Thursday, September 10, 2015
6:40 PM

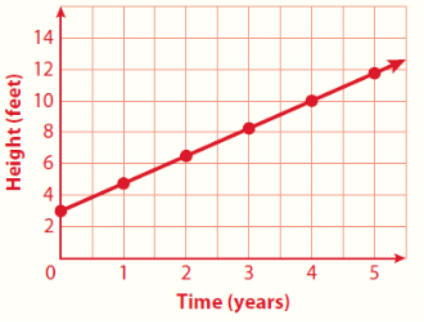
For Exercises 1–8, use the following information.

A tree is planted as a 3-foot sapling and grows $1\frac{3}{4}$ feet per year.

1. Complete the table to show the tree's growth for the first 5 years.
2. Identify the independent and dependent variables. Explain your choices.
3. Make a scatter plot of the data in your table. Does it make sense to draw a line through the plot? Explain. If it does, find the slope of the line.
4. Is this a direct variation function? Explain.

Time (years)	Height (feet)
0	3
1	4.75
2	6.5
3	8.25
4	10
5	11.75

② indep: time
dep: height
The height of the tree depends on the # of years it has been growing



③ Yes it makes sense to draw a line connecting the points because the tree's height grows continuously throughout the year.

$m = 1.75$ ft/yr

④ No, this is not a direct variation. The ratio of height to time is not constant. The graph doesn't go through (0,0).

5. Complete the following sentence to describe the way the tree's height changes: "Its height at any time is 3 feet plus _____."
6. Write an equation that models the height h of the tree after t years.
7. Check your model against the values in your table.
8. Find the height of the tree after 10 years if the same rate of growth continues.

⑤ "1.75 ft for each year it has been growing"

⑥ $h = 1.75t + 3$

⑦ $h(0) = 3$ $h(1) = 1.75(1) + 3 = 4.75$ $h(2) = 1.75(2) + 3 = 6.5$
The model agrees with the table.

⑧ $h(10) = 1.75(10) + 3 = 17.5 + 3 = \boxed{20.5 \text{ ft}}$

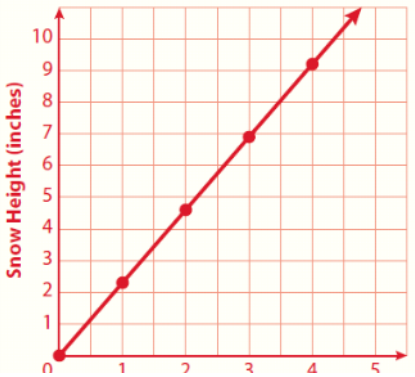
For Exercises 9–13, use the following information.

The table shows the amount of snow that accumulated on the ground during a snowstorm.

Time (hours)	Snow Height (inches)
0	0
1	2.3
2	4.6
3	6.9
4	9.2

9. Identify the independent and dependent variables. Explain your choices.
10. Make a scatter plot of the data. Does it make sense to draw a line through the plot? Explain. If it does, find the slope of the line.
11. Is this a direct variation function? Explain.
12. Write an equation that models the height h of the snow after t hours.
13. Find the height of the snow after 8 hours if the same rate of

⑨ ind: time dep: snow height
The height of snow accumulation depends on the amount of time snow has been falling.



⑩ Yes it makes sense to draw the line. Snow falls continuously over time.

⑪ Yes this is a direct variation. The ratios are

11. Is this a direct variation function? Explain.
12. Write an equation that models the height h of the snow after t hours.
13. Find the height of the snow after 8 hours if the same rate of snowfall continues.

(11) Yes this is a direct variation. The ratios are constant, and the graph includes (0,0).

(12) $h = 2.3t$

(13) $h(8) = 2.3(8) = \boxed{18.4 \text{ in}}$

14. DVDs can be bought from an Internet retailer for \$6.99 each. The shipping cost for the entire order is \$12, no matter how many DVDs are ordered.
   a. Write an equation that models the total cost C of an order of n DVDs.
   b. Find the total cost of an order of 8 DVDs.
15. A salesperson makes a salary of \$800 a week plus a commission of 6 percent on the value of all goods sold.
   a. Write an equation that models the salesperson's total income I for a week in which her sales amount is s (in dollars).
   b. Find the salesperson's total income if she sells \$2,000 worth of goods.

(14) (a) $C = 6.99n + 12$

(b) $C(8) = 6.99(8) + 12 = 55.92 + 12 = \boxed{\$67.92}$

(15) (a) $I = 0.06s + 800$

(b) $I(2000) = 0.06(2000) + 800 = 120 + 800 = \boxed{\$920}$

16. In one airline's frequent-flyer program, a passenger receives two credits for each round-trip flight. Also, 0.5 credits are awarded for each approved car rental.
   a. Write an equation that models the total number of credits C received if the number of round-trip flights is f and the number of car rentals is r.
   b. Find the number of credits received if a person made 5 round-trip flights and rented a car twice.
17. The assembly shop of a custom furniture manufacturer has just produced a set of 8 chairs. Each chair must be sanded 3 times. Then 2 coats of finish must be applied.
   a. Write an equation that models the total time t needed to complete a set of 8 chairs if it takes s minutes to sand a chair one time and f minutes to apply a coat of finish.
   b. Find the time it takes to complete a set of chairs if it takes 35 minutes to sand a single chair one time and 25 minutes to apply one coat of the finish.

(16) (a) $C = 2f + 0.5r$

(b) $f = 5, r = 2$

$C = 2(5) + 0.5(2) = 10 + 1 = \boxed{11 \text{ credits}}$

(17) (a) $t = 8(3s + 2f)$

(b) $s = 35, f = 25$

$t = 8(3 \cdot 35 + 2 \cdot 25) = 8(105 + 50)$

$= 8(155)$

$= \boxed{1240 \text{ minutes or } 20 \text{ hr } 40 \text{ mins.}}$

23. Suppose that your scores on the first four tests in a course are 84, 72, 65, and 90. There is one test remaining, and all tests have equal weight.
   a. Write an equation that relates your score T on the final test to your final average A for all 5 tests.
   b. Calculate your average if the score on your final test is 94.
24. One cell-phone plan costs \$39.99 a month for 450 minutes of talking and unlimited texting. Each additional minute over 450 costs 45 cents.
   a. Write an equation that models the relationship between the total cost C of the plan and the number of minutes m talked during a month in which more than 450 minutes are used.
   b. Another plan has the same features and costs. But it also includes a \$9.99 charge for up to 25 megabytes of data transfer. Each additional megabyte of data costs 20 cents. Revise your answer to part (a) to reflect the inclusion of the data feature, using d to

(23) (a) $A = \dfrac{84 + 72 + 65 + 90 + T}{5}$

(b) $A = \dfrac{84 + 72 + 65 + 90 + 94}{5} = 81$

(24) (a) $C = 0.45(m - 450) + 39.99$

m = # of minutes used over 450

(b) $C = 0.45(m - 450) + 39.99 + 0.20(d - 25) + 9.99$

b. Another plan has the same features and costs. But it also includes a $9.99 charge for up to 25 megabytes of data transfer. Each additional megabyte of data costs 20 cents. Revise your answer to reflect the inclusion of the data feature, using d to represent the number of megabytes of data transferred. Assume that at least 25 megabytes of data are transfered.

m = # of minutes used over 450

(b) $C = 0.45(m - 450) + 39.99 + 0.20(d - 25) + 9.99$

$0.45(m-450)$: extra minutes charge; 39.99: base mins charge; $0.20(d-25)$: extra data charge; 9.99: base data charge