Chapter 5 Review

MPM1D
Jensen

Section 1: Direct and Partial Variation

Constant of variation =

$$\frac{\Delta dependent}{\Delta independent}$$

1. Find the constant of variation for each direct variation.

a) The cost for a long-distance telephone call varies directly with time. A 12-min phone call costs $0.96.

b) The total mass of magazines varies directly with the number of magazines. The mass of 8 magazines is 3.6 kg.

c) The distance travelled varies directly with time. In 3 h, Alex drove 195 km.

2. The Jung family travels 300 km to a relative's home. The distance, *d*, in kilometres, varies directly with the time, *t*, in hours.

Equation of a direct variation is:

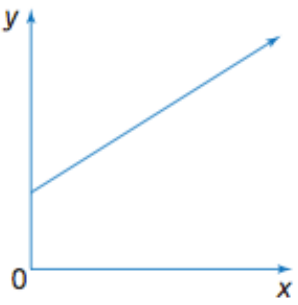
$$y = mx$$

a) Find an equation relating *d* and *t* if *d* = 144 when *t* = 1.5. What does the constant of variation represent?

b) Use the equation to determine how long it will take the Jungs to reach their destination.

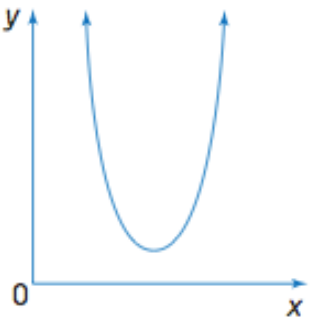
3. Classify each of the following graphs as direct variation, partial variation, or neither.

a)



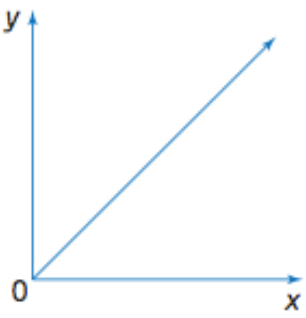
_____

b)



_____

c)



_____

4. The following table shows the Cost, C, to park in a downtown parking lot based on the number of hours, t, your car is parked for.

t (h)	C ($)
0	0
0.5	1.50
1	3.00
1.5	4.50
2	6.00
2.5	7.50

a) Is this an example of direct or partial variation?

b) What is the constant of variation?

c) What does the constant of variation represent in this situation?

d) Write an equation relating C and t

5. For the following table of values:

x	y
0	10
1	14
2	18
3	22
4	26

a) Is this an example of direct or partial variation?

b) What is the initial value?

c) What is an equation for this relation in the form y=mx+b

Equation of a partial variation:

$$y = mx + b$$

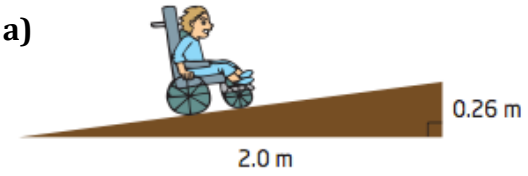
Section 2: Finding Slope from a Graph

Remember:

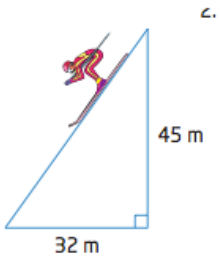
$$m = \frac{rise}{run} = \frac{y_2 - y_1}{x_2 - x_1}$$

6. Find the slope of each object/line:

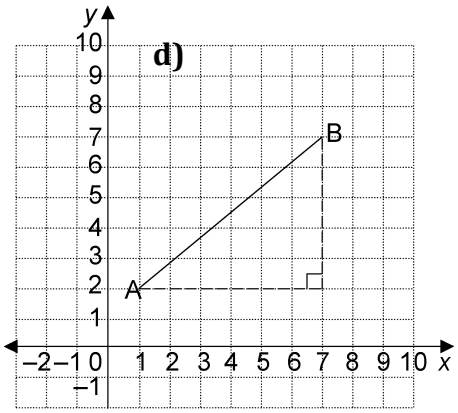
a)



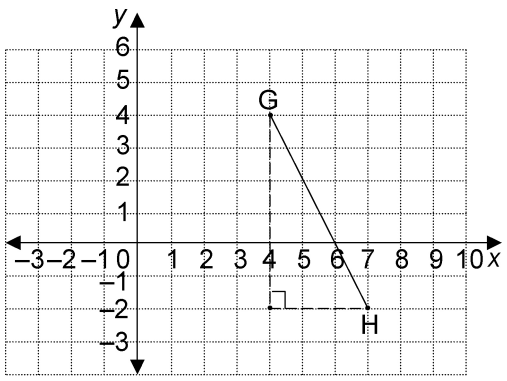
b)



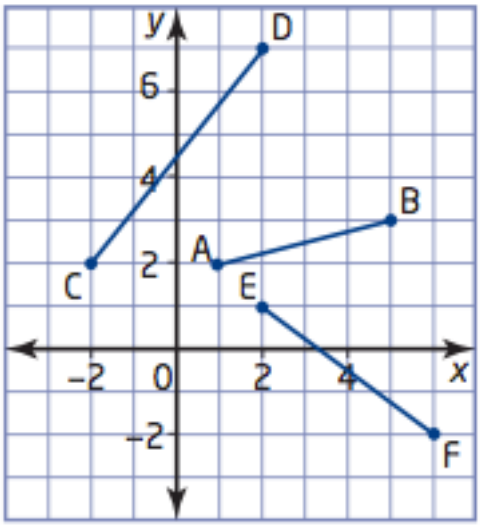
c)



d)



7. Find the slope of each of the following lines



Slope of AB: _____

Slope of CD: _____

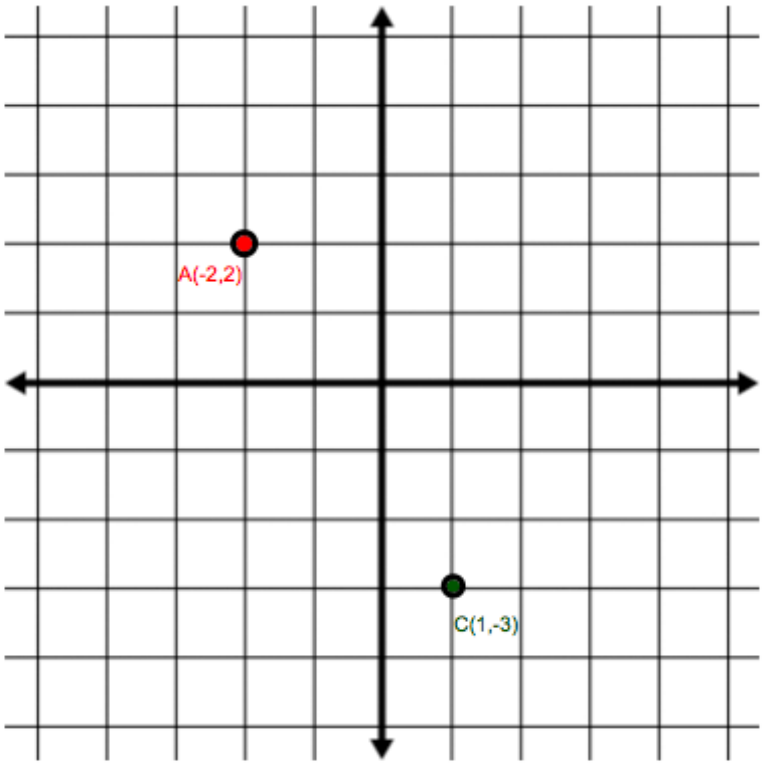
Slope of EF: _____

8.

a) Point A(-2,2) is plotted on the grid below. Draw line segment AB that has a slope of $-\frac{1}{2}$. Complete the table on the left with the coordinates of a point to the left and right of A.

b) Point C(1,-3) is plotted on the grid below. Draw line segment CD that has a slope of 2. Complete the table on the right with the coordinates of a point to the left and right of C.

x	*y*
-2	2



x	*y*
1	-3

Section 3: Slope as a Rate of Change

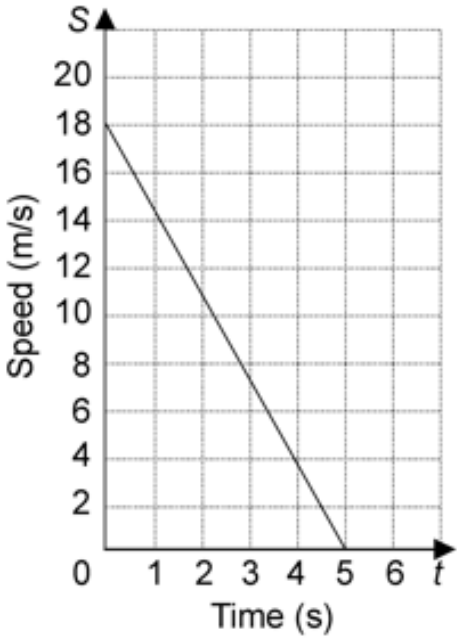
$$Rate\ of\ change = slope = \frac{\Delta dependent}{\Delta independent}$$

9. At rest, Vicky takes 62 breaths every 5 min. What is Vicky's rate of change of number of breaths?

10. When he is sleeping, Jeffrey's heart beats 768 times in 12 min. What is his rate of change of number of heartbeats?

11. The graph shows the speed of the cars on a roller coaster once the brakes are applied.

$$slope = \frac{rise}{run} = \frac{y_2 - y_1}{x_2 - x_1}$$



a) Find the slope of the graph

b) Interpret the slope as a rate of change

Section 4: First Differences

12. Use first differences to determine if each relation is linear or non-linear

a)

t	d
−1	21
0	13
1	9
2	7
3	6

_____

b)

x	y
0	4
1	11
2	18
3	25
4	32

_____

Section 5: Writing Linear Equations

13. For the following table of values:

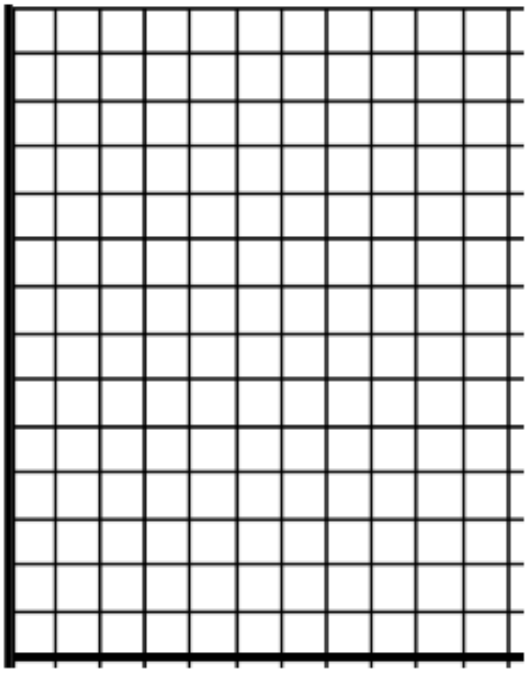
x	y
0	2
1	5
2	8
3	11
4	14

a) Calculate the slope (constant of variation) $m = \frac{y_2 - y_1}{x_2 - x^1}$

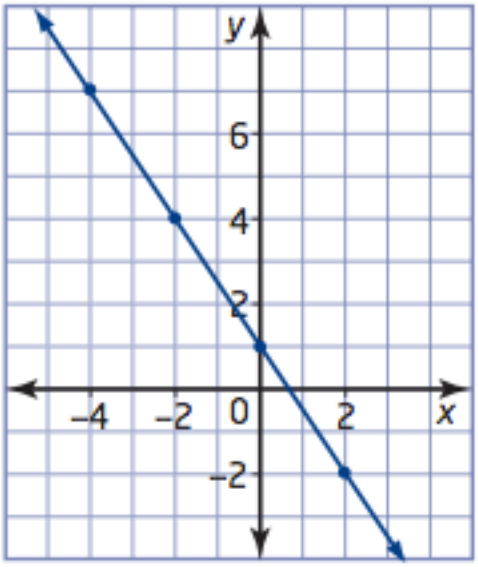
b) What is the y-intercept (initial value)

c) Write the equation of the linear relation ($y = mx + b$)

d) Graph the relation



14. For the following linear relation:



a) Calculate the slope ($m = \frac{rise}{run} = \frac{y_2 - y_1}{x_2 - x^1}$)

b) What is the y-intercept?

c) Write an equation for the line

15. y varies directly with x. When x=3, y=5

a) What is the slope of the line

b) What is the y-intercept (hint: what is the y-intercept of all direct variation relationships?)

c) Write an equation for the line

16. y varies partially with x. When x = 0, y=1, and when x = 2, y=7.

a) What is the slope of the line?

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

b) What is the y-intercept (what is the y-value when x=0?)

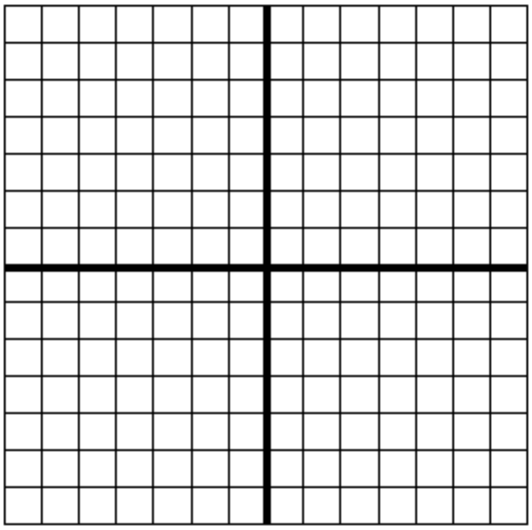
c) Write an equation for the line

17. A class is planning a field trip to an art gallery. The cost of renting a bus is $250. There is an additional fee of $4 per student. Write an equation to represent this linear relationship.

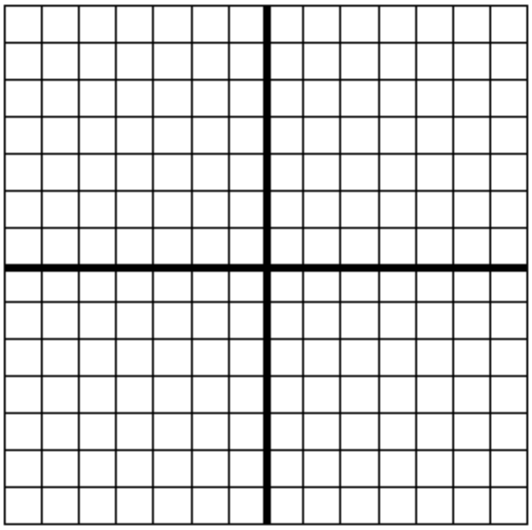
Section 6: Graphing a Linear Relation

18. Graph each of the following lines on the grids provided.

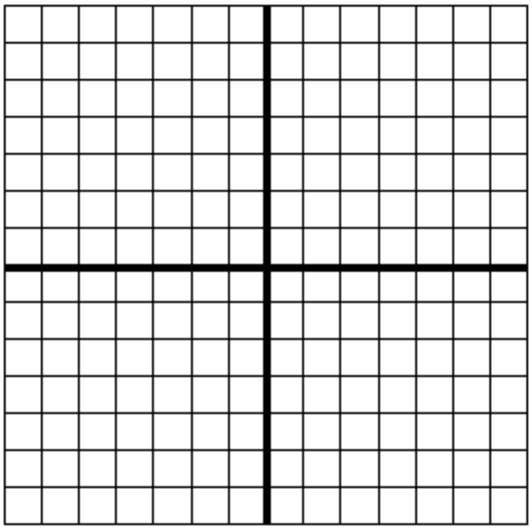
a) $y = 3x - 2$



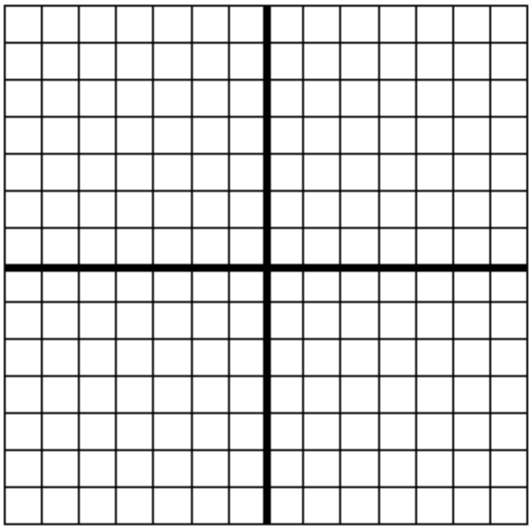
b) $y = -2x + 5$



c) $y = -\frac{1}{2}x$

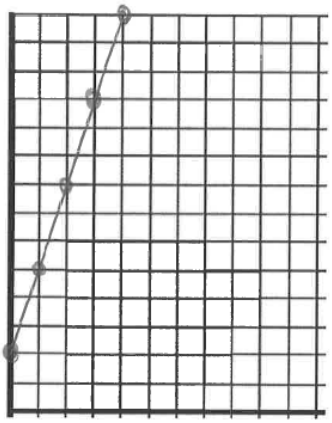


d) $y = \frac{3}{2}x - 3$



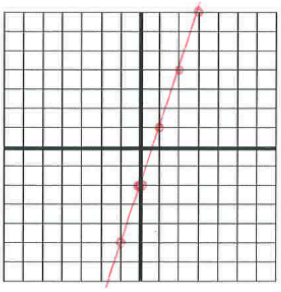
Answers

1) a) \$0.08 per minute b) 0.45 kg/magazine c) 65 km/h
2) a) $d = 96t$ b) 3.1 hours
3) a) Partial b) Neither c) Direct
4) a) Direct b) m=3 c) cost per hour to park downtown d) $C = 3t$
5) a) Partial b) b=10 c) $y = 4x + 10$
6) a) m=0.13 b) m=1.4 c) $m = \frac{5}{6}$ d) m=-2
7) $mAB = \frac{1}{4}$ $mCD = \frac{5}{4}$ $mEF = \frac{-3}{4}$
8) a) (-3,4) and (0,1) b) (0,-5) and (2,-1)
9) a) 12.4 breaths/min
10) 64 beats/min
11) a) -3.6 m/s^2 b) acceleration of cars on roller coaster after brakes are applied
12) a) non-linear b) linear
13) a) m=3 b) b=2 c) y=3x+2 d)

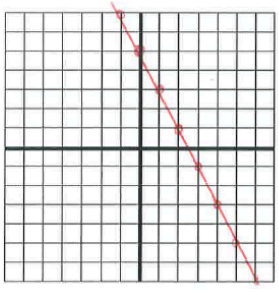


14) a) $m = \frac{-3}{2}$ b) b=1 c) $y = \frac{-3}{2}x + 1$
15) a) $m = \frac{5}{3}$ b) $b = 0$ c) $y = \frac{5}{3}x$
16) a) m=3 b) b=1 c) y=3x+1
17) y=4x+250
18)

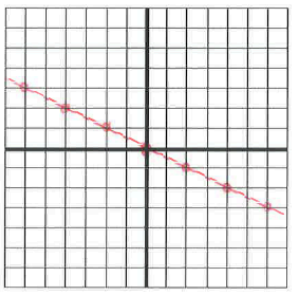
a) $y = 3x - 2$



b) $y = -2x + 5$



c) $y = -\frac{1}{2}x$



d) $y = \frac{3}{2}x - 3$