

Session 1

- Ernie walks $\frac{1}{6}$ mile in $\frac{1}{12}$ hour when he walks along the river trail. How many miles per hour does Ernie walk when he hikes on the trail?
 - $\frac{1}{72}$ mile per hour
 - $\frac{1}{2}$ mile per hour
 - 2 miles per hour
 - 3 miles per hour
- A submarine at an elevation of -35 feet rises 35 feet. What is the elevation of the submarine after it rises?
 - -70 feet
 - 0 feet
 - 35 feet
 - 70 feet
- A map has a scale of $\frac{1}{2}$ inch = 16 miles. The distance between two parks on the map is $2\frac{3}{4}$ inches. How many miles apart are the parks?
 - 40 miles
 - 44 miles
 - 76 miles
 - 88 miles
- A number cube labeled 1 to 6 is rolled 450 times. Which is the best prediction for the number of times that the number cube will land on a number less than 3?
 - about 150 times
 - exactly 150 times
 - about 225 times
 - exactly 225 times

- Which is equivalent to the expression below?

$$6x + 2x + y + 3y$$

- $2(4x + y)$
- $4(2x + y)$
- $4(2x + 2y)$
- $8(x + y)$

- Tia generated a list of random numbers to simulate an experiment based on the waiting times at a supermarket checkout line. The number 1 represents waiting in line less than 5 minutes and the number 2 represents waiting in line 5 minutes or more.

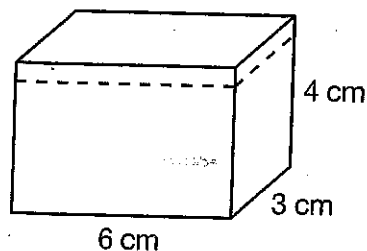
1, 1, 1, 1, 2, 1, 1, 1, 2, 1, 2, 2, 1, 2,
2, 1, 1, 2, 2, 1, 1, 2, 2, 2, 1

Which conclusion can Tia most reasonably draw from the simulation?

- A person is likely to wait in line less than 5 minutes 14% of the time.
 - A person is likely to wait in line 5 minutes or more 11% of the time.
 - A person is likely to wait in line less than 5 minutes more than 50% of the time.
 - A person is likely to wait in line 5 minutes or more 50% of the time.
- There are 12 girls and 16 boys in a diving class. One student is randomly selected to dive first. What is the probability that the student selected to dive first is a girl?
 - $\frac{3}{8}$
 - $\frac{3}{7}$
 - $\frac{4}{7}$
 - $\frac{3}{4}$

8. A circular garden has a diameter of 6 feet. Which of the following is closest to the area of the garden?
- 18.84 square feet
 - 28.26 square feet
 - 37.68 square feet
 - 113.04 square feet
9. Jerome earns \$200 per month plus \$12 for each bike he sells at the bike shop. This month, he wants to earn at least \$400. What is the least number of bikes that Jerome can sell to reach his goal?
- 15
 - 16
 - 17
 - 33
10. How is $4\frac{3}{11}$ written as a decimal number?
- $4.\overline{27}$
 - 4.272
 - 4.311
 - $4.\overline{36}$
11. Which of the following equations represents a proportional relationship?
- $\frac{3}{2} = \frac{15}{12}$
 - $\frac{8}{3} = \frac{36}{14}$
 - $\frac{6}{9} = \frac{24}{32}$
 - $\frac{4}{8} = \frac{15}{30}$

12. A piece of cheese has the dimensions of the rectangular prism shown below.



Marina cuts a slice of the cheese by making a horizontal cut across the top along the dotted lines. Which best describes the shape and dimensions of the top face of the slice?

- square with side lengths 4 cm
 - rectangle with sides 6 cm by 3 cm
 - rectangle with sides 6 cm by 4 cm
 - rectangle with sides 3 cm by 4 cm
13. A weather balloon at an elevation of 344 feet descends at a constant rate. The balloon reaches the ground in 4 minutes. Which best describes the rate at which the balloon's elevation changed?
- 86 feet per minute
 - 84 feet per minute
 - 84 feet per minute
 - 86 feet per minute

14. A local news station is conducting a survey to determine the favorite summer movie of teens in the city. How would the survey most likely get a random sample that is representative of the population?

- A. by asking every fifth person at a local movie theater to name his or her favorite movie
- B. by asking random teens from local schools to name their favorite movie
- C. by asking all the teens attending a current movie to name their favorite movie
- D. by calling teens from around the country

15. Subtract.

$$-3 - (-24) = \square$$

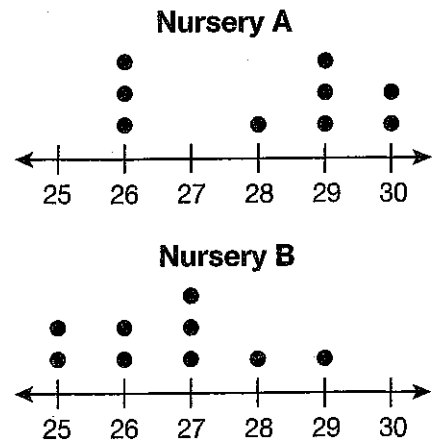
- A. -27
- B. -21
- C. 21
- D. 27

16. The total cost of 8 binders is \$24. The price of each binder is the same. Which equation represents the proportional relationship between the total cost, T , and the number of binders, n ?

- A. $T = \frac{n}{3}$
- B. $T = \frac{192}{n}$
- C. $T = 3n$
- D. $T = n + 16$

17. Garth bought tomato plants from two different nurseries. The dot plots show the heights of the plants from each nursery after a month.

Plant Heights (in centimeters)



Which best describes how the median height of the plants from Nursery A compares to the median height of the plants from Nursery B?

- A. The median height of the plants from Nursery A is 2 centimeters less than the median height of the plants from Nursery B.
- B. The median height of the plants from Nursery A is the same as the median height of the plants from Nursery B.
- C. The median height of the plants from Nursery A is 1 centimeter greater than the median height of the plants from Nursery B.
- D. The median height of the plants from Nursery A is 2 centimeters greater than the median height of the plants from Nursery B.

18. Lola owes her sister \$18.50. She gives her sister \$9.75. Which of the following best represents Lola's money?

A. $-\$8.25$
 B. $-\$8.75$
 C. $-\$9.25$
 D. $-\$28.50$

19. As a cold front moved in, the temperature dropped 3°F each hour for 6 hours. What was the total temperature change after the 6 hours?

A. -18°F C. -3°F
 B. -9°F D. -2°F

20. The perimeter of a rectangular field is 168 feet. The field is 36 feet wide. How long is the field?

A. 4.66 feet C. 66 feet
 B. 48 feet D. 96 feet

21. Which of the following are the angle measures of an obtuse triangle?

A. $60^{\circ}, 60^{\circ}, 60^{\circ}$
 B. $25^{\circ}, 70^{\circ}, 85^{\circ}$
 C. $35^{\circ}, 50^{\circ}, 95^{\circ}$
 D. $45^{\circ}, 45^{\circ}, 100^{\circ}$

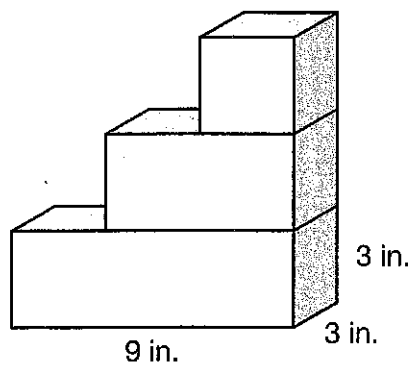
22. Katrina's ski boots cost 8% more than her skis. Her ski boots cost \$162. Which equation can be used to find the cost, c , of Katrina's skis?

A. $c + 0.08c = 162$
 B. $c + 0.8c = 162$
 C. $c - 0.08c = 162$
 D. $c - 0.8c = 162$

23. Regis has a bag with 8 tiles numbered 1 through 8. He randomly draws one tile from the bag without looking. Which of the following describes a likely outcome?

A. He selects a tile with the number 0.
 B. He selects a tile with the number 4.
 C. He selects a tile with a number greater than 7.
 D. He selects a tile with a number less than 6.

24. A glass display case shown below is made up of three rectangular prisms. The top prism is a cube, and the middle prism is 3 inches longer than the top cube. All the prisms have the same width and height.



What is the volume of the display case in cubic inches?

A. 54 in.^3
 B. 162 in.^3
 C. 243 in.^3
 D. 324 in.^3

25. Students were asked in a survey whom they would vote for class president in the upcoming class elections. The table below shows the results of a randomly sampled survey of seventh graders.

Candidate	Room	Room	Room
	1	2	3
Wallace	3	2	6
Casey	5	2	1
Whitney	2	4	2
Lisle	3	4	1

Based on the survey, which is the best prediction of the winner?

- A. Wallace
- B. Casey
- C. Whitney
- D. Lisle

26. Divide.

$$4\frac{1}{8} \div 2\frac{1}{4} = \square$$

- A. $\frac{6}{11}$
- B. $1\frac{5}{6}$
- C. $2\frac{1}{6}$
- D. $2\frac{1}{4}$

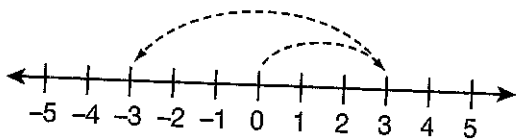
27. Renata conducted an experiment with a spinner. The results are shown in the table below.

Number	Times Landed
1	7
2	4
3	5
4	8
5	6

Based on this data, what is the experimental probability of spinning the number 4?

- A. $\frac{1}{8}$
 - B. $\frac{4}{15}$
 - C. $\frac{4}{11}$
 - D. $\frac{1}{2}$
28. LeVon tosses a penny and rolls a number cube labeled 1 to 6 at the same time. The possible outcomes for the penny are H (heads) and T (tails). Which of the following shows all of the possible outcomes in the sample space?
- A. HT, 123456
 - B. H, T, 1, 2, 3, 4, 5, 6
 - C. HT1, HT2, HT3, HT4, HT5, HT6
 - D. H1, H2, H3, H4, H5, H6, T1, T2, T3, T4, T5, T6

29. Which number sentence is illustrated on the number line below?



- A. $3 + (-3) = 0$
 - B. $3 + (-6) = -3$
 - C. $3 - (-6) = -3$
 - D. $-3 - (-3) = 0$
30. Ms. Claudius drove 196 miles in $3\frac{1}{2}$ hours. What was her speed in miles per hour?
- A. 56 miles per hour
 - B. 58 miles per hour
 - C. 62.5 miles per hour
 - D. 65.3 miles per hour
31. A jacket that regularly costs \$40 is on sale for \$32. What is the percent decrease in the price of the jacket?
- A. 8%
 - B. 15%
 - C. 20%
 - D. 25%
32. A bag has 4 red marbles, 4 blue marbles, and 2 green marbles. Jessie draws a marble from the bag at random, notes the color, and then replaces the marble. She then draws a second marble at random. What is the probability that both the marbles are green?
- A. $\frac{1}{45}$
 - B. $\frac{1}{25}$
 - C. $\frac{1}{5}$
 - D. $\frac{2}{5}$

33. Two angles are supplementary angles. One angle measures 58° . The other angle measures $(3n + 5)^\circ$. What is the value of n ?

- A. 9
- B. 32
- C. 39
- D. 122

34. The scale on a map is 2 inches = 75 feet. On the map, a rectangular park is 8 inches long and 3 inches wide. What is the actual area of the park?

- A. 900 square feet
- B. 1,800 square feet
- C. 22,500 square feet
- D. 33,750 square feet

35. The table shows the results of two surveys that a teacher took to find out how many minutes her students spend on homework each night.

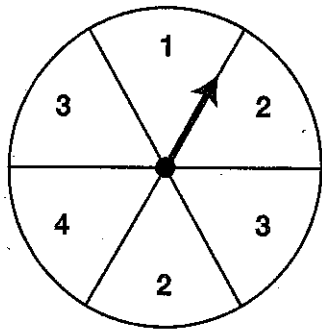
Sample	Data
A	20, 25, 30, 15, 20, 15, 25, 15
B	10, 10, 25, 20, 25, 25, 20, 10

Based on the sample data, which of the following is most likely to be closest to the median number of minutes that her students spend on homework each night?

- A. 10
- B. 15
- C. 20
- D. 25

36. Which of these would be the best sample for determining the favorite sport of students in a particular middle school?
- A. ten students at a local movie theater
 - B. every tenth student entering the school in the morning
 - C. five students from each of the school sports teams
 - D. the first ten students in the cafeteria at lunchtime
37. Emma earned \$120 at her part-time job. She also received a bonus of 20% of her salary for additional hours worked. How much did Emma earn in all?
- A. \$140
 - B. \$144
 - C. \$154
 - D. \$160
38. The water level in a full water tank changes by the same amount each day when the tank gets a leak. The total change in the water level is -128 gallons after 16 days. What was the daily change in the amount of water in the water tank?
- A. 2,048 gallons
 - B. 8 gallons
 - C. -8 gallons
 - D. $-2,048$ gallons
39. A home improvement store charges \$20 to rent a small truck for 1 hour. Each additional hour costs \$25. There is also a fuel surcharge of \$0.05 for each mile driven. How much will it cost to rent the truck for 4 hours if it is driven 30 miles?
- A. \$121.50
 - B. \$120.50
 - C. \$96.50
 - D. \$75.05
40. Jonny wants to place a poster that is $25\frac{1}{2}$ inches wide in the center of a wall that is 60 inches wide. How far from each corner should he place the poster for it to be centered?
- A. $16\frac{3}{4}$ in.
 - B. $17\frac{1}{4}$ in.
 - C. $18\frac{1}{3}$ in.
 - D. $34\frac{1}{2}$ in.
41. Mina tosses two number cubes labeled 1 to 6. What is the probability that the sum is equal to 5?
- A. $\frac{1}{36}$
 - B. $\frac{1}{9}$
 - C. $\frac{1}{6}$
 - D. $\frac{5}{36}$

42. Lucas conducted an experiment with the spinner shown below. The table shows the number of times that each number landed.



Times Landed

Number	Number of Tosses
1	6
2	12
3	7
4	5

For which number did the experimental probability equal the theoretical probability?

- A. 1
 B. 2
 C. 3
 D. 4
-
43. A circular tree ring has a radius of 8 centimeters. Which is closest to the circumference of the tree ring?
- A. 12.56 cm
 B. 25.12 cm
 C. 50.24 cm
 D. 200.96 cm
44. Lourdes wants to put molding around the edge of a rectangular frame that is 8 inches wide and 14 inches long. The molding costs \$0.75 per inch. She buys 3 additional inches of molding to be sure she has enough to go around the frame. What is the total cost of the molding?
- A. \$11.25
 B. \$25.75
 C. \$35.25
 D. \$84.75
45. The probability of spinning the number 5 on a spinner is $\frac{7}{9}$. Which best describes the likelihood of spinning a number other than 5 on the spinner?
- A. unlikely
 B. neither likely nor unlikely
 C. likely
 D. impossible
46. Ray buys a computer game for \$38. He uses a coupon to receive 15% off the price of the game. After the coupon is deducted, he must pay 6% tax. What is the total cost of the game, to the nearest cent?
- A. \$28.00
 B. \$34.24
 C. \$34.58
 D. \$36.56

47. Mr. Petrus buys $3\frac{1}{4}$ pounds of grapes for \$4.55. What is the unit cost of the grapes?

- A. \$1.22
- B. \$1.30
- C. \$1.40
- D. \$1.51

48. A shelf is $31\frac{1}{2}$ inches long. Alice is setting her model cars in a line along the shelf. If each car is $1\frac{3}{4}$ inches long, what is the greatest number of cars she can place in a line along the shelf?

- A. 15
- B. 16
- C. 17
- D. 18

49. Zane and Shelby's grandfather is 5 times as old as the total of their ages. If their grandfather is 70 and Shelby is 6, how many years old is Zane?

- A. 7
- B. 8
- C. 12
- D. 40

50. Samuel's jumps in a triple jump were $4\frac{5}{6}$, $3\frac{1}{3}$, and $2\frac{1}{2}$ feet. What was the total length of his jump?

- A. $9\frac{7}{11}$ ft
- B. $10\frac{1}{6}$ ft
- C. $10\frac{1}{3}$ ft
- D. $10\frac{2}{3}$ ft

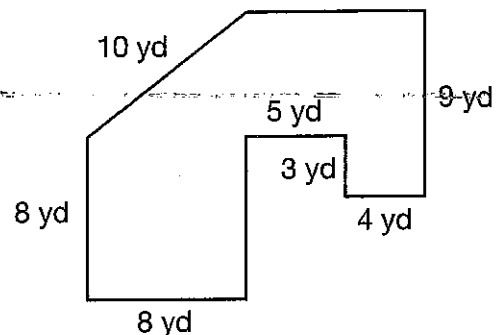
51. The function table shows the relationship between the cost and the number of fantasy books purchased at the book fair.

Number of Books, b	Cost, C (in dollars)
2	\$3
4	\$6
6	\$9
8	\$12

Which equation shows the proportional relationship between the cost and the number of books purchased?

- A. $C = 1.5b$
- B. $C = 3b$
- C. $C = b + 3$
- D. $C = \frac{1}{3}b$

52. A playground is constructed with the dimensions and shape shown below.



What is the area of the playground?

53. The low temperatures for one week at a ski resort were: -24°F , -15°F , -21°F , -32°F , -18°F , -9°F , and -14°F . What was the mean low temperature at the resort for the week?

54. The function table shows the relationship between the side lengths of a square and its perimeter.

Side Lengths, s (inches)	Perimeter, P (inches)
1	4
2	8
3	12
4	16
5	20

What type of relationship do the side lengths have with their perimeter?

55. Angie is saving money to buy a new tennis racket that costs \$138. She has saved \$46 so far. If Angie saves \$14 each week, what is the least number of weeks, w , that she will have to save to buy the racket? Write an inequality to describe the situation. Use the inequality to solve the problem.

56. The table shows the number of students that sing in a middle school chorus.

Chorus Members

Boys	Grade	Girls
5	6	8
11	7	14
9	8	13

The chorus director will randomly select one student to sing a solo. What is the probability that the soloist will be a girl? What is the probability that the soloist will be a seventh grade girl?

57. The numbers of pages read in books by fourth graders and by seventh graders are shown below.

Fourth grade: 87, 95, 76, 148, 104

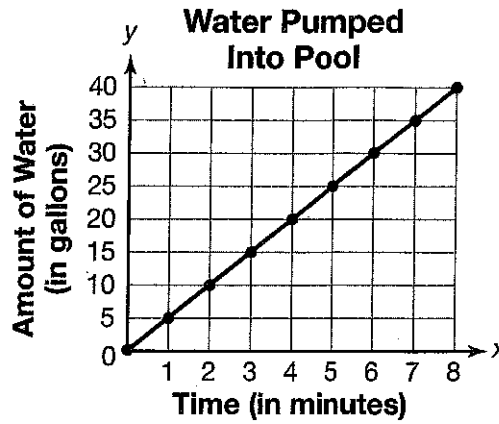
Seventh grade: 183, 187, 204, 215, 196

Use the mean absolute deviation to compare the variability in the mean number of pages read by students in each grade.



Session 2

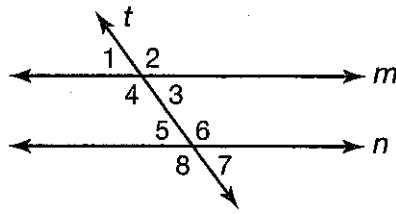
58. The graph below shows the relationship between the time in minutes, x , and the number of gallons of water, y , being pumped into a pool.



- A. Explain what each of the following coordinates means in terms of the time and the number of gallons of water: $(0, 0)$, $(1, 5)$, and $(6, 30)$. What is the unit rate? How do you know?

- B. Write an equation that can be used to find the number of gallons of water, y , in the pool at any time, x . Identify the constant of proportionality in the equation.

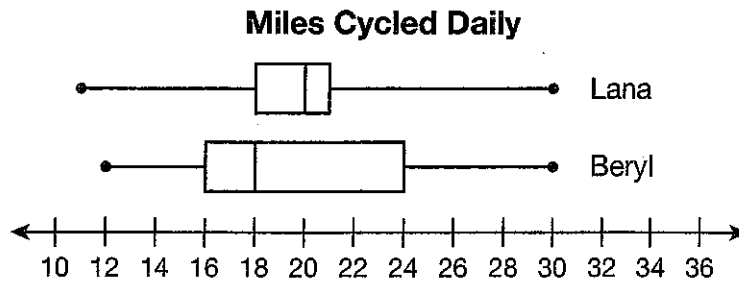
59. Look at the diagram below.



A. If $m\angle 3 = 64^\circ$, what are the measures of $\angle 1$ and $\angle 4$? Explain your answers.

B. If $m\angle 5 = 64^\circ$ and $m\angle 6 = (3x - 25)^\circ$, what is the value of x ? Explain your answer.

60. The double box-and-whisker plots show the number of miles cycled by Lana and by Beryl while they were training for a summer race.



A. How does the average number of miles cycled by Lana compare to the average number of miles cycled by Beryl? Explain your thinking.

B. How does the variability in number of miles cycled by Lana compare to the variability in number of miles cycled by Beryl? Explain your thinking.

