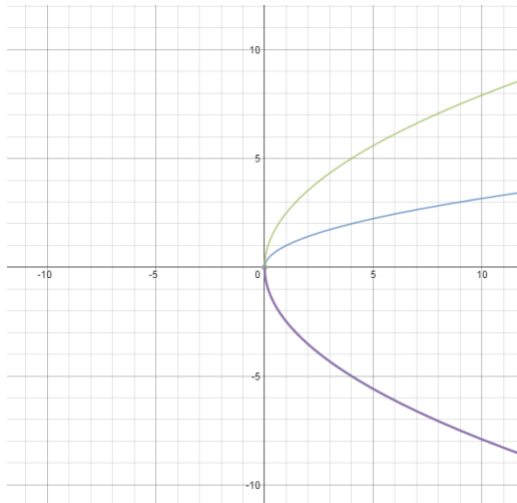


## 11.1 Graphs of Square Root Functions

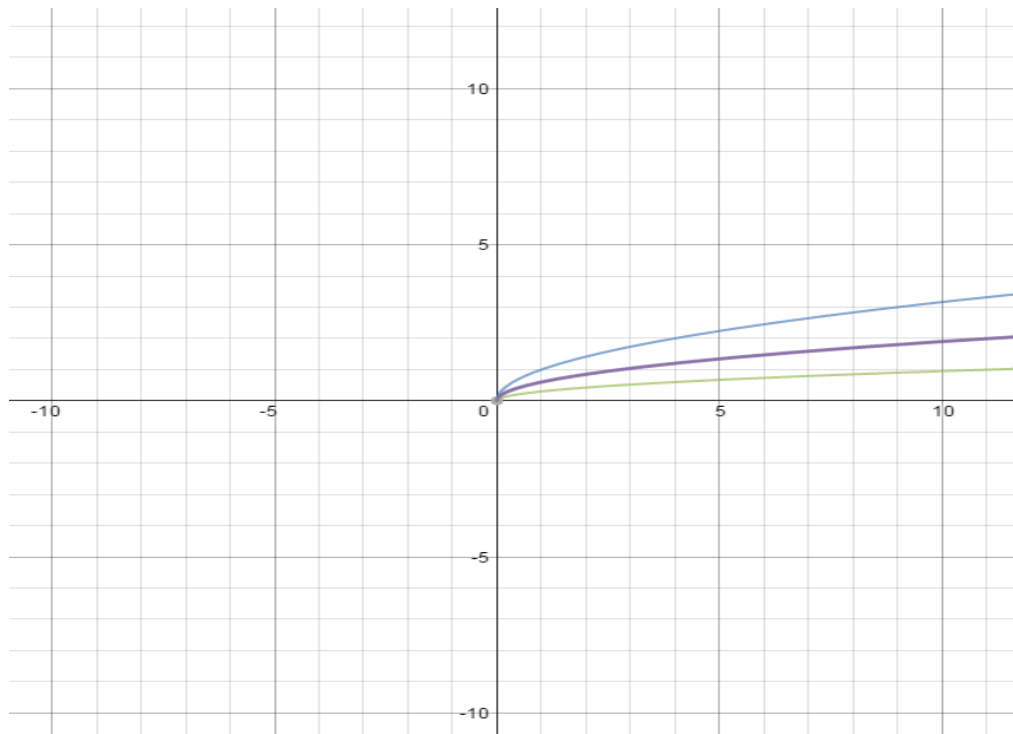
---

### Answers

1. You can't get a real root from a negative number
2. Domain:  $[0, \infty)$ , Range:  $[0, \infty)$
3.  $(2, 0)$
4.  $(-4, 6)$
5.  $(1, -1)$
6.  $(0, 3)$
7.  $(0, 4)$
- 8.



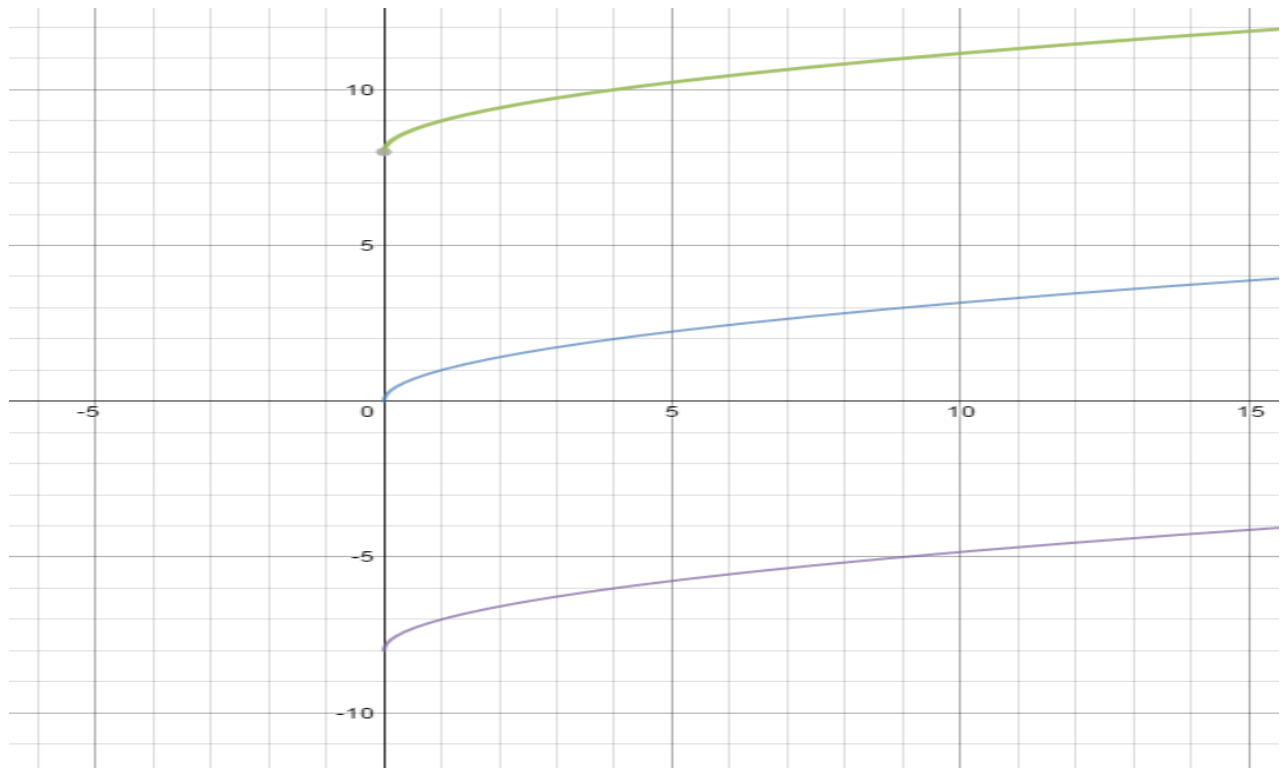
9.



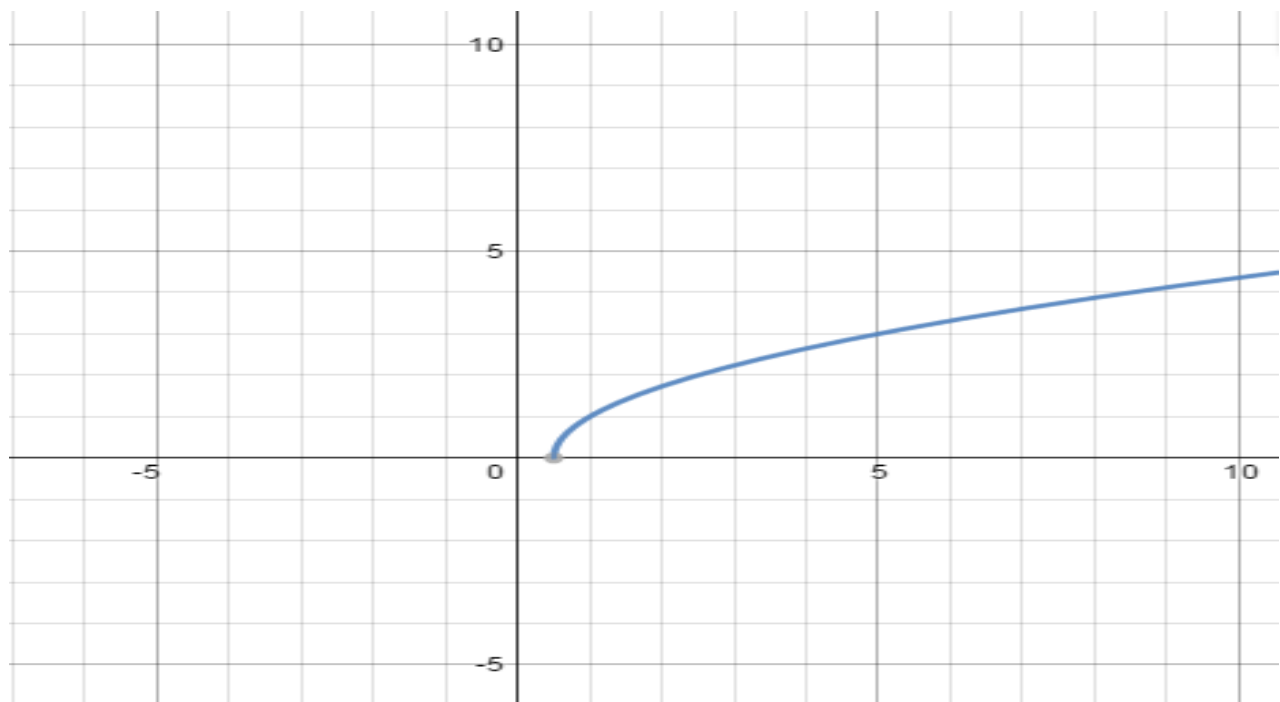
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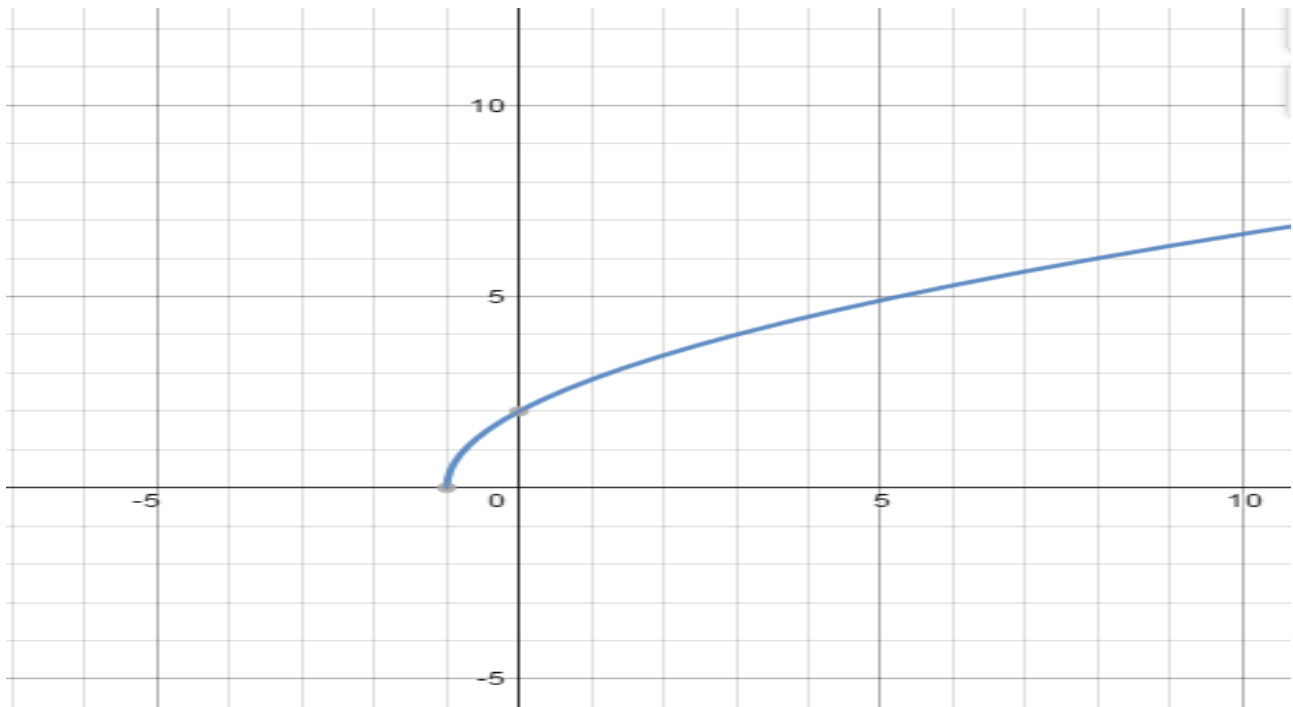
11.



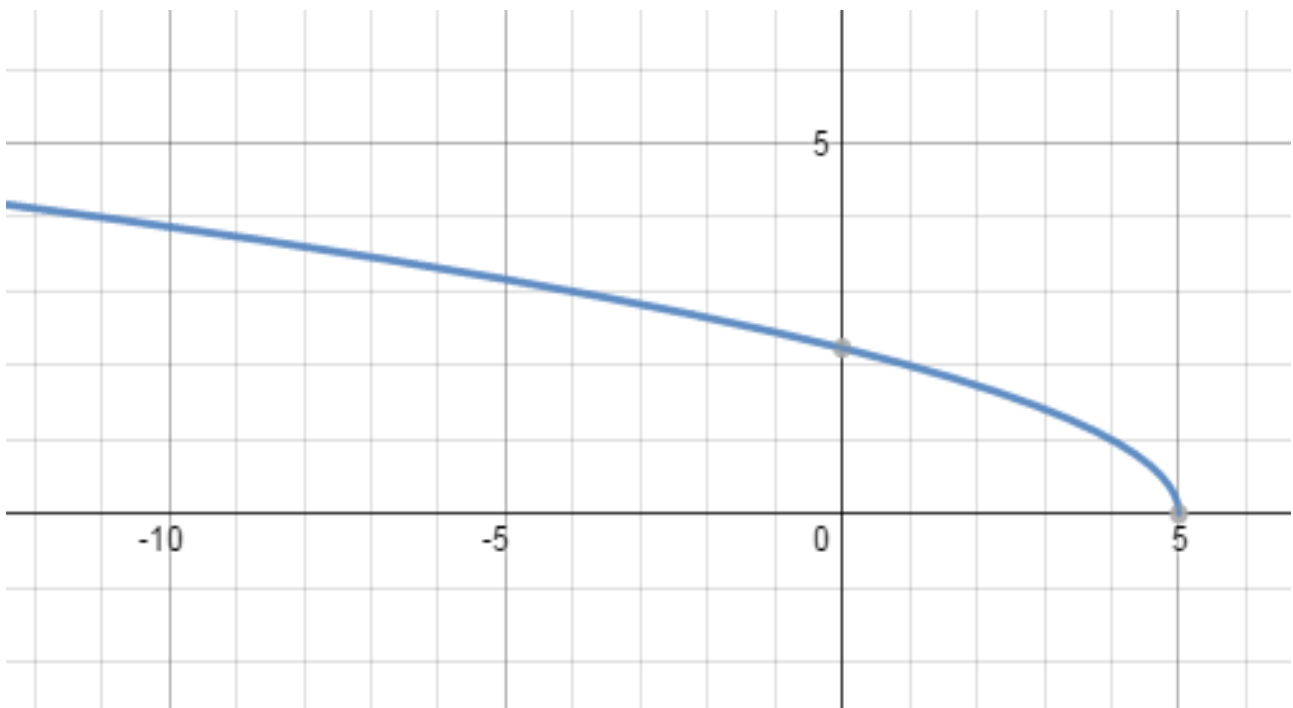
12.



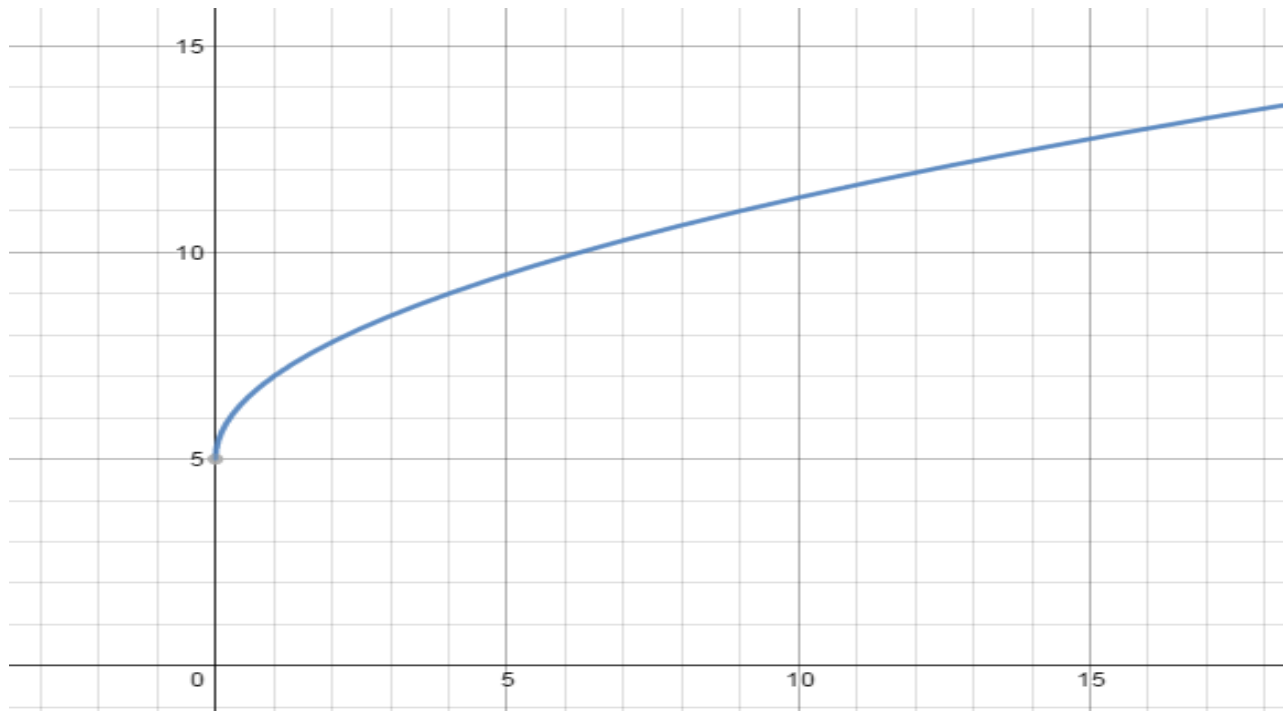
13.



14.



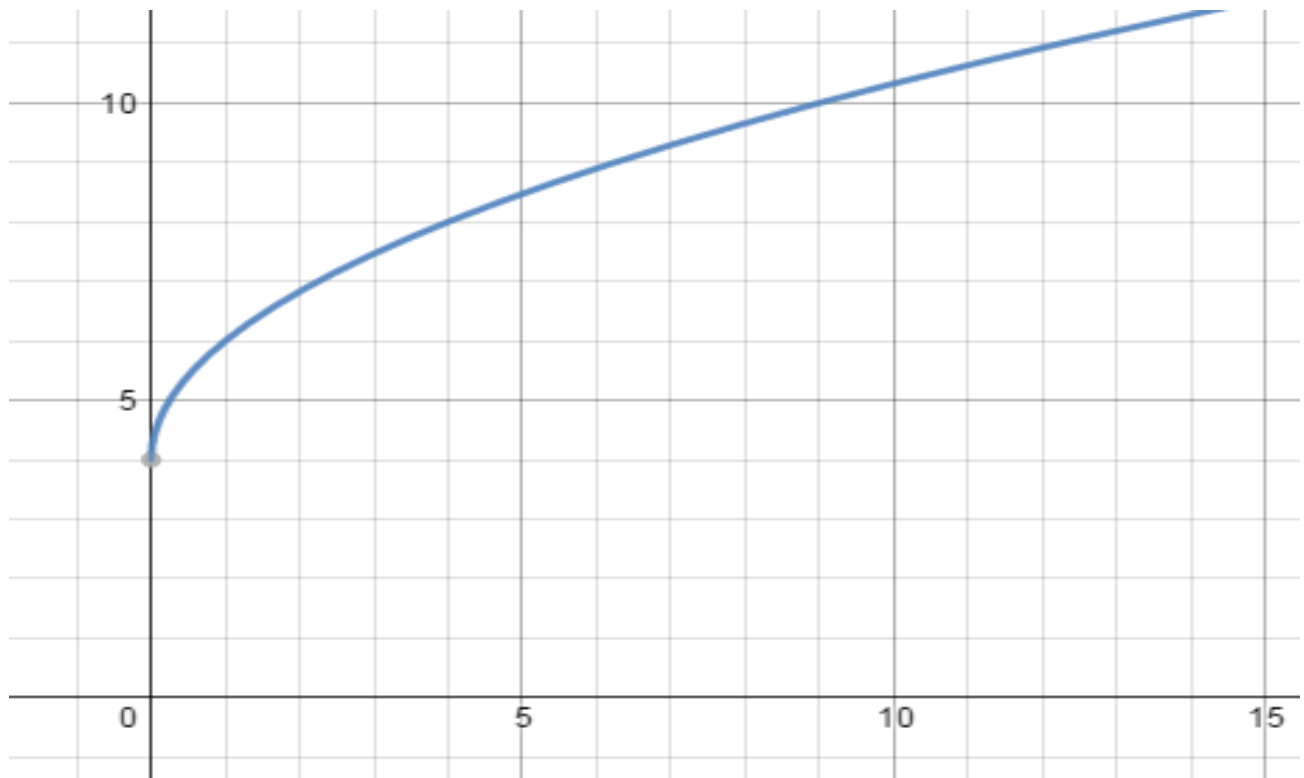
15.



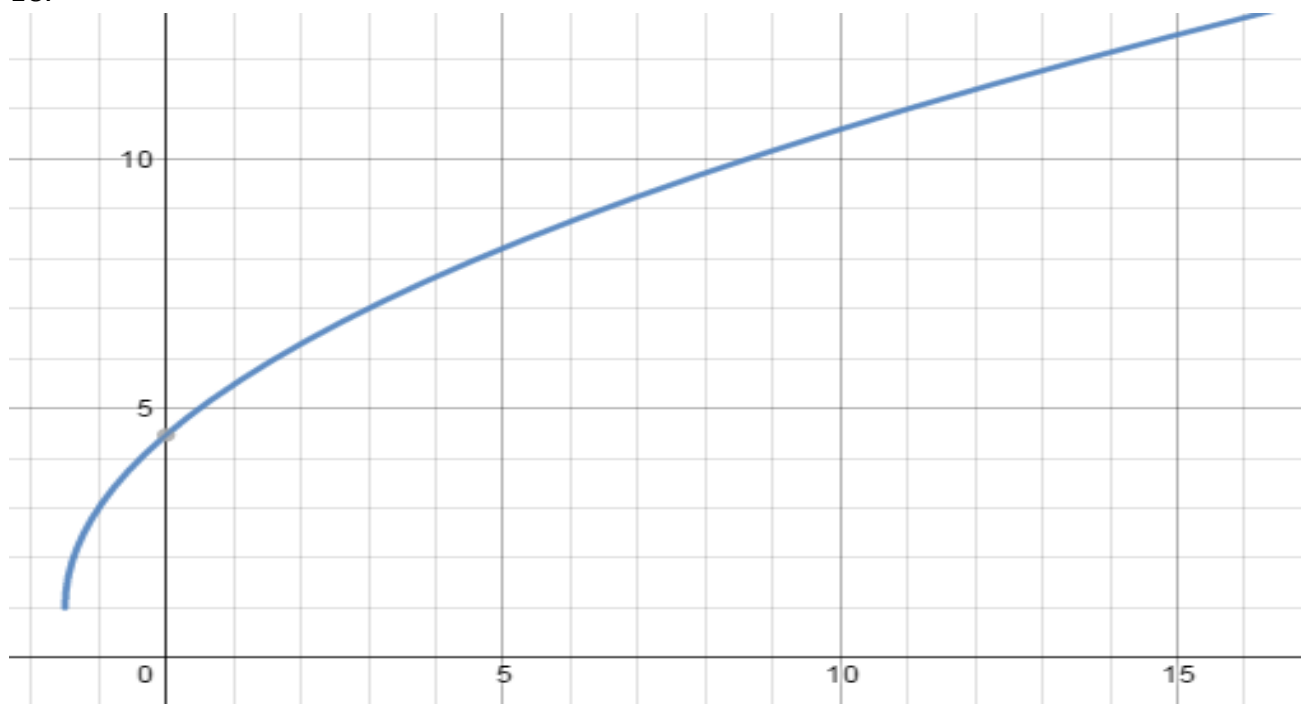
16.



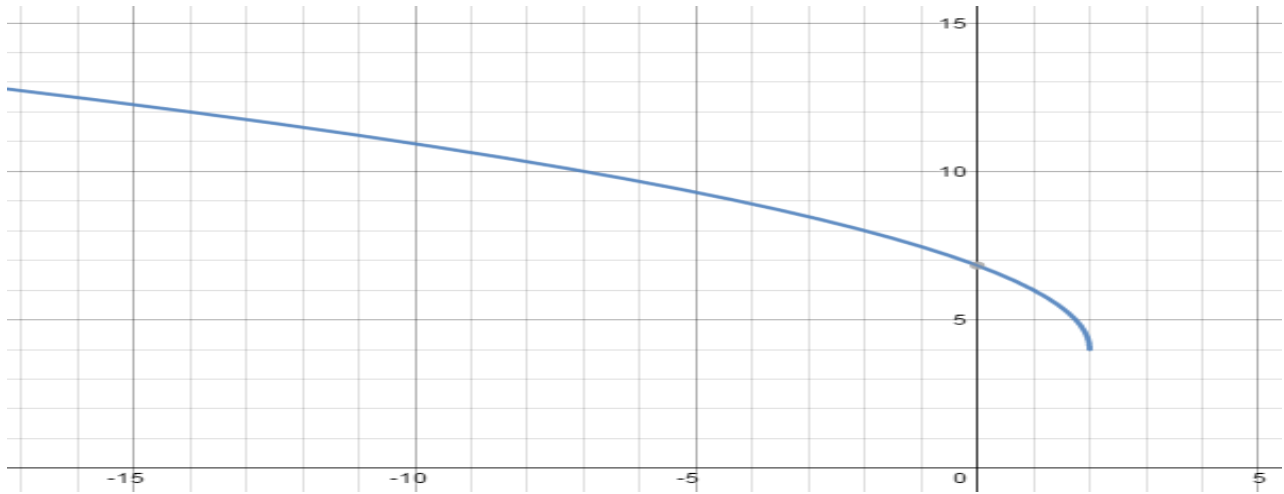
17.



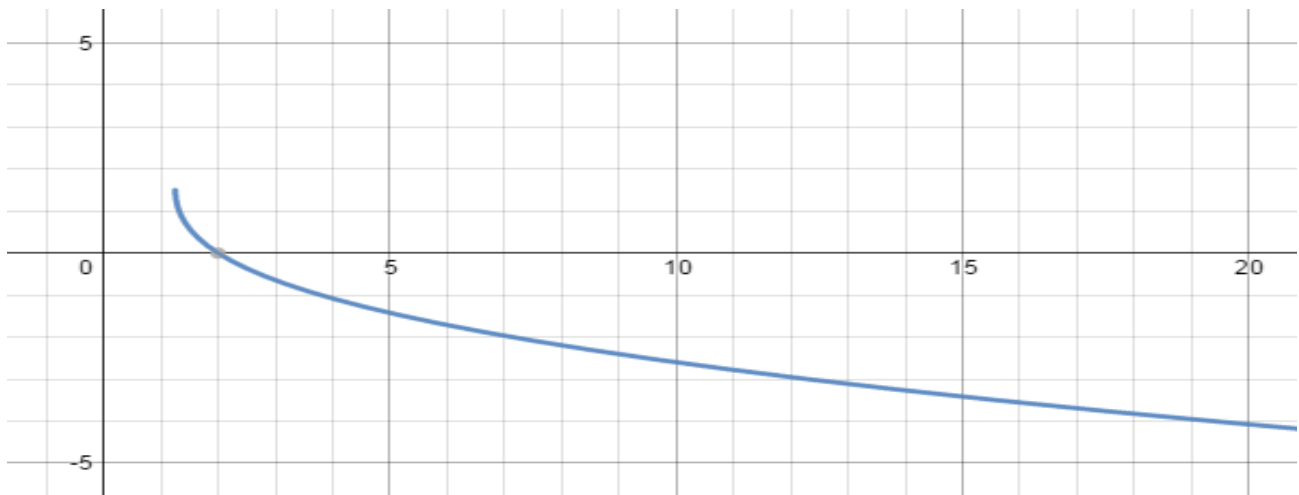
18.



19.



20.



21. About 53 feet less

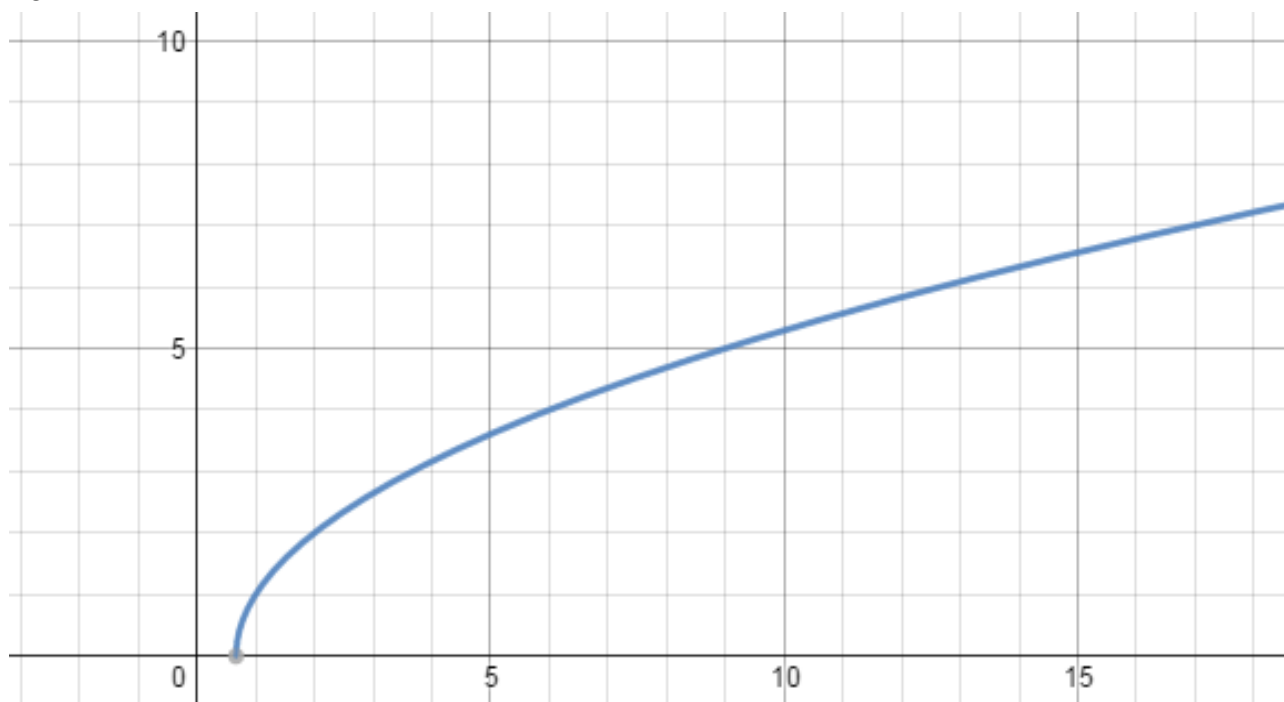
22. The pendulum is about 3.24 ft long

23. The pendulum is about 4.052 m long

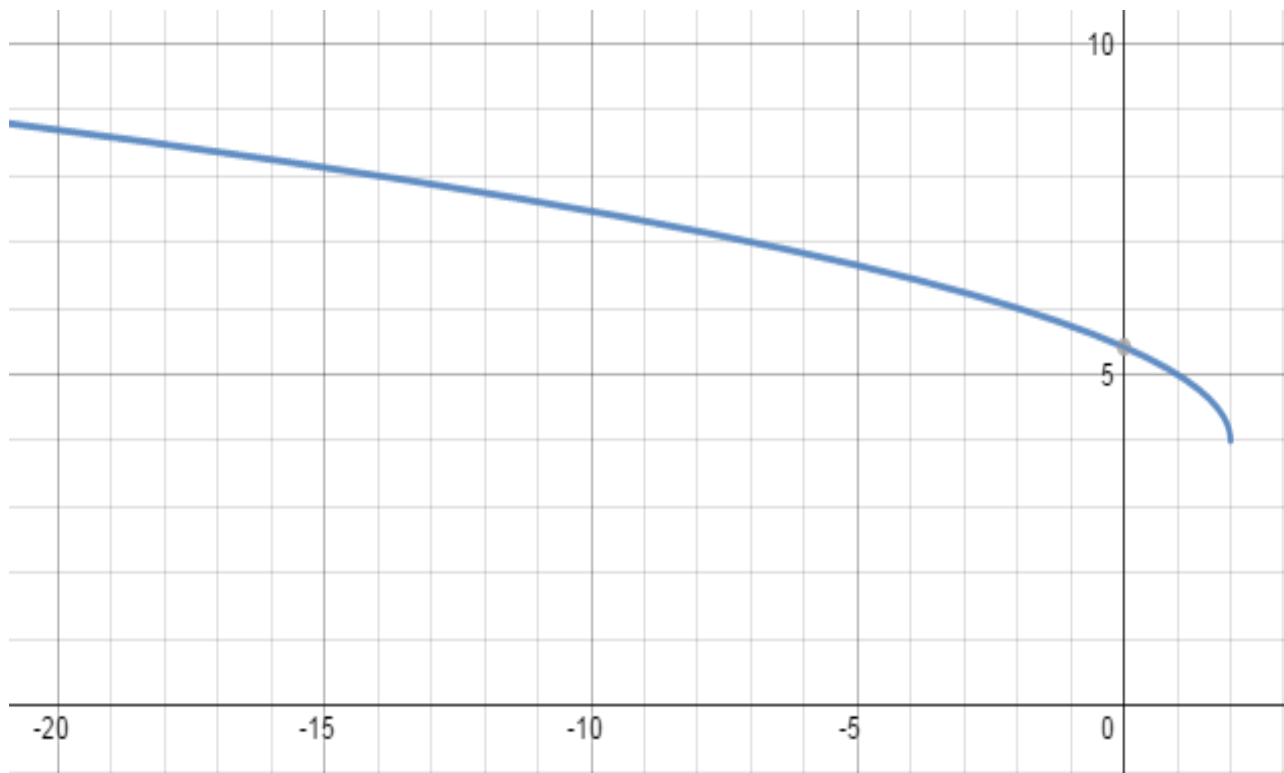
24. The length of the pendulum is about 0.8412 m

25. In Helsinki: 15.935, in Los Angeles: 15.898, in Mexico City: 15.869 meters

26.

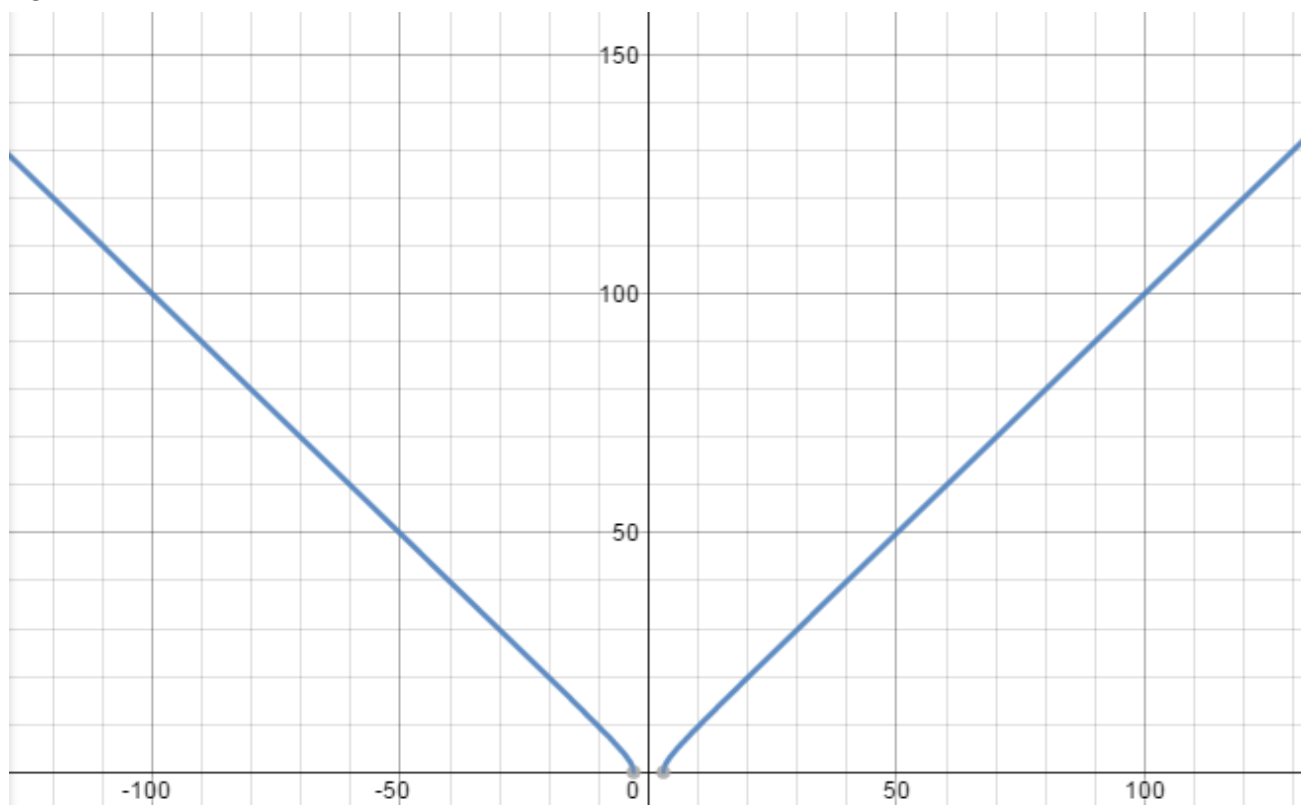


27.

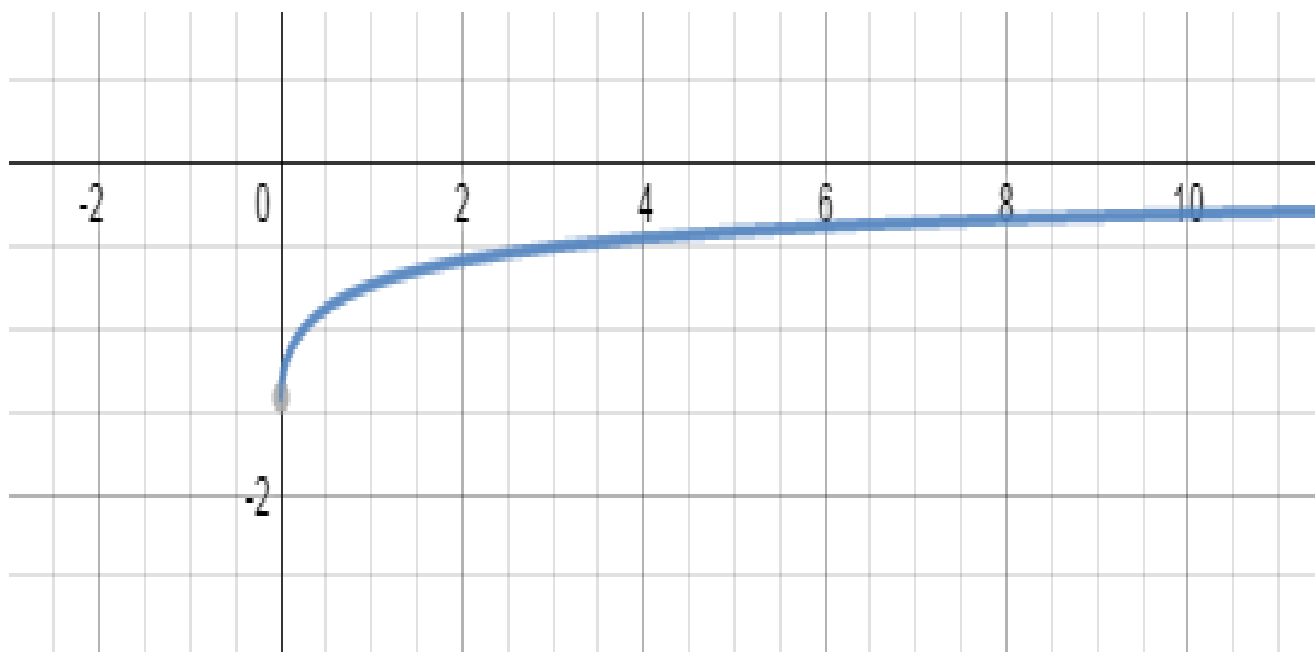




28.



29.



## 11.2 Simplification of Radical Expressions

---

### Answers

1. When  $n$  is an even whole number

2. 13

3. 3

4. -5

5. 4

6.  $14^{\frac{1}{3}}$

7.  $(zw)^{\frac{1}{4}}$

8.  $a^{\frac{1}{2}}$

9.  $y^{\frac{3}{9}} = y^{\frac{1}{3}}$

10.  $2\sqrt{6}$

11.  $10\sqrt{3}$

12.  $2^5\sqrt{3}$

13.  $\frac{4\sqrt{15}}{9\sqrt{7}}$

14.  $5^3\sqrt{4}$

15.  $2x^3\sqrt{x}$

### 11.3 Addition and Subtraction of Radicals

---

**Answers**

1.  $2ab^2\sqrt[3]{6b}$

2.  $\frac{2x\sqrt[3]{2x^2}}{3y\sqrt[3]{5y}}$

3. False:  $\left(5^{\frac{1}{7}}\right)\left(6^{\frac{1}{6}}\right) = 30^{\frac{13}{42}} = \sqrt[42]{30^{13}}$

4.  $-18\sqrt{2}$

5.  $60\sqrt{5}$

6.  $\sqrt{3}(9 + 7\sqrt{2})$

7.  $-26\sqrt{2}\left(x^{\frac{3}{2}}\right)$

8.  $7\sqrt{3a}$

9.  $5x\sqrt[3]{4}$

10. \$721.16

## 11.4 Multiplication and Division of Radicals

---

### Answers

1.  $4\sqrt{3} + 2\sqrt{15}$

2.  $a + b$

3.  $4x + 20\sqrt{x} + 25$

4.  $\frac{7\sqrt{15}}{15}$

5.  $\frac{9\sqrt{10}}{10}$

6.  $\frac{2\sqrt{5}}{5}$

7.  $\frac{\sqrt{15}}{3y}$

8. Radius  $\approx 6.1$  cm

9. The frame is 1.5 inches wide

10. Radius is 3.0456 cm

## 11.5 Radical Equations

---

### Answers

1.  $x = 6$

2.  $x = \frac{26}{3}$

3. No solutions ( $x = \frac{7}{12}$  is extraneous)

4.  $x = 4$

5.  $x = \{-5, 5\}$

6.  $x = 5$

7.  $x = 9$  ( $x = 4$  is extraneous)

8.  $x = \{-4, 9\}$

9. No solutions ( $x = -\frac{3}{2}$  is extraneous)

10.  $x = -2$  ( $x = -5$  is extraneous)

11.  $x = 25$

12. No solutions ( $x = \frac{32}{3}$  is extraneous)

13.  $x = -3$

14.  $x = \{1, 9\}$

15.  $x = \left\{\frac{62}{33}, 2\right\}$

16.  $x = 25$

17. Base =  $2\sqrt{6}$ , height =  $4\sqrt{6}$

18. Area of base =  $1600 \text{ m}^2$

19.  $V_2 = 395.14$

20.  $t = 2.92$

## 11.6 Pythagorean Theorem and its Converse

---

### Answers

1. 3-4-5 right triangle
2. isosceles right triangle
3. 30-60-90 right triangle
4.  $c = 25$
5.  $c = 15$
6.  $b = \sqrt{105} \approx 10.24$
7.  $\sqrt{130} \approx 11.40$
8.  $a = 28$
9.  $b = \sqrt{432} \approx 20.78$
10. Sides are 12, 16, and 20 feet
11. Sides are  $\frac{3+3\sqrt{2}}{2}$ ,  $(6 + 3\sqrt{2})$ ,  $\frac{9+9\sqrt{2}}{2}$

12.  $90\sqrt{2} \approx 127.28$  ft

13. The diagonal  $\approx 23.75$  cm

14. 8 feet

15. Area  $\approx 32.24$  square units

16. The long side is 164 ft

17. The boats are  $\approx 44.82$  mi apart after two hours

18. The area is  $\approx 83.21$  square units

19. The sides are apx: 5.35, 10.7, and 11.96 units

20. The diagonal is apx 17.20 inches

21. The ramp extends apx 9.68 ft



## 11.7 Distance Formula

---

### Answers

1.  $d = \sqrt{(y_1 - y_2)^2 + (x_1 - x_2)^2}$

2.  $d = 14$

3.  $d = 6\sqrt{5}$

4.  $d = \sqrt{53}$

5.  $d = 5$

6.  $d = \sqrt{29}$

7.  $d = 9$

8.  $d = \frac{\sqrt{58}}{2}$

9.  $d = 4\sqrt{10}$

10.  $d = \frac{\sqrt{12658}}{10} \approx 11.25$

11.  $(-4, 8)$  and  $(-4, -4)$

12.  $(-9.75, 3)$  and  $(5.75, 3)$

13.  $d \approx 14.83$  mi

## 11.8 Midpoint Formula

---

### Answers

1.  $\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}$

2.  $M = (0, 7)$

3.  $M = (0, 0)$

4.  $M = (0, 7)$

5.  $M = (-4, -\frac{9}{2})$

6.  $M = (\frac{9}{2}, -\frac{3}{2})$

7.  $M = (6, -\frac{3}{2})$

8.  $M = (\frac{7}{10}, -\frac{41}{40})$

9.  $M = (\frac{1}{2}, -\frac{1}{2})$

10.  $M = (6, -1)$

11. Point (2, -9)

12. Point (16, -9)

13. a.  $d(A,B) = 4\sqrt{29} \approx 21.5407$

b.  $M = (4, 6)$

## 11.9 Measures of Central Tendency and Dispersion

---

### Answers

1. Measures of central tendency are the center values of a data set. 3 such measures are discussed in this concept: Mean, Median, and Mode.
2. The median is the middle value of a set of data when the data is arranged in ascending order. The mean on the other hand is the average of all the data. When a data set has a wide range, the median is a better choice to describe the center than the mean.
3. When a data set has two modes, it is considered bimodal. A mode is determined by finding the value that repeats the most, if there are two values that repeat an equal number of times the data set is considered bimodal.
4. Range, Standard deviation, and Variance are the three measures of dispersion. Range is the easiest to compute.

5. Variance formula: 
$$\sigma^2 = \frac{(x_1 - \bar{x})^2 + (x_2 - \bar{x})^2 + \dots + (x_n - \bar{x})^2}{n}$$

6. The variance is a measure of the dispersion, and its value is lower for tightly grouped data, than it is for widely spread data.
7. Standard variation is a means mathematicians have used to standardize variance by using the standard deviation, which measures how closely data clusters around the mean.
8. All values are the same as the mean
9. Mean: \$346,877.50  
Median: \$44,530.00  
Range: 2,456,960

10. Mean: 12.33  
Median: 13  
Mode: None – all listed numbers unique  
Range: 13
11. Mean: 44  
Median: 49  
Mode: None – all listed numbers unique  
Range: 38
12. Mean: 12.5  
Median: 11  
Mode: 9  
Range: 10
13. Mean: 3.8333  
Median: 3  
Mode: 3, 6  
Range: 9
14. Mean: 8.125  
Median: 10  
Mode: 12  
Range: 20
15. Mean: 12.8  
Median: 11  
Mode: None – all listed numbers unique  
Range: 15
16. Mean: 263  
Median: 227  
Mode: None – all listed numbers unique  
Range: 312
17. Mean: 21.75  
Median: 15  
Standard Deviation: 33.92

18. Mean: 14  
Median: 14  
Standard Deviation: 2.51
19. Mean: 15  
Median: 16  
Standard Deviation: 2.71
20. Mean: 9  
Median: 9  
Standard Deviation: 2.74
21. Mean: 263  
Median: 227  
Standard Deviation: 98.65
22. Mean: Would increase by 7  
Median: Would be increased by 7  
Mode: All modal numbers would be increased by 7  
Range: Would not change  
Standard deviation: Would not change
23. Mean: Would double  
Median: Would Double  
Mode: All modal numbers would double  
Range: Would not change
24. 85
25. Even if Henry scored a perfect 100% on his fifth test, the average of all 5 test scores would still only be 89%.
26. 945
27. 188.83

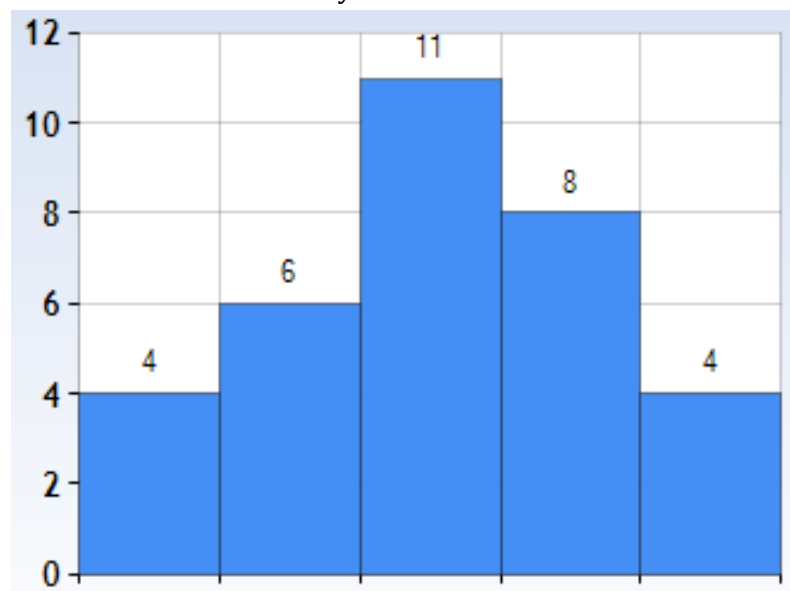
28. a. Mean Golf Score: 43  
b. Standard Deviation: 8.10  
c. The median would more accurately reflect the scores
29. mean: 1,408,679 Median: 962,500 Mode: 875,000 The median is used to minimize the effect of outliers.
30. a. mean  
b. median  
c. mean
31. James' cabbages are larger on average, but John's are more consistent
32.  
a. Inter-Cal (she can expect her travel time to be consistent)  
b. Fast-Dog (She will minimize average travel time)

## 11.10 Stem and Leaf Plots

---

### Answers

1. A stem-and-leaf plot is an organization of numerical data into categories based on the place value. The stem contains the digits in the largest place, and the leaf contains the digits in the smallest place. It is easy to read as a “quick look chart, and serves as an easy method for sorting numbers manually.
2. A histogram is a bar chart that describes a frequency distribution. It is useful for quickly ascertaining the spread of data.
3. For examples a, b and c a histogram would be a good use of determining frequency because histograms are visual representations of frequency, the histogram would easily allow someone to determine the most and least popular sodas of a student population, let a teacher adjust time limits on assessments, and allow a mall to appropriately plan parking lot distances from the store entrances.
4. Observations will vary



## 5.a. Stem and Leaf Plot:

Stem	Leaf
8	7 9
9	4
10	0
11	8
12	2 3
13	1 7 8
14	1 3 4
15	9
16	3 4 4 5 8
17	5
18	
19	3
20	4
21	7 9
22	0 6
23	
24	8 8
25	0
26	6

b. 28 stores

c. The 11 represents 110, and the 8 represents 8

d. 61%



6.

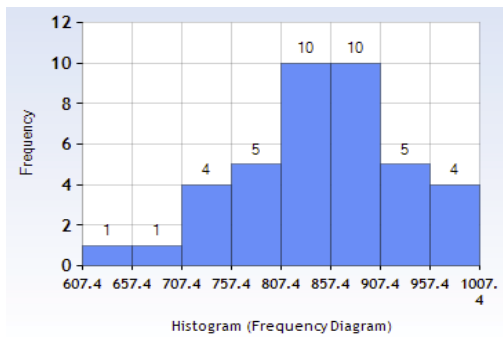
Stem	Leaf
6	0 7
7	2 4 4 5 6 6 7 8 9
8	0 1 1 1 2 2 4 4 5 5 5 6 6 8 8 8 8 9
9	0 0 3 4 4 5 5 6 6 8 8

- a. Mean: 846.815
- b. Median: 851.7
- c. Mode: 822.2

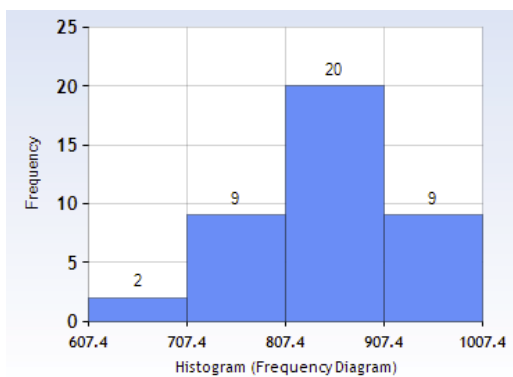
B.

Frequency Table	
Class	Count
607.4-657.3	1
657.4-707.3	1
707.4-757.3	4
757.4-807.3	5
807.4-857.3	10
857.4-907.3	10
907.4-957.3	5
957.4-1007.3	4

a.



b.



7.

Stem	Leaf
0	0 2 2 3 4
0	5 5 6 6 7 7 7 8 8
1	0 1 2 2 2 2 3 3 3 4 4
1	5 5 5 5 5 5 6 6 6 6 8 8 8 9
2	0 0 0 1 1 2
2	5 6 7 7 8 8 8
3	0 1
3	5 5 5 5 5
4	0 0 2
4	8 8
5	
5	
6	
6	5 5

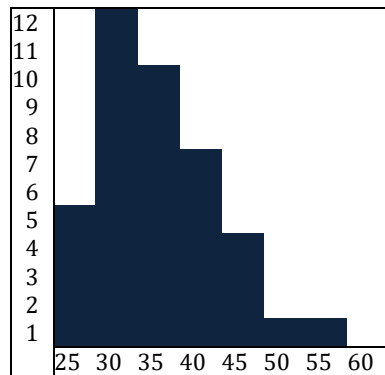
8. Conclusions should be reasonable and thought out using data from the graph to support the conclusion.

Stem	Leaf
1	2 3
2	1 7
3	3 4 5 7
4	0 0 1

9. a. Mean: 36.8 Median: 35.5 Mode: 32  
 b.

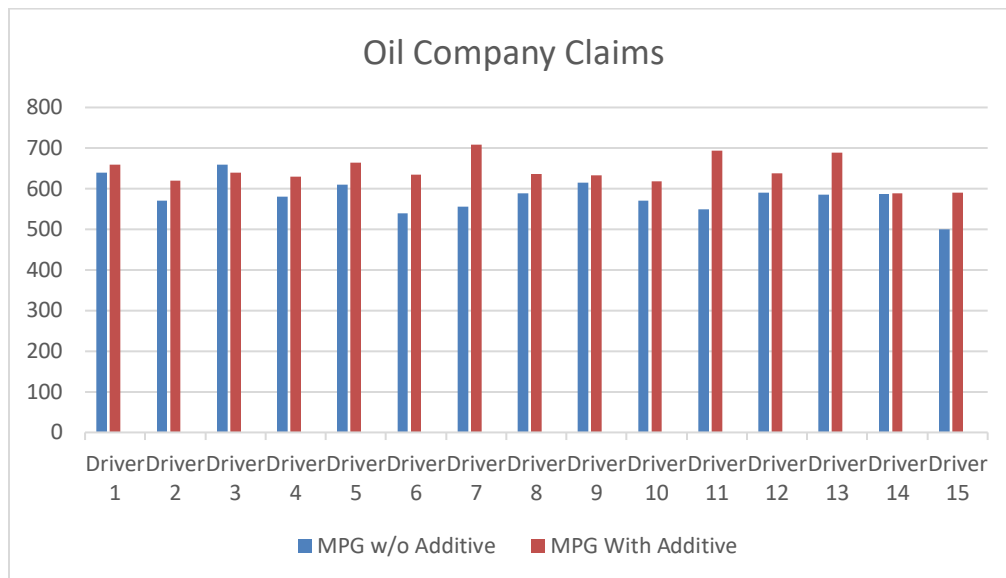
55-60	
50-54	
45-49	
40-44	
35-39	
30-34	
25-29	

c.



10. a. 2 siblings  
 b.  
 c. 75 students have siblings  
 d. 38 students have an odd number of siblings  
 e. 26%
11. Any situation that reasonably applies to the data, such as, dollars in savings, age of seniors on a bowling team ect.

12. Just by looking at the data, a student should be able to see that only two drivers in the data do not directly report an increased mpg usage. So the data should be considered true.

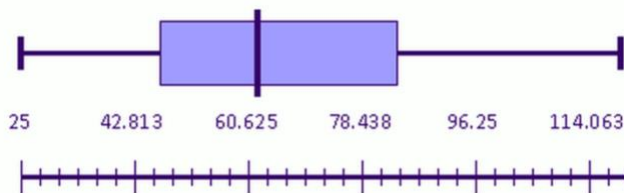


## 11.11 Box and Whisker Plots

### Answers

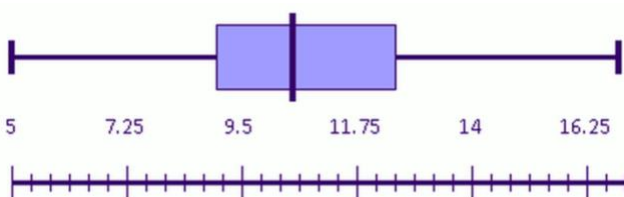
- The five-number summary includes the minimum, 1<sup>st</sup> quartile, median, 3<sup>rd</sup> quartile, and maximum
- A box-and-whisker plot is a visual representation of the five-number summary (answers will vary)
- Specific data points are not indicated

4.



- 20
  - 10

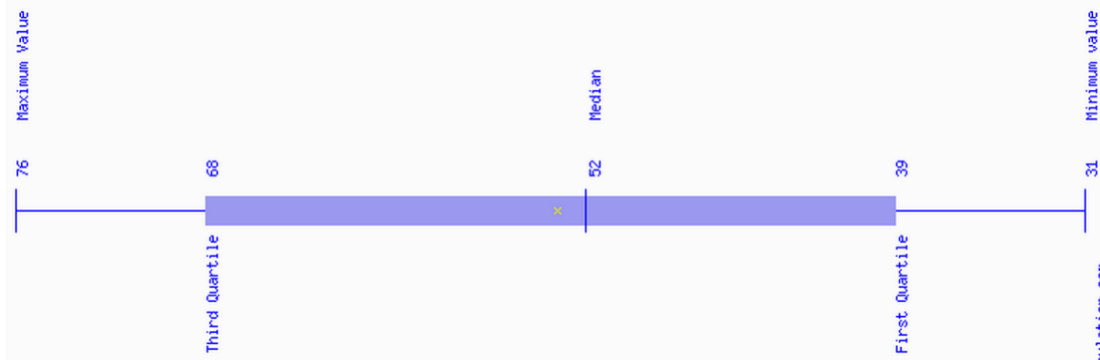
6. Range: 11.25, IQR: 3.25



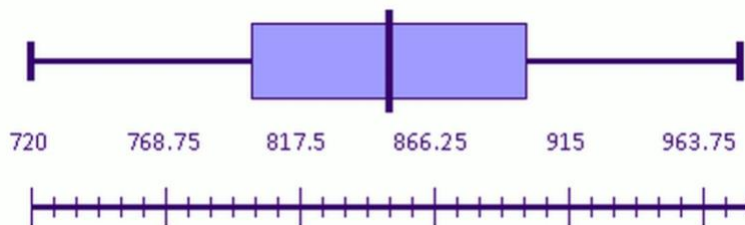
- Answers will vary
- Boxplot appearance will vary, but should indicate:
  - minimum: 49, Q1: 50, median: 53.5, Q3: 57, maximum: 67

9. Appearance of boxplot will vary, but should indicate 5-number summary:  
 a. 3, 8, 10.5, 13, 18  
 b. Example B 5-number summary was 5, 9, 10.5, 13, 17, so the median was the same, but the range differed.
10.  
 California: 6, 9.5, 11.5, 15.75, 23  
 Texas: 5, 13.75, 16, 21, 35

11. Sample boxplot shown here. Note that IQR = 29



- a. Not an outlier  
 b. Outlier  
 c. Not an outlier  
 d. Not an outlier
12. Sample boxplot shown. Values 620 and 1070 may be considered outliers.



13. Answers will vary
14.  
 a. Females 27.5 – 67.5, Males 22.5 – 57.5  
 b. It is the middle value for each  
 c. Answers will vary
15. d