

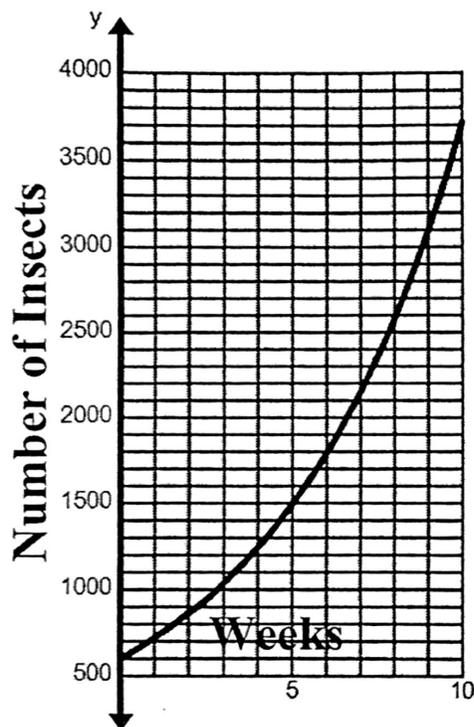
1. Use the table of a linear function to find the rate of change and y-intercept.

$$\text{Rate of change} = \frac{23 \text{ bounces}}{1 \text{ min}}$$

$$\text{y-intercept} = (0, 4)$$

| Minutes | Bounces |
|---------|---------|
| 0 | 4 |
| 1 | 27 |
| 2 | 50 |
| 3 | 73 |

Use the graph below to answer questions 2-4:



2. Find the average rate of change over the interval $[0, 3]$.

$$\frac{150 \text{ insects}}{1 \text{ week}}$$

3. Find the average rate of change over the interval $[0, 9]$.

$$\frac{800 \text{ insects}}{3 \text{ weeks}} = \frac{266.6 \text{ insects}}{1 \text{ week}}$$

4. Are the following statements true or false?

A. The insects are dying away.

False

B. The number of insects is getting bigger at a faster and faster rate.

True

C. The number of insects increased faster early on and slowed down as time passed.

False

D. The number of insects increased slowly early on and got faster as time passed.

True

E. The rate that the insects are growing is not a constant rate.

true

The table on the right shows how much money someone has as they withdraw a certain percent each month.

| Years | Money |
|-------|---------|
| 0 | 2000 |
| 2 | 1920.80 |
| 4 | 1844.74 |
| 5 | 1807.84 |
| 8 | 1701.53 |

5. What is the average rate of change over the interval $[0, 4]$?

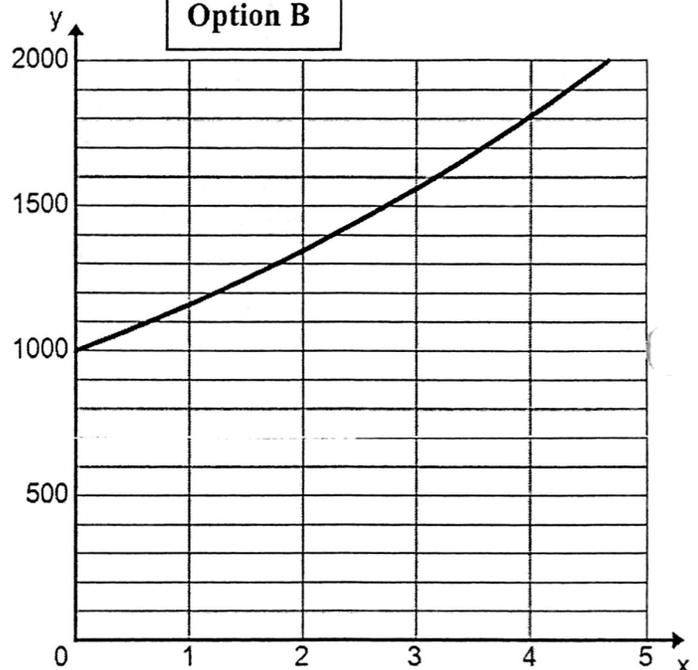
$$\frac{-\$38.82}{1 \text{ year}}$$

The following graph and table represent two different investments. Use them to answer the questions that follow.

Option A

| Years | Investment Worth |
|-------|------------------|
| 0 | \$600 |
| 1 | \$950 |
| 2 | \$1300 |
| 3 | \$1650 |
| 5 | \$2350 |

Option B



6. Which investment would be worth more at year 2?

option B

7. What is the average rate of change over the interval $[0, 4]$ for both investments?

$$\text{option A: } \frac{\$350}{1 \text{ year}}$$

$$\text{option B: } \frac{\$200}{1 \text{ year}}$$

8. Which investment follows a linear growth pattern? Which one follows an exponential growth pattern?

option A

option B

Use the following functions to answer the next two questions.

$$f(x) = 12x$$

$$g(x) = 4^x$$

9. Fill in the blank with the appropriate symbol (<, >, =).

Average rate of change of $f(x)$ over $[0, 2]$



Average rate of change of $g(x)$ over $[0, 2]$

10. Fill in the blank with the appropriate symbol (<, >, =).

Average rate of change of $f(x)$ over $[3, 6]$



Average rate of change of $g(x)$ over $[3, 6]$

Show your work here for calculating the Average Rates of Change in 9 and 10...

Solve the inequality.

11. $5(m+1) \leq 25$

$$m \leq 4$$

12. $9 - 3n > -2(n - 3)$

$$n < 3$$

13. ~~...~~
 $-2h - 9 \leq -4(h+3) + 4$

$$h \leq \frac{1}{2}$$

14. $\frac{m}{3} + 10 \leq 3$

$$m \leq -21$$

15. The following two way table shows the number of people who rent an apartment or own a home, and whether they own a pet or not.

| | Rent | Own | Total |
|--------|------|-----|-------|
| Pet | 10 | 35 | 45 |
| No Pet | 23 | 27 | 50 |
| Total | 33 | 62 | |

- a. What percent of people that do not own a pet do own a home.

$$\frac{27}{50} = .54 = 54\%$$

- b. What percent of renters own a pet?

$$\frac{10}{33} = .30 = 30.30\%$$

- c. What percent of pet owners own a home?

$$\frac{35}{45} = .77 = 77.7\%$$

- d. What percent of homeowners also own a pet?

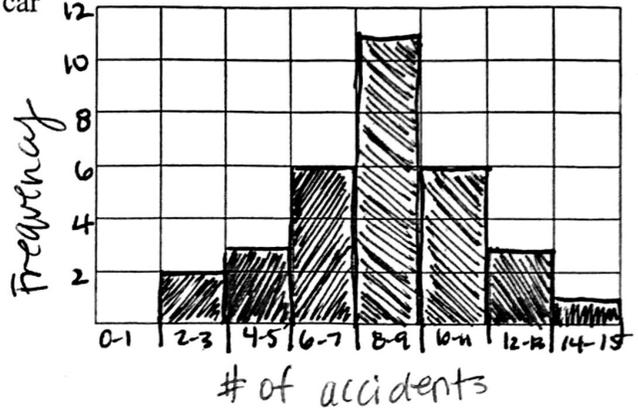
$$\frac{35}{62} \approx .56 = 56\%$$

- e. Is there a stronger correlation between homeowners who own pets, or pet owners who own a home?

16. The following data shows the number of fatalities from car accidents per 100,000 people in different states.

a. Make a **histogram**. Use an interval of two. Make sure you label your diagram. You might find it helpful to make a frequency table.

3, 3, 4, 5, 5, 6, 6, 7, 7, 7, 7, 8, 8, 8, 8, 8, 8, 9, 9, 9, 9, 9, 9, 10, 10, 10, 11, 11, 11, 12, 12, 13, 14



b. Is it symmetric or skewed (what is the distribution)?

Symmetric or Normal distribution

c. Describe the median, mean, and standard deviation.

\downarrow \downarrow \downarrow
 8.5 8.375 2.68

d. If two more states responded to the survey and the mean increased, but the median did not, what are two potential responses for those states?

1 # 8 or lower

1 # way high to raise the mean

17. Eugene is keeping track of the calories in each snack he eats. His results are listed below. He records the number of calories in each snack for a week.

100, 110, 90, 290, 311, 450, 175, 90, 85, 110, 300, 850, 300, 150, 400, 180, 350, 240, 70, 100, 250

a. Check for outliers. Show your work.

No outliers

b. Calculate the five number summary.

min: 11
 Q₁: 17
 med: 23.5
 Q₃: 52
 max: 65

c. Make a **box-and-whisker plot** of the data.



d. Is it symmetric or skewed (what is the distribution)?

skew right

e. Compare the mean to the median.

$\bar{x} = 33.4$ med = 23.5

f. What is fair assumption you can make about Eugene's diet based on the data and your box and whisker plot?

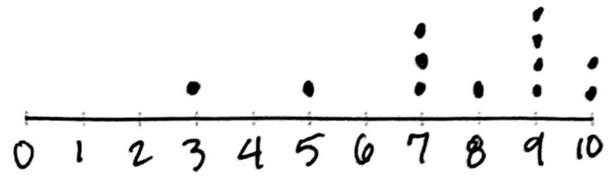
*answers

may vary *

• 50% of his snacks were 23.5 calories or less.
 • 50% of his snacks were 23.5 - 65 calories.

18. The following data shows Quiz Scores for Class A.
9, 5, 3, 7, 7, 9, 9, 9, 7, 8, 10, 10

- a. Make a dot plot for the quiz scores.
b. Describe any gaps, clusters, and outliers



• Data is clustered on the right hand side.
• gaps @ 4 & 6

19. The table shows the milligrams of caffeine per serving in certain types of tea. Calculate the standard deviation.

| Amount of Caffeine In Tea (milligrams) | | | | |
|--|----|----|----|----|
| 9 | 46 | 18 | 35 | 30 |
| 12 | 56 | 24 | 38 | 32 |

$\sigma = 14.04$

20. The table shows the milligrams of caffeine per serving in certain types of coffee. Calculate the standard deviation.

| Amount of Caffeine In Coffee (milligrams) | | |
|---|-----|-----|
| 145 | 170 | 150 |
| 90 | 100 | 100 |
| 165 | 135 | 106 |

$\sigma = 28.76$

21. Ninety customers in a music store were asked whether they liked Country or not and whether they liked Rap or not. Out of 30 customers that liked Rap, 25 also liked Country. There were 44 customers that didn't like either Rap or Country.

- a. Construct a two-way table summarizing the data.

| Like | Like Country | Dislike Country | Totals |
|-------------|--------------|-----------------|--------|
| Rap | 25 | 5 | 30 |
| Dislike Rap | 16 | 44 | 60 |
| Totals | 41 | 49 | 90 |

- b. Mark the following statements as true or false.

F A customer is more likely to like rap than country.

T If a customer were selected randomly, he or she is more likely to like Rap, but not Country, than to like Country, but not Rap.

F 28% of people that like Rap also like Country.

T 61% of people that like Country also like Rap.

22. The table shows the percent of Americans with a high speed internet connection in their home.

| Age | 25 | 30 | 35 | 40 | 45 | 50 |
|---------|----|----|----|----|----|----|
| Percent | 40 | 42 | 36 | 35 | 36 | 32 |

- a. Use your graphing calculator to calculate the regression line and the correlation coefficient.

$y = -.34x + 49.48$ & $r = -.88$

- b. Describe the correlation.

Negative & Strong

- c. According to the model, estimate how many 20 year olds have a high speed connection.

about 42.68 20 year olds have high speed connection.

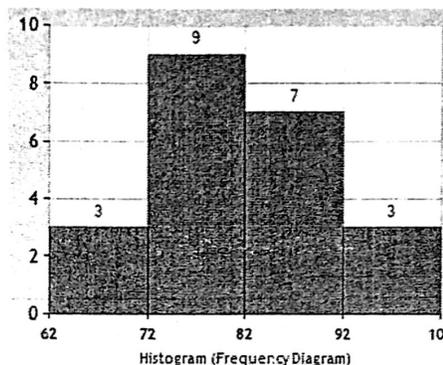
23. The table gives the sales of a clothing chain since 2004. Let x be the number of years since 2004.

| Year | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|-----------------------------|------|------|------|------|------|------|------|
| Sales (Millions of Dollars) | 6.84 | 7.6 | 10.9 | 15.4 | 17.6 | 21.2 | 26.5 |

- a. Use your graphing calculator to calculate the regression line and the correlation coefficient.
 $y = 3.32x + 5.20$ & $r = .99$
- b. Describe the correlation.
 Positive & very strong
- c. Use the model to estimate the sales in 2020.
 about 58.27 million dollars
- d. According to your model, about how many more millions of dollars of sales are there each year?
 about 3.32 million more dollars each year

24. Match the histogram to the correct data set.

- A. 62, 63, 65, 72, 73, 75, 75, 76, 76, 79, 81, 81, 82, 83, 84, 85, 85, 90, 94, 94, 95, 100
- B. 62, 63, 65, 71, 73, 75, 75, 76, 76, 79, 81, 81, 82, 83, 84, 85, 85, 90, 91, 94, 95, 100
- C. 62, 63, 65, 72, 73, 75, 75, 76, 76, 79, 81, 81, 82, 83, 84, 85, 85, 90, 91, 94, 95, 100
- D. 62, 63, 65, 72, 73, 75, 75, 76, 76, 79, 81, 82, 82, 83, 84, 85, 85, 90, 91, 94, 95, 100



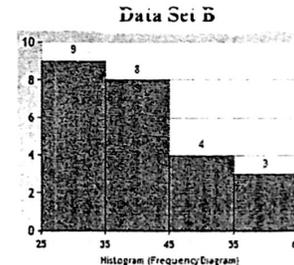
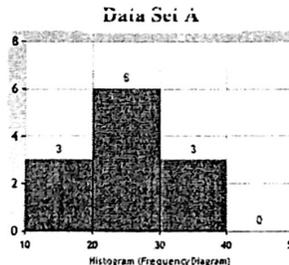
25. What's the lowest value that x can be so that it is an outlier in the following data set?

3, 4, 6, 10, 11, 14, 15, 15, 16, 18, 18, 19, x

- A. 28 B. 29 C. 33 D. 34

26. Which of the following is true about the data sets associated with the following histograms?

- A. Data Set A has the greater standard deviation and the greater mean.
- B. Data Set B has the greater standard deviation, but the lesser mean.



- C. Data Set A has the lesser standard deviation and the lesser mean.
- D. Data Set B has the lesser standard deviation, but the greater mean.

27. Describe how you determined which data set in number 30 had the greatest mean.

set B had greater #5 in its data set so it must have the higher mean.

28. Describe how you determined which data set in number 30 had the greatest standard deviation.

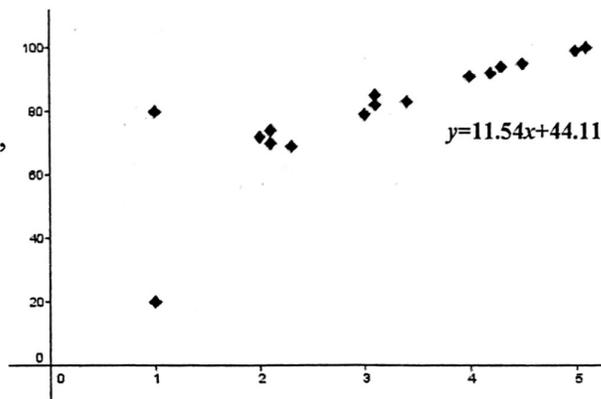
All of the data in Set A was within a range of 30 whereas set B was within a range of 40.

29. Match the following descriptions with the right correlation coefficient.

- Strong Positive Correlation **D**
- Very Weak Positive Correlation **C**
- Weak Negative Correlation **A**
- Strong Negative Correlation **B**

- A. -0.25
- B. -0.8
- C. 0.1
- D. 0.9

30. You conduct a survey asking students how many hours they studied for a test (x), and how well they scored on the test (y). The scatter plot is shown, as well as the regression line. According to the equation, what would you expect who studied for one hour to score on the test?



- A. 20%
- B. 50%
- (B)** 56%
- D. 80%

Find the distance between each pair of points. Give your answer as a simplified radical and as a decimal rounded to the hundredths place.

35. P(3, 4), Q(7, 2)

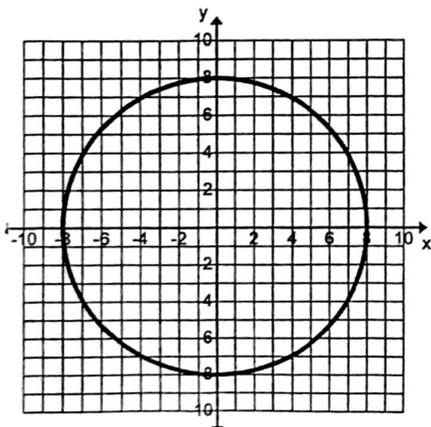
$$\sqrt{20} = 2\sqrt{5} \approx 4.47$$

36. M(-3, 8), N(-5, 1)

$$\sqrt{53} \approx 7.28$$

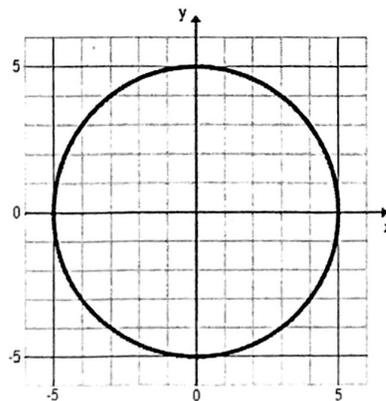
37. The following circles are both centered at the origin. You will be told one coordinate that is on the circle. Determine and prove whether the second coordinate is located on the circle or not.

- a. (8, 0) is on the circle.
- Is (-7, 4) on the circle?



No

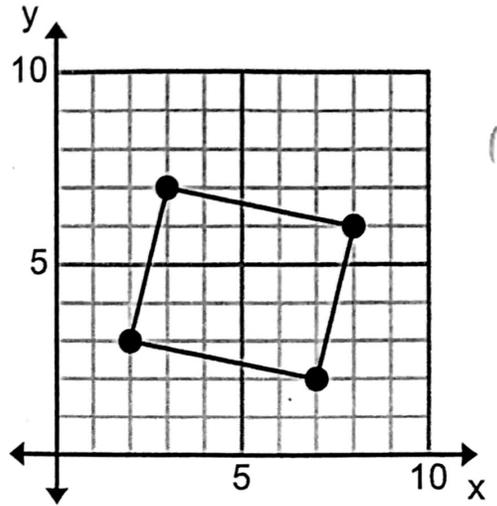
- b. (5, 0) is on the circle.
- Is (4, 3) on the circle?



Yes

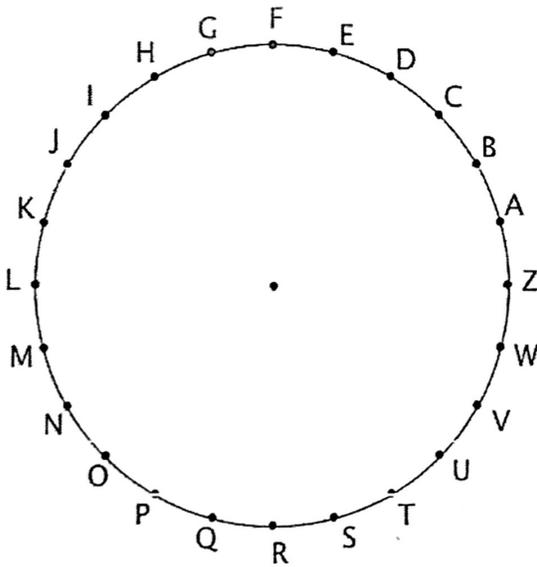
38. What type of polygon is shown here? Explain what characteristics you checked to make your conclusion

Parallelogram



- opposite sides have the same slope
 $\frac{4}{1} \neq -\frac{1}{5}$
- NO right angles because consecutive sides are NOT \perp . $\frac{4}{1} \neq -\frac{1}{5}$ are NOT \perp .
- opposite sides are congruent.
 long sides = $\sqrt{20}$ units
 short sides = $\sqrt{17}$ units

Use the circle to answer the following questions



39. What points could you connect in order to inscribe a square inside the circle?

Any dots that are 6 apart

40. What points could you connect in order to inscribe a regular hexagon inside the circle?

Any dots that are 4 apart