

Key

Semester Exam Review Packet 2018

*This packet is not necessarily comprehensive. In other words, this packet is not a promise in terms of level of difficulty or full scope of material.

Equations

$$1. \quad 9 - 2(n-1) = \frac{3n}{4}$$

$$9 - 2n + 2 = \frac{3n}{4}$$

$$11 - 2n = \frac{3n}{4}$$

$$44 - 8n = 3n$$

$$\boxed{n=4}$$

$$2. \quad \frac{2}{3}x - \frac{1}{4} = \frac{2}{3}(x - \frac{1}{4})$$

$$\frac{2}{3}x - \frac{1}{4} = \frac{2}{3}x - \frac{2}{12}$$

$$-\frac{1}{4} = -\frac{1}{6}$$

No Solution

$$3. \quad \frac{3(2-x)}{5} = 3$$

$$6 - 3x = 15$$

$$-3x = 9$$

$$x = -3$$

$$\boxed{x=-3}$$

$$4. \quad 31 + 2x - (x - 2) = 3(x + 8) - 2x + 9$$

$$31 + 2x - x + 2 = 3x + 24 - 2x + 9$$

$$x + 33 = x + 33$$

All real #'s or infinitely many solutions

5. Cheap Company long distance phone calls cost 36 cents plus 3 cents per minute. Economy Company long distance phone calls cost 6 cents per minute. How long is a call that costs the same amount no matter which company is used? What is the cost of that call?

$$.36 + .03m = .06m$$

$$-.03m \quad -.03m$$

$$.36 = .03m$$

$$12 = m$$

$$.06(12) = .72$$

12 minute call
cost \$0.72

6. If $16 + 4x$ is 10 more than 14, what is the value of $8x$?

A. 2

B. 6

C. 16

D. 80

$$16 + 4x = 10 + 14$$

$$16 + 4x = 24$$

$$-16 \quad -16$$

$$4x = 8$$

$$\frac{4x}{4} = \frac{8}{4} \quad x = 2$$

$$8x = 8(2) = 16$$

Solving for a Variable

7. Solve $3x + 7y = 2$ for y

$$3x + 7y = 2$$

$$-3x \quad -3x$$

$$7y = 2 - 3x$$

$$\frac{7y}{7} = \frac{2 - 3x}{7}$$

$$y = \frac{2 - 3x}{7} \text{ or } y = \frac{2}{7} - \frac{3x}{7}$$

8. Solve $\frac{a}{2} + 2b = 6$ for a .

$$\frac{a}{2} + 2b = 6$$

$$-2b \quad -2b$$

$$\frac{a}{2} = 6 - 2b$$

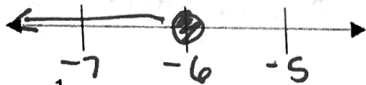
$$2\left(\frac{a}{2}\right) = 2(6 - 2b)$$

$$\boxed{a = 12 - 4b}$$

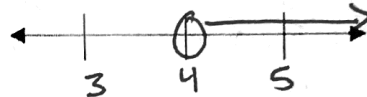
Inequalities

Solve and graph the following inequalities:

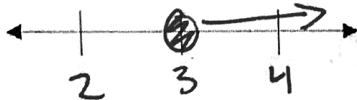
$$\begin{aligned}
 9. \quad & 2.5 + 2x \geq 5.5 + 2.5x \\
 & \quad \quad -2x \quad \quad -2x \\
 & 2.5 \geq 5.5 + .5x \\
 & -5.5 \quad -5.5 \\
 & \frac{-3}{.5} \geq \frac{.5x}{.5} \\
 & -6 \geq x
 \end{aligned}$$



$$\begin{aligned}
 10. \quad & -2(1-x) < 3(x-2) \\
 & -2 + 2x < 3x - 6 \\
 & \quad \quad -2x \quad -2x \\
 & -2 < x - 6 \\
 & \quad \quad +6 \quad +6 \\
 & 4 < x \\
 & x > 4
 \end{aligned}$$

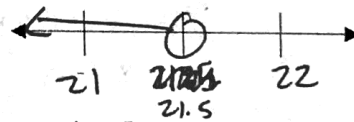


$$\begin{aligned}
 11. \quad & \frac{1}{6}(6x + 12) - x \geq -10x + 32 \\
 & x + 2 - x \geq -10x + 32 \\
 & 2 \geq -10x + 32 \\
 & \quad \quad -32 \quad -32 \\
 & -30 \geq -10x \\
 & \frac{-30}{-10} \geq \frac{-10x}{-10} \\
 & 3 \leq x \\
 & x \geq 3
 \end{aligned}$$



12. A 15-foot-tall cedar tree is growing at a rate of 2 feet per year beneath power lines that are 58 feet above the ground. The power company will have to prune or remove the tree before it reaches the lines. How many years can the power company wait before taking action?

$$\begin{aligned}
 & 15 + 2x < 58 \\
 & \quad \quad -15 \quad -15 \\
 & 2x < 43 \\
 & \frac{2x}{2} < \frac{43}{2} \\
 & x < 21.5 \\
 & \text{less than} \\
 & 21.5 \text{ years}
 \end{aligned}$$

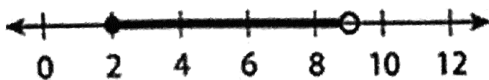


13. Patty's Pizza charges \$5.50 for a large pizza plus \$0.30 per topping. Pizza Town charges \$5.00 for a large pizza plus \$0.40 per topping. Which inequality can you use to find the number of toppings x so that the cost of a pizza at Pizza Town is greater than the cost of a pizza at Patty's Pizza?

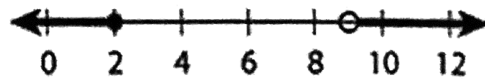
- A $(5 + 0.4)x > (5.5 + 0.3)x$ ✗
 B $5.5x + 0.3 > 5x + 0.4$ ✗
 C $5.5 + 0.3x > 5 + 0.4x$ ✗
 D $5 + 0.4x > 5.5 + 0.3x$ ✓

$$5.50 + .3x < 5 + .4x$$

14. Write the compound inequality for each graph

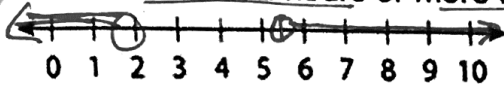


$$2 \leq x \leq 9$$



$$x > 2 \text{ or } x < 9$$

Graph the following situation on the number line then write the compound inequality.
 A welding shop figures a new welding machine will be cost effective if it runs less than 2 hours or more than 5.5 hours per day.

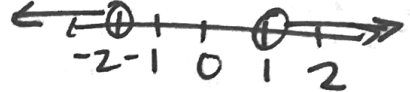


$x < 2$ or $x > 5.5$

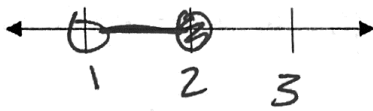
16. Which compound inequality has no solution?

- A. $x > 1$ OR $x < -2$ ✓
 B. $x < 1$ AND $x > -2$ ✓

- C. $x < 1$ OR $x < -2$
 D. $x > 1$ AND $x < -2$



17. Solve and graph the compound inequality: $10 < 3x + 7 \leq 13$



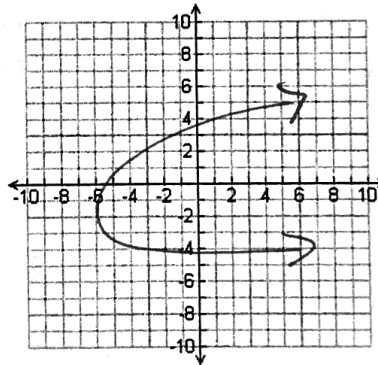
$3 < 3x \leq 6$
 $\frac{3}{3} \frac{3x}{3} \leq \frac{6}{3}$
 $1 < x \leq 2$

Functions

18. Create a table for a function.

19. Create a graph that is not a function.

x	y
1	5
2	-8
3	12
1	5
7	-8

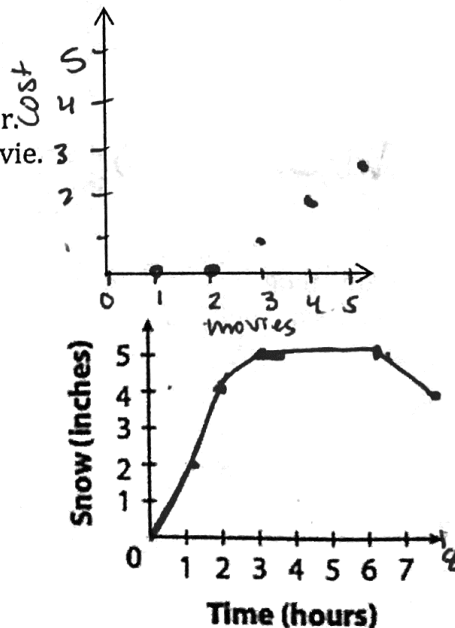


20. Create a Graph for this situation:

You get two movies free from Blockbuster. Then you get charged a fixed rate per movie.

$X =$ number of movies

$Y =$ the total money spent in dollars



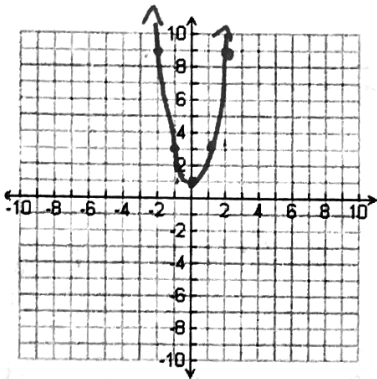
21. Create a Graph for this situation:

At the start of a snowstorm, it snowed two inches an hour for two hours, then slowed to one inch an hour for an additional hour before stopping. Three hours after the snow stopped, it began to melt at one-half an inch an hour for two hours.

For 22 and 23, make a table of values and use these values to graph the function.

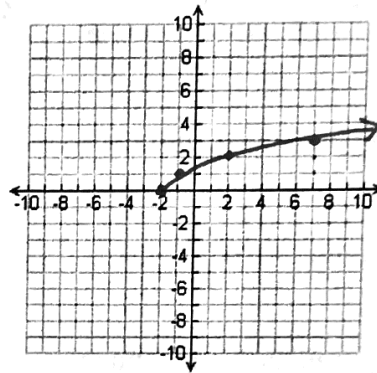
22. $b(x) = 2x^2 + 1$

x	b(x)
-2	9
-1	3
0	1
1	3
2	9



23. $f(x) = \sqrt{x+2}$

x	f(x)
-2	0
-1	1
2	2
7	3

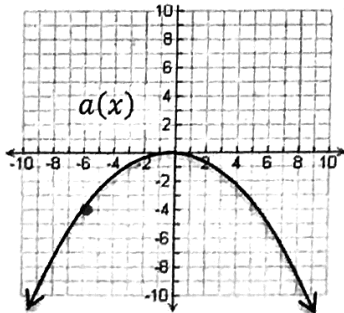


24. You put a yam in the oven. After 45 minutes, you take it out. Let $f(t)$ be the temperature of the yam t minutes after you placed it in the oven.

- a. What does $f(0) = 65$ mean in terms of the situation? *at the beginning the yams are 65°*
- b. What does $f(5) < f(10)$ mean in terms of the situation? *the yams are hotter after being in the oven for 10 minutes than 5 minutes*
- c. What does $f(40) = f(45)$ mean in terms of the situation? *the yams are hot at 40 minutes and 45 minutes at the same temperature.*

25. Which is greater, $a(-6)$ or $b(-6)$?

$b(x) = |x - 3| + 2$



26.

$$a(-6) = -4$$

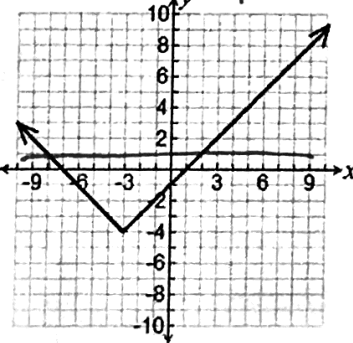
$$b(-6) = |-6 - 3| + 2$$

$$= |-9| + 2$$

$$= 9 + 2$$

$$= 11$$

$b(-6) > a(-6)$



Domain: $x \in \mathbb{R}$

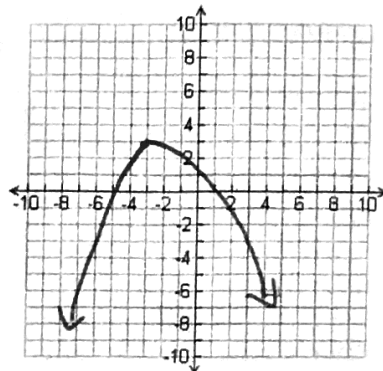
Range: $y \geq 2$

Increasing interval: $-3 < x < \infty$

Decreasing interval: $-\infty < x < -3$

$f(x) = 1$ what does x equal? $x = -8$ and $x = 2$

27. Draw a graph that is increasing then decreasing and has a domain of all real numbers and a range of $y \leq 3$



8. A car can travel 30 miles on a gallon of gas and has a 20 gallon gas tank. Let g be the number of gallons of gas the car has in its tank. The function $d = 30g$ gives the distance d in miles that the car travels on g gallons.

a. Is this a continuous or discrete situation? Why?

Continuous because you can have a fraction of a gallon and go a fraction of a mile.

b. What are reasonable values for the domain and range of the situation?

$$D: 0 \leq g \leq 20$$

$$R: 0 \leq d \leq 600$$

c. How far can the car travel on 12 gallons of gas?

$$d = 30(12) = 360 \text{ miles}$$

29. The population P (in thousands) of Hope City, from 2001 to 2007 is

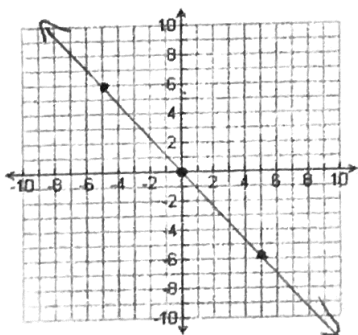
Year	2001	2003	2005	2007
P	739	802	893	947

Find the average rate of change from 2001 to 2005.

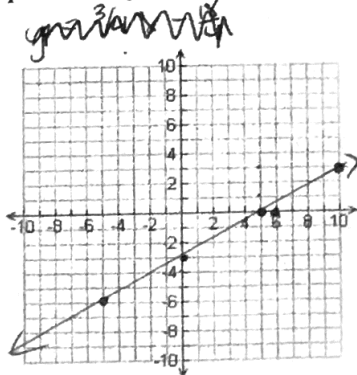
$$\frac{893 - 739}{2005 - 2001} = \frac{154}{4} = 38.5$$

Linear Functions

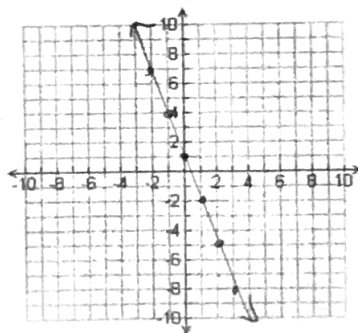
30. Graph: $y = -\frac{6}{5}x$



31. Graph: $3x - 5y = 15$ $y = \frac{3}{5}x - 3$



32. Graph: $y + 2 = -3(x - 1)$ $(1, -2)$



- 33.
- From Store A, the total cost to ship a 5-ounce package is \$4.25, and the total cost to ship a 6-ounce package is \$4.60. Store B charges a flat fee of \$1.50, plus \$0.50 per ounce of ship a package.
 - Which statement is true?

$$\frac{4.60 - 4.25}{6 - 5} = \frac{0.35}{1}$$

\$0.35 per ounce

- A) The flat fee for shipping is \$0.15 more at Store B
- B) The flat fee for shipping is \$1.00 more at Store A
- C) The flat fee for shipping is \$1.15 more at Store B
- D) The flat fee for shipping is \$2.00 more at Store A

$$5 \times 0.35 = 1.75$$

$$4.25 - 1.75 = 2.5$$

34. Find the equation for the line between points $(-2, 4)$ and $(6, 8)$

$$\frac{8-4}{6-(-2)} = \frac{4}{8} = \frac{1}{2} \quad 8 = \frac{1}{2}(6) + b \quad 8 = 3 + b \quad b = 5$$

$$y = \frac{1}{2}x + 5$$

35. Fred has \$10 to spend on turkey and ham for an upcoming dinner. Each pound of turkey costs \$4 and each pound of ham costs \$2.

a. Write an equation representing this situation.

$$4x + 2y = 10$$

b. What is the x-intercept? What does it represent?

$2\frac{1}{2}$, Fred can buy 2.5 lb of turkey and no ham for \$10

c. What is the y-intercept? What does it represent?

5, Fred can buy 5 lb of ham and no turkey for

36. Put each equation in slope intercept form.

a. $2x + 5y = 10$

$$\begin{array}{r} -2x \\ \hline 5y = 10 - 2x \\ \hline y = 2 - \frac{2}{5}x \end{array}$$

$$y = 2 - \frac{2}{5}x$$

b. $y + 2 = -3(x - 2)$

$$\begin{array}{r} y + 2 = -3x + 6 \\ -2 \\ \hline y = -3x + 4 \end{array}$$

$$y = -3x + 4$$

c. $1 - 3x + y = 5x$

$$\begin{array}{r} 1 - 3x + y = 5x \\ +3x \\ \hline y = 8x - 1 \end{array}$$

$$y = 8x - 1$$

37. a. Find the slope. Interpret it in terms of the situation.

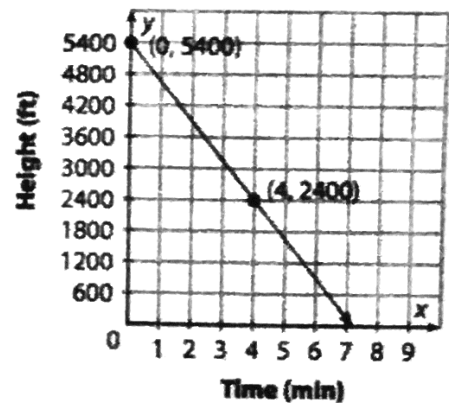
$$\frac{5400 - 2400}{0 - 4} = \frac{3000}{-4} = -750$$

The chair lift goes down 750 ft every minute

b. Find the y intercept. Interpret it in terms of the situation.

$(0, 5400)$ At the start, the chairlift is 5400 ft in the air.

Height of a Chairlift



Linear Inequalities

38. Which point is a solution of the inequality $y > -x + 3$?

A. $(0, 3)$

C. $(-1, 4)$

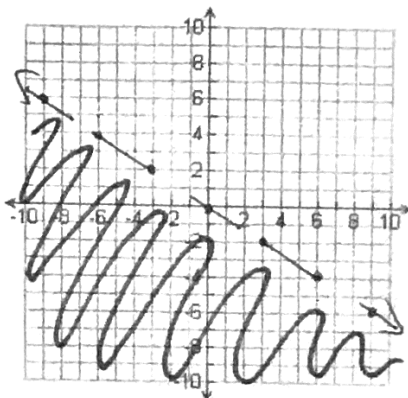
B. $(1, 4)$

D. $(0, -3)$

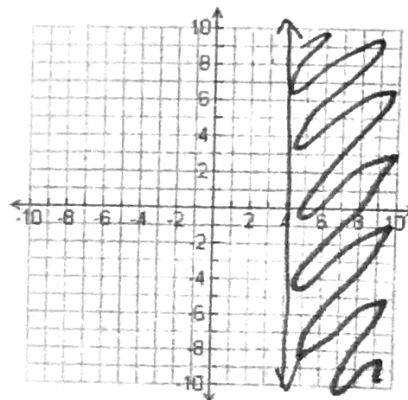
$$4 > -1 + 3$$

$$4 > 2 \quad \checkmark$$

39. Graph: $y < -\frac{2}{3}x$



40. Graph: $x \geq 4$



41. Adam is ordering helium balloons for his sister's birthday. He has up to \$15 to spend. Decorative balloons cost \$3.00 each and solid colored balloons cost \$0.75 each.

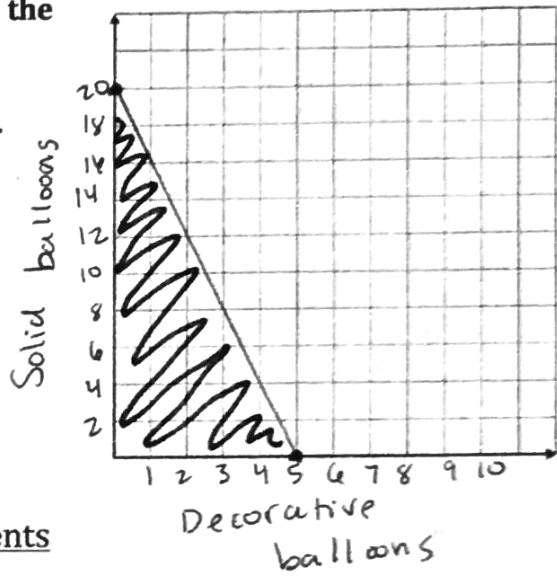
Let x be the number of decorative balloons and y be the number of solid colored balloons that he buys.

- Write an inequality that represents the scenario.
- Graph the solution
- Give two possible combinations

a.) $3x + .75y \leq 15$

b.)

c.) 2 decorative and 10 solid



Exponents

42. $\frac{60b^0b^3a^6e^2}{4a^6e^{-2}}$

$\frac{15b^3a^6e^2e^2}{a^4} = 15b^3e^4$

45. $\frac{(2hj^2k^{-2}h^4j^{-1}k^4)^0}{2h^{-3}j^{-4}k^{-2}}$

$\frac{1}{2h^{-3}j^{-4}k^{-2}} = \frac{h^3j^4k^2}{2}$

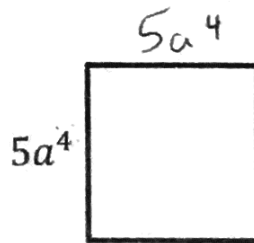
43. $\left(\frac{2c^{-3}a^4}{a^{10}}\right)^2 = \frac{4c^{-6}a^8}{a^{20}}$

$\frac{4}{a^{12}c^6}$

44. $-6^2 \cdot 2^{-2}$

$\frac{-36}{2^2} = \frac{-36}{4} = -9$

46. Find the area of the square:



$5a^4 \cdot 5a^4 = 25a^8$

Exponentials

Write the equation for each chart.

47.

x	f(x)
-2	0
-1	2
0	4
1	6
2	8

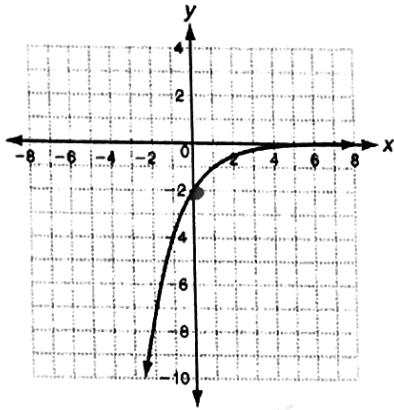
$y = 2x + 4$

48.

x	f(x)
-2	5/9
-1	5/3
0	5
1	15
2	45

$y = 5(3)^x$

49. The graph of which function is shown below?



- A $y = -2(2)^x$ C $y = 2(2)^x$ ✗
 B $y = -2\left(\frac{1}{2}\right)^x$ D $y = 2\left(\frac{1}{2}\right)^x$ ✗

50. What is the domain and range of the graphed function?

D: $x \in \mathbb{R}$

R: $y < 0$

51. The value of a car can be modeled by the function $g(t) = 22500(0.554)^t$, where t is the number of years. Describe what is happening with the value of the car, using both numbers from the function in your explanation.

The car starts at being worth \$22,500.
 Each year the car's worth is depreciating by 44.6%.

52. Suppose 6,700,000 people watch the first episode of "Keeping Up with the Kardashians", but the number of viewers decreases by 3.5% each week.

a. Write an exponential function to model the situation.

$$f(x) = 6,700,000 (.965)^x$$

b. If the pattern continues, how many will watch the season finale, which is ten weeks later?

$$f(10) = 6,700,000 (.965)^{10}$$

$$f(10) = 4,691,891 \text{ people}$$

53. Jane's credit card company charges 20% interest per year, compounded quarterly. If Jane's credit card bill was originally \$775, how much will the bill be after 4 years if she doesn't pay it off? Round your answer to the nearest cent.

$$f(t) = 775 \left(1 + \frac{.2}{4}\right)^{4t}$$

$$f(t) = 775 (1.05)^{4t}$$

$$f(4) = 775 (1.05)^{16}$$

$$f(4) = \$1,691.73$$

Sequences

54. Find the 27th term of the sequence: $a_1 = 4$; $a_n = a_{n-1} + 9$

$$a_n = 4 + 9(n-1)$$

$$a_{27} = 4 + 9(26) = 238$$

$$a_{27} = 238$$

55. Find the first 4 terms of the sequence $f(n) = -2n - 6$

$$f(1) = -2(1) - 6$$

$$f(3) = -12$$

$$f(1) = -8$$

$$f(4) = -14$$

$$f(2) = -2(2) - 6$$

$$-8, -10, -12, -14$$

$$f(2) = -10$$

56. The odometer on a car reads 60,473 on day 1. Every day, the car is driven 54 miles. If this pattern continues, what is the odometer reading on day 20?

$$a_n = 60,473 + 54(n-1)$$

$$a_{20} = 60473 + 54(19)$$

$$a_{20} = 61499 \text{ miles}$$

57. The 60th term of an arithmetic sequence is 106.5 and the common difference is 1.5. Find the explicit and recursive rule for the sequence.

$$a_{60} = 106.5$$

$$d = 1.5$$

$$a_{60} = 1.5(59) + a_1$$

$$106.5 = 1.5(59) + a_1$$

$$106.5 = 88.5 + a_1$$

$$18 = a_1$$

$$R: a_1 = 18$$

$$E: a_n = 18 + 1.5(n-1)$$

$$a_n = a_{n-1} + 1.5$$

$$a_n = 1.5n + 16.5$$

58. The 10th term of a geometric sequence is 20. The common ratio is -0.5. Find the explicit and recursive rule for the sequence.

$$a_{10} = a_1(-0.5)^9$$

$$20 = a_1(-0.5)^9$$

$$-10240 = a_1$$

R:

$$a_1 = -10,240$$

$$a_n = a_{n-1} \cdot (-0.5)$$

E:

$$a_n = -10240(-0.5)^{n-1}$$

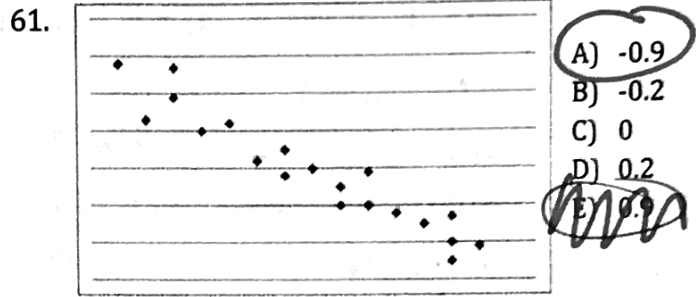
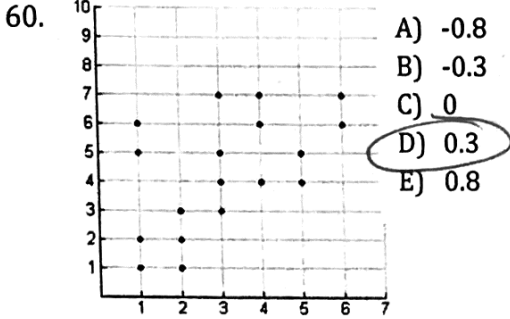
$$a_n = 20480(-0.5)^n$$

Data

59. Describe a situation where you would expect to see a negative correlation in a scatterplot.

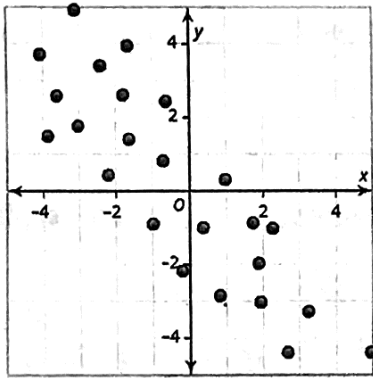
The pages you have left in a book
and the time you spent reading.

For each scatter plot, choose the value of the correlation coefficient "r" that most matches the scatter plot.



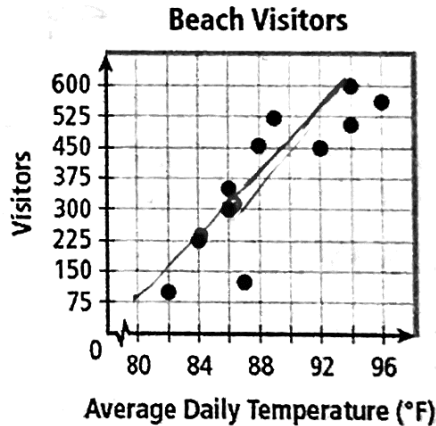
62. Which of these would be the most appropriate line of best fit for the scatter plot?

- A. $y = x + 0.3$ ✗ B. $y = -\frac{1}{3}x$ ✗
C. $y = -x - 0.3$ D. $y = -3x - 1$ ✗



63. The scatter plot compares the average daily temperature on a given day with the number of beach visitors. About how much does the number of visitors increase per degree Fahrenheit?

- A. 15 visitors per °F B. 60 visitors per °F
C. 40 visitors per °F D. 5 visitors per °F



64. The line of best fit below represents the relationship between a student studying x hours and their GPA (y). What does the slope represent in the context of the situation?

What does the y-intercept represent?

$$y = 0.2x + 1.75$$

y int \Rightarrow if they do not study they will have a 1.75 GPA.

Slope \Rightarrow for each hour they study their GPA will increase by .2 points

65. Describe a few good strategies for multiple choice tests.

\rightarrow try to answer the question before looking at the answers

\rightarrow check other solutions to see if they are wrong.