1 Jenise wants to find out if the students at her school would support using school money to buy new band uniforms. Which survey will result in a random sample?

   A   She asks each student on her bus.

   B   She asks all band members in the school.

   C   She picks every fourth student that leaves the school on Tuesday.

   D   She picks 75 names at random, sends emails, and records those that return.

2 An athlete pays $\frac{1}{10}$ of her annual income to her agent. The agent pays $\frac{2}{9}$ of that money to his assistant. What fraction of her annual income is the athlete paying the assistant?

   A $\frac{2}{10}$

   B $\frac{1}{9}$

   C $\frac{1}{45}$

   D $\frac{9}{20}$

3 A clock tower has a circular clock face with a circumference of 48π feet. What is the radius of the clock face?

   A   6 feet

   B   12 feet

   C   24 feet

   D   72 feet

4 Jonas has a spinner divided into 3 congruent sections, numbered 1 to 3. He also has a number cube, with faces numbered 1 to 6. He created the table below to show all the possible outcomes for spinning the spinner and tossing the number cube.

POSSIBLE OUTCOMES

	1	2	3	4	5	6
1	(1, 1)	(1, 2)	(1, 3)	(1, 4)	(1, 5)	(1, 6)
2	(2, 1)	(2, 2)	(2, 3)	(2, 4)	(2, 5)	(2, 6)
3	(3, 1)	(3, 2)	(3, 3)	(3, 4)	(3, 5)	(3, 6)

Jonas wants to find the probability that both the spinner and the number cube will land on an odd number. Which of the following represents the complete list of favorable outcomes for this experiment?

A (1, 1), (3, 3)

B (1, 1), (1, 3), (1, 5)

C (1, 1), (1, 3), (1, 5), (3, 1), (3, 3), (3, 5)

D (1, 1), (1, 3), (1, 5), (2, 1), (2, 3), (2, 5), (3, 1), (3, 3), (3, 5)

5 Marissa simplified the expression shown below as follows.

$$10 - 25 - 6 + (-2)$$

$-15 - 6 + (-2)$	Step 1
$-9 + (-2)$	Step 2
-11	Step 3

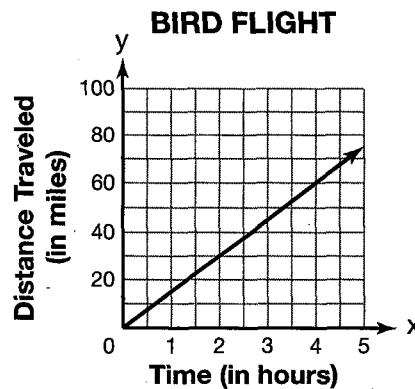Which of the following best describes Marissa's mistake?

A In Step 1, she should have replaced $10 - 25$ with 15, not -15.

B In Step 1, she should have replaced $10 - 25$ with -35, not -15.

C In Step 2, she should have replaced $-15 - 6$ with -21, not -9.

D In Step 2, she should have replaced $-15 - 6$ with 21, not -9.

Go On

6 The graph below shows the distance that a bird flies over time.

BIRD FLIGHT

What does the point (0, 0) on this graph mean?

A The bird flies at a speed of 0 miles per hour.

B The bird cannot fly.

C The time the bird flies is not measured.

D Before the bird starts flying, he has not traveled any distance.

7 A park is $\frac{3}{4}$ mile long and $\frac{1}{2}$ mile wide. Which fraction represents the ratio of the park's length to its width?

A $\frac{3}{8}$

B $\frac{1}{2}$

C $\frac{3}{2}$

D $\frac{8}{3}$

8 A rectangular window has a height of $5\frac{1}{2}$ feet and a width of $1\frac{1}{2}$ feet. What is the perimeter of the window?

A 7 feet

B 13 feet

C 14 feet

D 28 feet

Book 1

9   The table shows the results of spinning a spinner that has the numbers 1 through 4.

SPINNING A SPINNER

Result	Number of Times
1	20
2	15
3	10
4	5
Totals	50

Based on the results given in the table, what is the probability of landing on 3?

A   0.3

B   0.25

C   0.2

D   0.1

10   The high school basketball team has a mean height of 71 inches. The junior high school basketball team has a mean height of 64 inches. The mean average deviation of each data set is 2.8. Which comparison of the data sets is correct?

A   The difference in the mean heights is greater than twice the mean absolute deviation, so there is some overlap of the data.

B   The difference in the mean heights is greater than twice the mean absolute deviation, so there is a large amount of overlap of the data.

C   The difference in the mean absolute deviation is zero, so there is no overlap of the data.

D   The difference in the mean absolute deviation is zero, so there is complete overlap of the data.

Go On

11 Simplify the expression below.

$$\frac{2}{3} \times \left(-\frac{1}{6}\right)$$

A 4

B $\frac{1}{9}$

C $-\frac{1}{9}$

D -4

12 Which of the following shows how the expression below can be factored using the **greatest** common factor?

$$6p^3 - 12p^2 + 9p$$

A $3(2p^3 - 4p^2 + 3p)$

B $3p(2p^2 - 4p + 3)$

C $3p^2(2p^2 - 4p + 3)$

D $6p(p^2 - 2p + 9)$

13 Mary waits tables at a diner every weekend to make extra money. She donates 20% of her tip to her favorite charity and then keeps the rest. Last weekend Mary earned $250 in tips. How much money did Mary keep for herself last weekend?

A $200

B $125

C $50

D $25

14 Aaron recorded the number of inches of rainfall for 6 randomly chosen days in April and May, as shown below.

RAINFALL (in inches)

April	0	$\frac{1}{2}$	4	2	2	$\frac{1}{2}$
May	1	0	1	$\frac{1}{2}$	0	$\frac{1}{2}$

Based on the means of these sets of data, which of the following is a reasonable conclusion?

A On average, the amounts of rainfall were the same in April and May.

B On average, the amounts of rainfall were higher in April than in May.

C On average, the amounts of rainfall were higher in May than in April.

D There was greater variability in the amounts of rainfall in May than in April.

15 Adita spends more than $24 at the gift shop. She buys a mug for $9 and 3 books that cost the same amount. Which inequality shows the cost in dollars, d, of each book?

A

B

C

D
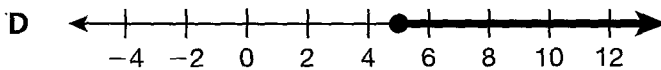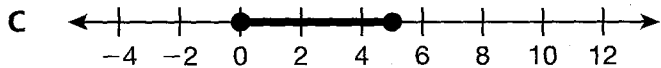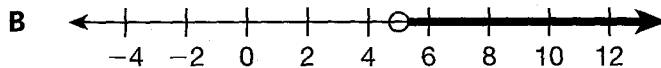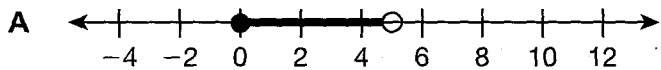
16 Which of the following is the decimal equivalent to $\frac{5}{12}$?

A   2.4

B   0.512

C $0.41\overline{6}$

D $0.\overline{416}$

17 Trinh has $14.44 in her school lunch account. She spends $7.75 on lunches and deposits $6.50. What is her new balance?

A $28.69

B $13.81

C $13.19

D $0.19

18 Ethan measured the side length and perimeter of five squares, as shown in the table below.

MEASURE OF SQUARES

Side Length (in inches)	2	3	5	6	9
Perimeter (in inches)	8	12	20	24	36

Which of the following best explains why these values are or are not in a proportional relationship?

A   They are proportional, because the perimeter always increases by the same amount from column to column.

B   They are proportional, because the ratio of perimeter to side length is always 4:1.

C   They are not proportional, because the side length increases by varying amounts from column to column.

D   They are not proportional, because the difference between side length and perimeter is different for each column.

19 Simplify the expression below.

$$-3\left(-\frac{1}{6} + 0.3\right)$$

A -1.4

B -0.4

C 0.8

D 3.9

20 Simplify the expression below.

$$-3x^2 + 7x + 2 + x^3 - x^2 - 9$$

A $-3x^2 + 7x - 7$

B $x^3 - 3x^2 + 7x - 7$

C $x^3 - 4x^2 + 7x - 9$

D $x^3 - 4x^2 + 7x - 7$

21 A spinner is divided into 12 congruent sections, numbered 1 through 12. If Eleanor spins the spinner once, what is the probability that it will land on a multiple of 5?

A $\frac{1}{12}$

B $\frac{1}{6}$

C $\frac{1}{4}$

D $\frac{3}{4}$

Go On

22 A factory manager conducted tests on a random sample of 150 products. Of the products tested, 2 were found to have defects. Based on this information, how many products in a batch of 3,000 are likely to be defective?

A 20

B 40

C 60

D 120

23 Temperature in degrees Fahrenheit is equal to 32 more than $\frac{9}{5}$ times the temperature in degrees Celsius. One day, the high temperature in Edison, NJ, was 95 degrees Fahrenheit. What was the high temperature in degrees Celsius?

A 35°C

B 71°C

C 113°C

D 203°C

24 Which phrase describes a relationship that has a constant of proportionality of 4.6?

A The value of y is equal to the sum of x and 4.6.

B The value of y is equal to the product of 4.6 and x.

C The value of y is equal to the sum of 4.6 and the product of 4.6 and x.

D The value of y is equal to the difference between 4.6 and the product of 4.6 and x.

Book 1

25 A repair crew needs to mark off the area of the sidewalk they are working on. They end up using 26 yards of netting to create a rectangular work zone around the repair site. If the work zone is 4 yards wide, how long is the work zone?

A   6.5 yards

B   9 yards

C   11 yards

D   22 yards

26 The probability of drawing a green marble from a bag of 40 marbles is $\frac{3}{5}$. The probability of drawing a yellow marble from the same bag is $\frac{3}{10}$. Which statement correctly describes the outcomes for drawing one marble from this bag?

A   Drawing a yellow marble is impossible.

B   Drawing a green marble is unlikely.

C   Drawing a yellow marble is neither likely nor unlikely.

D   Drawing a green marble is more likely than drawing a yellow marble.

27 Simplify the expression below.

$$(-0.2) \times 0.4 \times (-5)$$

A   4

B   0.4

C   −0.4

D   −4

28 On August 1, Ira's bank balance was $300. During the month, he wrote checks for $450.00 and $115.25 and made one deposit of $225.00. Which of the following best represents her checking account balance at the end of the month?

A   −$490.25

B   −$65.00

C   −$40.25

D $1090.25

STOP

TIPS FOR TAKING THE TEST

Here are some suggestions to help you do your best:

- Be sure to carefully read all the directions in the test book.

- Read each question carefully and think about the answer before choosing your response.

- Look for words that are **bolded**. They are important.

- Read all the answer choices and then go back and pick the best answer for the question.

29 The line graphed below represents the total distance traveled by a train over time.
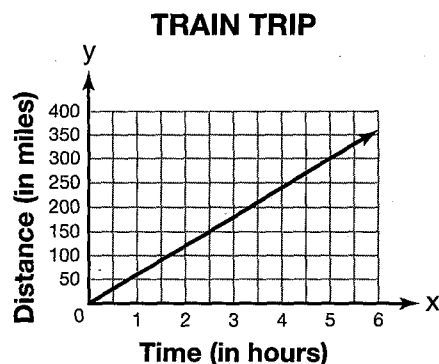
TRAIN TRIP

Based on this graph, which of the following statements is true?

A The train traveled 300 miles in 1 hour.

B The train traveled 300 miles in 4 hours.

C The train traveled 150 miles in 3 hours.

D The train traveled 120 miles in 2 hours.

30 Erika wants to know what percent of the seventh-grade students at her school play musical instruments. She surveyed a random sample of seventh-grade students at her school. Which of the following best explains why this sample is or is not representative of the population Erika wants to study?

A The sample is representative, because it is a random sample that is drawn from the population she wants to study.

B The sample is not representative, because it is a random sample.

C The sample is not representative, because it does not include every seventh-grade student in the school.

D The sample is not representative, because it does not include eighth-grade students.

Go On

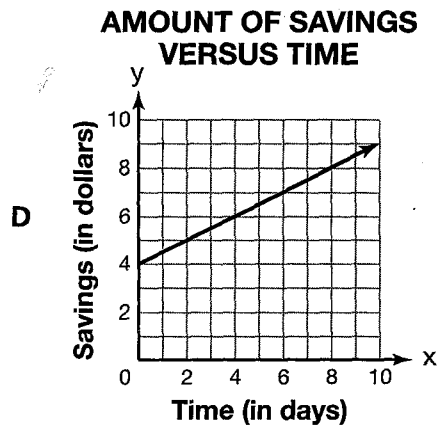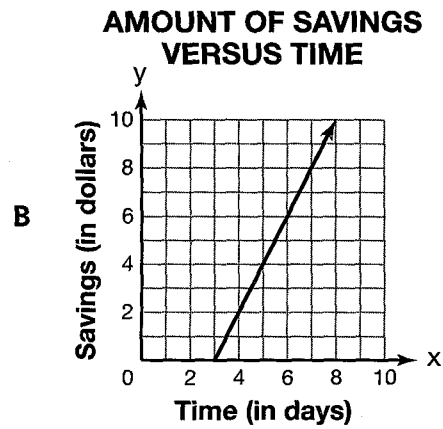**31** The table below shows the high temperature, in °F, each day in Fairbanks, Alaska, during a week in January.

Day	Sun	Mon	Tue	Wed	Thu	Fri	Sat
High Temperature (in °F)	−8	2	−6	−3	4	5	−1

What was the mean high temperature?

A   −4

B   −2

C   −1

D   1

32 The temperature has changed by −8.4°F over the last 1.5 hours. What is the average change in the temperature each hour?

A   5.6°F

B   0.56°F

C   −0.56°F

D   −5.6°F

33 Tomas adds money to his savings account. Which graph shows a proportional relationship between the amount of money in the account and the time in days?

A

AMOUNT OF SAVINGS VERSUS TIME

Savings (in dollars) vs. Time (in days)

C

AMOUNT OF SAVINGS VERSUS TIME

Savings (in dollars) vs. Time (in days)

B

AMOUNT OF SAVINGS VERSUS TIME

Savings (in dollars) vs. Time (in days)

D

AMOUNT OF SAVINGS VERSUS TIME

Savings (in dollars) vs. Time (in days)
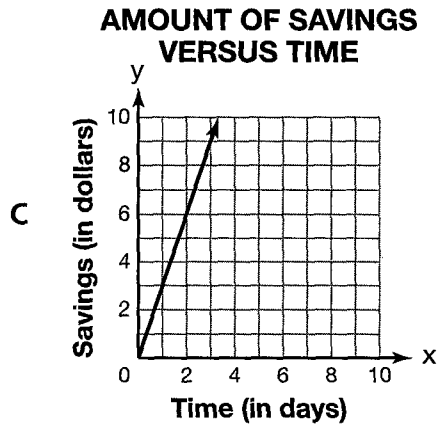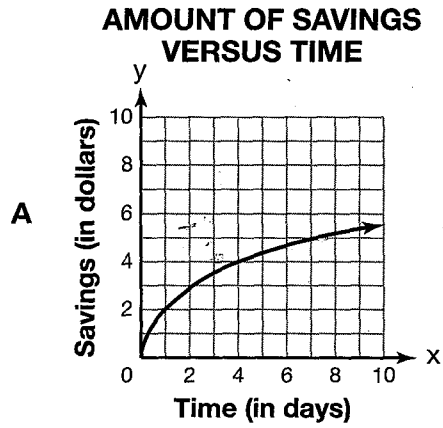
34 Hana wants to estimate the average number of pages in a cookbook. She randomly chooses 12 cookbooks from the cookbook section at her town's library and records the total number of pages, as shown below.

349	208	620	495
384	243	130	395
215	128	93	190

Based on this sample, which is the **best** estimate of the mean number of pages in a cookbook?

A   229

B   288

C   418

D   527

35 Aiden randomly asked 10 students from two math classes for their quiz scores from yesterday's quiz. Her results are shown below.

Class 1: 84, 84, 88, 88, 92, 92, 92, 92, 96, 100

Class 2: 80, 84, 88, 88, 92, 92, 92, 96, 96, 100

Which of the following sentences is true?

A   Class 2 has the greater mean.

B   Class 2 has the greater median.

C   Class 2 has the greater interquartile range.

D   Class 2 has the greater mode.

Book 2

36 Talia makes a scale drawing of the stage at her school. The stage has the dimensions shown.

|←– 30 feet –→|

20 feet

|←––––––– 70 feet ––––––→|

Scale
2.5 feet : 4 inches
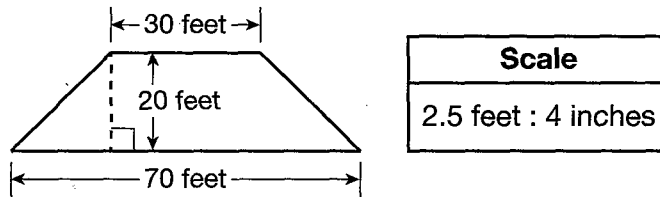
[not drawn to scale]

What area, in square inches, does the scale drawing have?

A 391 square inches

B 1,000 square inches

C 1,600 square inches

D 2,560 square inches

37 Ryan currently makes $12 per hour at his part time job. Due to Ryan's impeccable work ethic, his boss has decided to give him a raise. Ryan's boss will increase his pay by one-third of its current value. What will Ryan's new hourly rate be?

A $4

B $8

C $14

D $16

38 A jacket has a regular price of $80. It is on sale for 10% off. The sales tax is 7%. What is the total cost of the jacket including tax?

A $81.84

B $77.04

C $72.00

D $66.96

Go On

39 A recipe calls for $1\frac{1}{2}$ cups flour to $\frac{3}{4}$ cup grape jelly. How many cups of grape jelly are needed for each cup of flour?

A $\frac{1}{4}$ cup of grape jelly for each cup of flour

B $\frac{1}{2}$ cup of grape jelly for each cup of flour

C $1\frac{1}{8}$ cups of grape jelly for each cup of flour

D 2 cups of grape jelly for each cup of flour

40 The table below shows the distance, *d*, that a model train travels over time, *t*.

MOVEMENT OF A MODEL TRAIN

Time (in seconds)	Distance (in meters)
3	3.6
6	7.2
9	10.8
12	14.4

Which equation represents the relationship of distance, *d*, and time, *t*, for the train?

A $d = 0.83t$

B $d = 3t$

C $d = 3.6t$

D $d = 1.2t$

41 The price of a computer is marked down from $550 to $484 for a sale. The following week, the computer is marked down again by the same percent as during the week before. How much lower than the original price is the price after the second markdown?

A $425.92

B $132.00

C $124.08

D $58.08

42 Which expression is equivalent to $\frac{3}{8} \cdot (3x - 40)$?

A $3x - 15$

B $\frac{3}{8}x - \frac{3}{8}$

C $\frac{9}{8}x - 15$

D $\frac{9}{8}x - 40$

43 One particular type of plant needs at least 70 ounces of water each week (7 days) and no more than 100 ounces. Which set of inequalities represents the amount of water, w, that the plant should receive per day?

A $70 < w < 100$

B $10 < w < 14\frac{2}{7}$

C $70 \leq w \leq 100$

D $10 \leq w \leq 14\frac{2}{7}$

44 Jonathon spins a spinner that has the numbers 1 to 8. Which outcome is impossible?

A   landing on a 5

B   landing on an even number
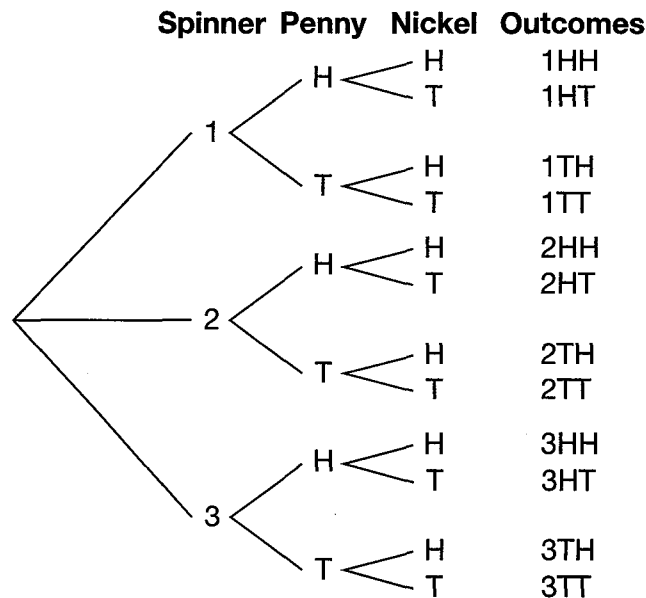
C   landing on a number that is 8 or less

D   landing on a number greater than 10

Go On

45 Tammy knits custom scarves. Last year, she charged $2.50 for each $\frac{1}{2}$ foot of scarf. This year, she increases the charge per half foot by 6%. How much does she earn this year to knit a scarf that is $4\frac{1}{2}$ feet long?

A $23.85

B $22.50

C $11.93

D $1.35

46 Amari makes the tree diagram shown below to find the possible outcomes of rolling a spinner with equal sections numbered 1 through 3, tossing a penny, and tossing a nickel.

Spinner	Penny	Nickel	Outcomes
1	H	H	1HH
		T	1HT
	T	H	1TH
		T	1TT
2	H	H	2HH
		T	2HT
	T	H	2TH
		T	2TT
3	H	H	3HH
		T	3HT
	T	H	3TH
		T	3TT

What is the probability of landing on 2 and having at least one coin land heads up?

A $\frac{1}{6}$

B $\frac{1}{4}$

C $\frac{1}{3}$

D $\frac{3}{4}$

47 Mieko is putting a ribbon border around the edge of a circular mirror, as shown below.
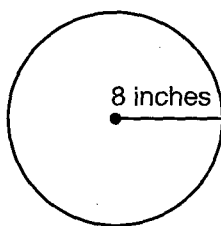
8 inches

[not drawn to scale]

What length of ribbon, in **inches**, does Mieko use? Use 3.14 for π.

A   200.96 inches

B   100.48 inches

C   50.24 inches

D   25.12 inches

48 Mr. Flores charges $530 for car repairs to his credit card, which charges no interest if paid in full within 9 months. He pays $150 the first month. How much must he pay each month for the next 8 months so that he pays no interest?

A $47.50

B $58.89

C $66.25

D $380.00

49 A cell phone plan charges $59.90 a month, plus $0.25 per text message. Which expression can be solved to find how many text messages, x, can be sent while still keeping the monthly bill under $75?

A $59.9 + 0.25x > 75$

B $x(59.9 + 0.25) < 75$

C $59.9 + 25x < 75$

D $59.9 + 0.25x < 75$

50 A scale measures with a 1.5% margin of error, which means that the measurement given by the scale may be up to 1.5% lower or higher than the actual weight of the object. If Colin uses this scale to weigh a suitcase and the scale reads 40 pounds, what is the range of possible actual weights for the suitcase?

A   34 pounds to 46 pounds

B   35.5 pounds to 44.5 pounds

C   38.5 pounds to 41.5 pounds

D   39.4 pounds to 40.6 pounds

51 Which expression is equivalent to $9 - 27m$?

A $-18m$

B $9m(1 - 3)$

C $m(9 - 27)$

D $9(1 - 3m)$

52 The rent for an office space is $674.30 per month. The office is $306\frac{1}{2}$ square feet in area. What is the monthly cost per square foot to rent the office?

A $22.48

B $2.20

C $0.46

D $0.22

53 Lucia is conducting an experiment in which she repeatedly draws a marble from a bag without looking, records its color, and replaces it. She conducted 40 trials in the experiment, with the results shown below.

LUCIA'S RESULTS

Result	Red	Blue	Yellow
Frequency	16	14	10

If Lucia were to conduct the same experiment with 2,000 draws, **approximately** how many times should she expect to draw a yellow marble?

A   125

B   250

C   400

D   500

54 Simplify the expression below.

$$\frac{4}{9} \div 12$$

A   27

B $\frac{16}{3}$

C $\frac{3}{16}$

D $\frac{1}{27}$

55 Derrick has a chance to win a new music player. He must pick one of the two winning tokens from a bag that holds 15 tokens. What is the probability that Derrick picks a winning token?

A $\frac{1}{15}$

B $\frac{2}{15}$

C $\frac{13}{15}$

D $\frac{14}{15}$

STOP

TIPS FOR TAKING THE TEST

Here are some suggestions to help you do your best:

- Be sure to carefully read all the directions in the test book.

- Read each question carefully and think about the answer before choosing your response.

- Look for words that are **bolded**. They are important.

- Be sure to show your work when asked. You may receive partial credit if you have shown your work.

56 Beatrice is exploring the relationship between the side length of a square and the area of the square. The table below shows data that she calculated.

DATA ON SQUARES

Side Length (in inches)	Area (in square inches)
1	1
2	4
3	9
4	16

Based on the data Beatrice calculated, are the side length and area of a square proportionally related? On the lines below, answer the question and explain your reasoning.

_____

_____

_____

_____

Go On

57 Deborah earns $10 per hour tutoring other students in math class. She makes a graph of what she earns versus the time that she tutors for. On the lines below, explain what the point (0, 0) on the graph represents.

_____

_____

_____

_____

58 Mr. Jones is teaching a lesson about finding the perimeter of a rectangle. In the lesson, he explains that there are two equivalent equations you can use to calculate the perimeter of a rectangle, given the length, L, and width, W, of the rectangle. The first is $P = L + W + L + W$ and the second is $P = 2(L + W)$. On the lines below, show how the first equation transforms into the second.

_____

_____

_____

_____

_____

59 There is a $\frac{2}{5}$ chance that the cafeteria at Horace's school will serve pizza for lunch today and a $\frac{3}{7}$ chance they will serve hot dogs. Horace leaves for school believing it is more likely that the cafeteria will be serving hot dogs rather than pizza. Is Horace correct? On the lines below, answer the question and explain your reasoning.

_____

_____

_____

_____

_____

60 Enzo wants to know if he could win the election for class president, so to get an idea, he surveys the 35 students that ride the bus with him. Of these students, 12 said they would absolutely vote for Enzo, 10 said they absolutely would not vote for Enzo, and the remaining students said it would depend on who he was running against. There are a total of 450 students in Enzo's class. If Enzo's bus survey is an accurate representation of his entire class, what number of students in his class are undecided on who they'd vote for?

Show your work.

Answer _____ students

Go On

61 Bob won big at bingo last night, he walked away with $800. The first thing Bob does is to take a cab to his mother's house. He gives the cab driver $20 and tells him to keep the change. Bob then gives his mother $\frac{1}{3}$ of his remaining winnings and decides to walk down the street to his aunt's house to share his winnings with her as well. Bob gives his aunt one fourth of what money he has left. Lastly, Bob gives one sixth of what he has left to his best friend and keeps the rest for himself. How much money does Bob get to keep?

Show your work.

Answer $_____

62 Last year, the attendance at the homecoming football game was 300. This year, 360 people attended.

Part A

What was the percent increase from last year to this year?

Show your work.

Answer _____ %

Part B

If the increase in the number of people from this year's to next year's homecoming football is the same as from last year to this year, is the percent increase the same? On the lines below, answer the question and explain your reasoning.

_____

_____

_____

_____

_____

Go On

63 Ben's contract states that he must work more than 10 hours per project. The graph below represents the number of hours he can work on a project.
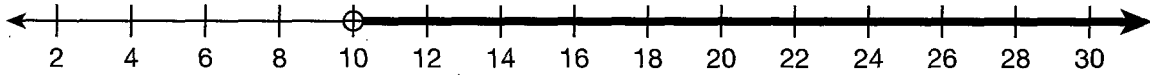
Part A

Write an algebraic inequality representing the number of hours, h, Ben can work on a project.
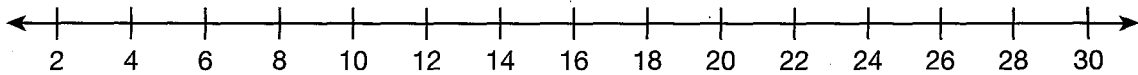
Answer _____

Part B

Ben gets paid $12.50 per hour in addition to a flat fee of $50. He wants to earn more than $300 for his current project. Write an inequality to represent this situation.

Answer _____

Part C

Solve the inequality you wrote in Part B and graph the solution set on the number line below. On the lines below, explain what the solution set represents for Ben.

_____

_____

_____

_____

_____

Book 3

64 Ernest has a circular shaped piece of wire with a radius of 4 inches. Without cutting or breaking the wire, he bends it into the shape of a square.

Part A

What is the circumference of the circle? (Let $\pi = 3.14$) Round your answer to the hundredths place.

Answer _____ inches

Part B

Once the wire is bent into a square, what is the side length of the square? Round your answer to the hundredths place.

Answer _____ inches

Part C

What is the difference between the area of the circle and the square? Round the answer to the hundredths place.

Show your work.

Answer _____ square inches

PRACTICE TEST 2

65 June is conducting an experiment using a quarter, a nickel, and a six-sided number cube. Her experiment consists of tossing both coins and rolling the number cube.

Part A

Create a tree diagram, or list, of all of the possible outcomes for her experiment.

Part B

What is the probability that the coins don't come up the same (i.e., heads and tails or tails and heads) and the cube shows a prime number? Record your answer as a percent rounded to the nearest tenth.

Show your work.

Answer _____ %

STOP