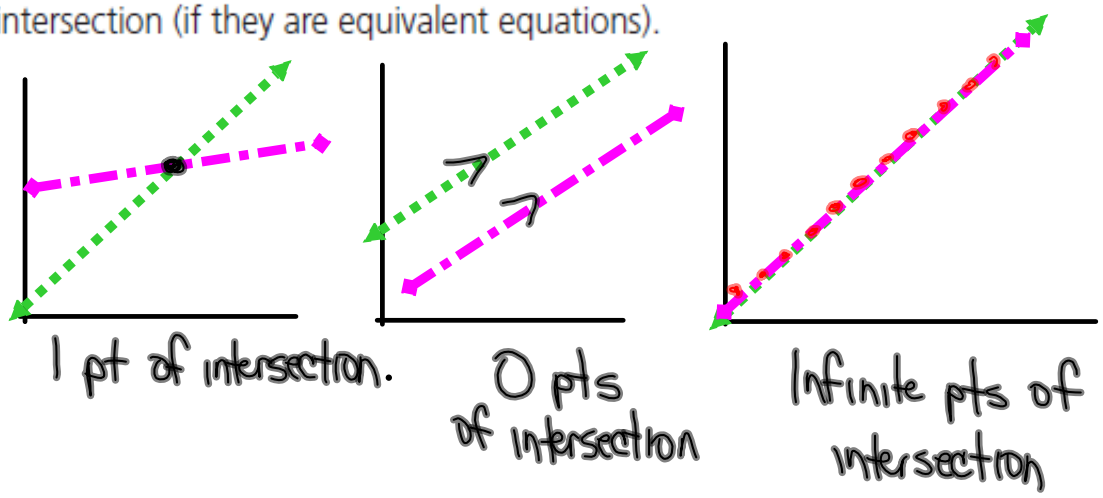
* Must expand brackets first.

$4x + 6x = -18 + 8$

$\frac{10x}{10} = \frac{-10}{10}$

$x = -1$

A system of linear equations can have one point of intersection, zero points of intersection (if the graphs are parallel), or infinite points of intersection (if they are equivalent equations).



Example Four

Mary Claire is choosing between 2 music downloading clubs. The first club charges a member of $5 plus $2.50/song while the second club charges a membership of $3 plus $3/song.

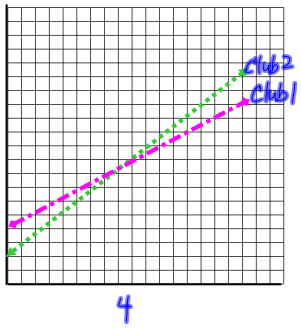
a) Write the equations that represents both clubs.

① $y = 5 + 2.5s$

② $y = 3 + 3s$

y = total cost
s = # of songs

b) Which club should Mary Claire join? Create a table of values to graph your equations.



Club 1

# of song	Cost
0	5
5	17.50
10	30

# of songs	Cost
0	3
5	18
10	33

① If M.C. buys less than 4 songs use club 2

② If M.C. buys more than 4 songs use club 1

③ If M.C. buys exactly 4 songs