



QUESTION CATALOGUE

Math 7-8

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A. Selection and Comp. of Operations

Addition and subtraction of real numbers

437. Mrs. Apple purchased oranges from the grocer with a \$10 bill. She received 2 dollars, 1 quarter, 2 dimes, 1 nickel, and 2 pennies in change. How much did she pay for the oranges?

- (1) **\$7.48**
- (2) \$7.52
- (3) \$8.48
- (4) \$8.52

830. Juan is holding 4 cans that weigh 3 kilograms in total. Three cans weigh 487 grams, 397 grams, and 806 grams. What is the weight of the fourth can?

- (1) 913 grams
- (2) **1,310 grams**
- (3) 1,690 grams
- (4) 2,116 grams

1086. Compute: $\frac{3}{2} + 5\frac{4}{5} =$

- (1) $6\frac{2}{5}$
- (2) **$7\frac{3}{10}$**
- (3) $7\frac{2}{5}$
- (4) $8\frac{1}{2}$

1154. When 7 is subtracted from a number four times, the result is 3. What is the number?

31

1192. The sum of $\frac{1}{2}$ and $\frac{1}{3}$ is

- (1) $\frac{1}{6}$
- (2) $\frac{1}{5}$
- (3) $\frac{5}{6}$
- (4) **$\frac{5}{6}$**

1193. The difference between $\frac{1}{4}$ and $\frac{1}{5}$ is

- (1) $\frac{9}{20}$
- (2) **$\frac{1}{20}$**
- (3) $\frac{1}{9}$
- (4) $\frac{1}{9}$

1279. Dwight and Harold want to go to the 3:00 P.M. movie but promised their dad they would mow the lawn first. Dwight can mow the lawn in 2 hours and Harold can mow the same lawn in 3 hours. In addition to the family's lawn mower, they borrow a neighbor's mower and mow the lawn together.

If the boys must allow one hour to shower and walk to the theater, what is the *latest* time they can begin mowing the lawn in order to make it to the theater on time? Provide a complete explanation to show how you arrived at your answer.

Constructed Response

1404. Sally is $65\frac{3}{4}$ inches tall. Jake is $64\frac{1}{2}$ inches tall. How much taller is Sally?

- (1) $\frac{3}{4}$ inch
- (2) **$1\frac{1}{4}$ inch**
- (3) $1\frac{1}{2}$ inch
- (4) $1\frac{3}{4}$ inch

1405. XYZ stock sold for $13\frac{1}{8}$ on the stock market. The stock went up by $3\frac{1}{2}$ points. What does the stock sell for now?

- (1) $16\frac{1}{16}$
- (2) $16\frac{2}{10}$
- (3) $16\frac{2}{16}$
- (4) **$16\frac{5}{8}$**

1450. Base your answer to the following question on the following information.

Mrs. Drama's class put on a school play, but they have a mathematical problem. Provide the work that shows how you arrived at your solution.

The play included three witches. Each witch costume needed $3\frac{1}{5}$ yards of fabric for the cape and $1\frac{2}{5}$ yards of fabric for the hat. How much fabric did Mrs. Drama need to buy for the three costumes in total?

$13\frac{4}{5}$

1455. The supermarket had a sale on bottles of JW Cola. The following are the prices.

Number of Bottles	Price Total
1	\$0.69
3	\$1.99
5	\$2.99

George wanted to buy four bottles of JW Cola. What was the best way to buy them, in terms of the deal, and how much did the four bottles cost? Show your work.

Buy it as 1 and 3 bottles. The total cost is \$2.68.

1557. A new set of golf clubs at The Sports Club sells for \$149.95. A catalog offers the set for \$129.50 plus \$3.25 for shipping and handling. How much can be saved by purchasing the golf clubs through the catalog?

- (1) \$12.70
- (2) **\$17.20**
- (3) \$20.45
- (4) \$40.25

1637. A new bike at Smith Sports sells for \$234.99. A catalog offers the same bike for \$198.45 plus \$10.30 for shipping and handling. How much can be saved by purchasing the bike through the catalog?

- (1) **\$26.24**
- (2) \$36.54
- (3) \$40.84
- (4) \$443.74

1638. A new bookcase at Bob's Furniture costs \$153.67. A catalog offers the same bookcase for \$124.86 plus \$15.70 for shipping and handling. How much can be saved by purchasing the bookcase from the catalog?

- (1) **\$13.11**
- (2) \$28.81
- (3) \$44.51
- (4) \$294.23

18. Jon works 28 hours per week and earns \$10.35 per hour. What is the best estimate of his salary for two months?
(1) \$240 (3) **\$2,400**
(2) \$300 (4) \$3,000
105. Mary worked 27 hours per week and made \$13.22 per hour. About how much money did Mary make in half a year?
(1) \$350 (3) **\$9,000**
(2) \$4,500 (4) \$18,000
343. Which of the following is the best estimate for 15% of 62?
(1) 4 (3) **9**
(2) 6 (4) 12
580. Round 432.6654 to the nearest hundredth.
(1) 432.6 (3) **432.67**
(2) 432.66 (4) 432.665
627. Linda's family went to an amusement park and bought a \$12.35 family pass. The 4 of them each had a \$3.30 lunch. Estimate the total cost of the pass and the lunches.
(1) \$15 (3) \$32
(2) **\$25** (4) \$51
628. Tonya takes the train to work each day. The round trip ticket is \$7.60. She also has a \$5.25 lunch each day. Estimate how much money she spends in 5 days.
(1) \$13 (3) \$45
(2) \$32 (4) **\$65**
631. Mr. Sullivan bought pencils, which cost \$0.63 each, for each of his 23 students in his first class. He then bought pens, which cost \$0.94 each, for each of his 16 students in his second class. What is the best estimate for the total cost of the pencils and pens?
(1) **\$26** (3) \$42
(2) \$39 (4) \$62
633. To find the total number of strawberries in a grocery store, Caryn counted the number of strawberry containers and then counted the number of strawberries in three random containers. There were 286 containers, and the first three containers had 11, 15, and 10 strawberries. Which of the following is a reasonable estimate of the total number of strawberries in the store?
(1) 24 (3) **3,432**
(2) 1,929 (4) 9,438
763. Which is equal to $99 \div 225$?
(1) 0.0044 (3) **0.44**
(2) 0.044 (4) 4.4
1971. Stefan wants to estimate $54.94 - 32.98$. What is a good estimate? How did you reach this conclusion?
 $55 - 33 = 22$

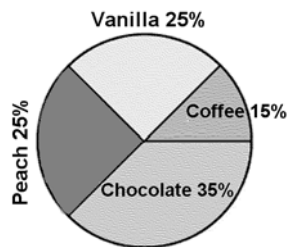
764. Which is approximately equal to $25 \div 900$?
(1) 0.0027 (3) 0.27
(2) **0.027** (4) 2.7
1000. Estimate the sum of 68, 46, 73, 81, and 59 by rounding to the nearest ten.
(1) 300 (3) 320
(2) 310 (4) **330**
1001. Choose the situation from the list below where a result using approximate numbers would be most acceptable.
(1) Billy is class treasurer. He needs to keep a record of how much money was raised at the bake sale to pay for the class trip.
(2) Mona keeps a count of items at a warehouse and needs to report the numbers to her manager so that he can order items that the warehouse needs more of.
(3) **John is holding a barbecue. He needs to buy enough steaks and hamburgers to serve the people coming.**
(4) Mike needs to pay his plumber, and is searching for change in his couch.
1009. Choose the situation where exact numbers would most likely be involved.
(1) Will checks to see if he has enough money when he leaves to go out.
(2) A mechanic needs to know how much air to put in a flat tire.
(3) Bobby needs to know how tall his brother is.
(4) **Mary goes to the ATM machine. The machines asks her how much to withdraw**
1093. Jim's school is going to make 2 new playgrounds, each 13.8 feet by 28.2 feet. Estimate the combined area of the 2 new playgrounds.
anything in the range of 600 – 900.
1094. Bill needed to build a new office complex for each of his 12 workers. Each worker needs an area of 3.7 feet by 5.2 feet. Estimate the total area that Bill needs in his new office complex for his workers.
anything between 222 and 250 sq. ft.
1095. Igor was building a new house which consisted of 6 rooms, each having dimensions 3.1 meters by 3.6 meters. Estimate the total number of square meters in the house.
anything between 54 m^2 and 72 m^2 .
1148. The product of $\frac{9}{10}$ and $\frac{4}{5}$ is
(1) **between 0 and 1.** (3) between 2 and 3.
(2) between 1 and 2. (4) greater than 3.

519. What is 23% of 30?
 (1) 1.9 (3) **6.9**
 (2) 5.8 (4) 14.2
522. A candy bar says that only 15% of its calories come from fat. If the candy bar has 250 calories, how many of those come from fat?
 (1) 25 (3) **37.5**
 (2) 30 (4) 45
552. Anita answered 34 questions correctly on an exam with 40 questions. What percent of the questions did she answer correctly?
 (1) 75% (3) **85%**
 (2) 80% (4) 90%
564. Which of the following correctly shows $\frac{3}{2}$ as a percent?
 (1) 50% (3) **150%**
 (2) 100% (4) 200%
578. Carmen loaned her friend \$800.00 for one year and received \$96.00 in interest. What was her annual rate of interest?
 (1) 8% (3) **12%**
 (2) 10% (4) 14%
642. Ethan was at school for basketball practice. He made 80% of his free throws that he tried. He made 120 successful free throws. How many attempts did he make?
 (1) 66 (3) **150**
 (2) 96 (4) 216
643. On a test, Bess got 85% of the questions correct. There were 160 questions. How many did she get right?
 (1) **136** (3) 245
 (2) 188 (4) 296
674. There are 560 students in the graduating class of Central High School. 85% of the students are going to college after graduating. How many of the 560 students are not going to college?
 (1) 15 (3) 85
 (2) **84** (4) 476
675. A large company took a survey of its 2,700 employees. 17% responded that they would like better management. How many employees dislike the company management?
 (1) 46 (3) 1700
 (2) **459** (4) 2241
963. What is 25% of 18.64?
 (1) **4.66** (3) 466
 (2) 46.6 (4) 4,660

Base your answers to questions **683** and **684** on the table below which shows the kind of fruit preferred for the 8th grade at Central Middle School, separated by gender.

	Male	Female
Apple	56	74
Orange	44	26

683. What percent of students prefer oranges?
 (1) 26% (3) 44%
 (2) **35%** (4) 70%
684. What percent of those who prefer apples are female?
 (1) 56% (3) 65%
 (2) **57%** (4) 74%
692. Sara wanted to reduce the size of her class picture. The original size of the picture was 12 in by 16 in. The new size was 3 in by 4 in. To what percent of the original dimensions did Sara reduce her picture to?
 (1) 0.25 % (3) **25 %**
 (2) 4 % (4) 75%
723. The circle graph below shows the popularity of ice cream flavors among 400 students at Stevens High School.



- How many of the 400 students like coffee flavored ice cream?
 (1) 11.5 (3) 100
 (2) **60** (4) 140
918. The original price of a candy bar was \$0.60. During a sale, the price of the candy bar dropped to \$0.45. What was the discount rate?
 (1) **25%** (3) 66%
 (2) 33% (4) 75%
926. Mr. Putter, a salesperson, earned \$503.00 at the end of one week. He receives a weekly base salary of \$404.00 in addition to 11% of his weekly sales. What is the amount of Mr. Putter's sales?
 (1) \$44.40 (3) **\$900.00**
 (2) \$99.00 (4) \$907.00
1745. What is 54% of 50?

II. MEASUREMENT

A. Standard/Nonstandard and Metric/Customary systems

1. Systems of Measurement Unit of measure

532. In which of the following units could you measure the temperature?

- (1) grams (3) meters
(2) liters (4) **degrees**

533. In which of the following units could you measure the mass of a rock?

- (1) **grams** (3) meters
(2) liters (4) degrees

554. Which is the correct order to show units from smallest to largest?

- (1) **milliliter, liter, kiloliter** (3) kiloliter, milliliter, liter
(2) liter, milliliter, kiloliter (4) liter, kiloliter, milliliter

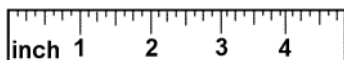
565. The volume of a cereal box could be 300

- (1) cubic millimeters (3) **cubic centimeters**
(2) liters (4) feet

583. It started snowing at 2:30. It stopped snowing 4 hours and 45 minutes later. When did the snow end?

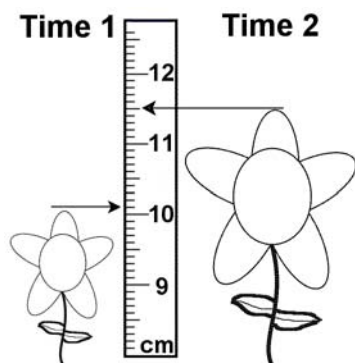
- (1) 6:15 (3) 7:30
(2) **7:15** (4) 8:15

589. What is the smallest division on the ruler below?



- (1) $\frac{1}{4}$ inch
(2) $\frac{1}{8}$ **inch**
(3) $\frac{1}{10}$ inch
(4) $\frac{1}{16}$ inch

590. For an experiment, Andrea is determining the growth of a flower. She measures the plant once each week. The picture below shows the height of the plant at two times. How much did the plant grow between Time 1 and Time 2?



- (1) **1.4 cm** (3) 10.1 cm
(2) 1.5 cm (4) 11.5 cm

823. Jamal is riding his bike on a 4 mile trip. It will take him 40 minutes to complete the trip. What is his average speed?

- (1) 3 mph (3) **6 mph**
(2) 4 mph (4) 8 mph

824. Felicia was driving exactly 55 miles per hour for between 3 and 4 hours. What is a possible distance that she drove?

- (1) 13.75 (3) 150
(2) 18 (4) **200**

974. Which unit is best to use to measure the distance between your hand and elbow?

- (1) millimeters (3) decameters
(2) **centimeters** (4) kilometers

975. What unit would be best to weigh a teenage boy?

- (1) milligrams (3) grams
(2) centigrams (4) **kilograms**

977. Julia worked from 8:45 AM through 4:30 PM today, with a 45 minutes lunch break. How many hours did she actually work?

- (1) 6 hours 0 minutes (3) **7 hours 0 minutes**
(2) 6 hours 30 minutes (4) 7 hours 15 minutes

1004. Carlo wants to find his height. Which would be the best unit of measurement to use?

- (1) millimeter (3) decameter
(2) **centimeter** (4) kilometer

1005. The volume of a bottle of water can best be measured in

- (1) microliters (3) decaliters
(2) **liters** (4) kiloliters

1023. When measuring the distance between Atlanta to New York City, which would be the best unit of measurement?

- (1) millimeter (3) meter
(2) centimeter (4) **kilometer**

1029. Which unit of measurement would best be used to measure the volume of a drop of water?

- (1) **milliliter** (3) liter
(2) centiliter (4) kiloliter

1030. An anvil weighing 2 kilograms weighs how many milligrams?

- (1) 2 (3) 20,000
(2) 2,000 (4) **2,000,000**

1396. Which unit of measurement would be most appropriate if you were to measure an angle?

- (1) **degrees** (3) pounds
(2) inches (4) feet

II. MEASUREMENT

A. Standard/Nonstandard and Metric/Customary systems

1. Systems of Measurement Conversion within customary or metric units

2694. Put the following measurements in order from smallest to largest:

1.5 feet, 1 yard, 15 inches, 1 foot

1 foot, 15 inches, 1.5 feet, 1 yard

2695. If a factory makes 360 buckets in an hour, how many buckets do they make in 1 minute?

- (1) **6 buckets** (3) 18 buckets
(2) 10 buckets (4) 36 buckets

2696. José is 75 inches tall. Which of the following is the same height?

- (1) 6 feet 0 inches (3) 6 feet 2 inches
(2) 6 feet 1 inch (4) **6 feet 3 inches**

2697. Evaluate $194 \text{ cm} + 100,000 \text{ mm}$

- (1) 101.94 centimeters (3) **101.94 meters**
(2) 100,194 meters (4) 100,194 millimeters

2698. A race car travels at 180 miles per hour. If there are 5,280 feet in a mile, how many feet can the race car travel in an hour?

- (1) 528,000 feet (3) 29.33 feet
(2) **950,400 feet** (4) 15,840 feet

2699. If a certain meteor passes by the earth every $5\frac{2}{3}$ years, how many months will it take for the meteor to pass the earth?

- (1) 5 months (3) 60 months
(2) 8 months (4) **68 months**

2830. Justin's new car uses 1 gallon of fuel for every 25 miles that he drives. If Justin took a trip where he used 3.5 gallons of fuel, how many feet did Justin drive? (1 mile = 5280 feet)

Show your work.

462,000 feet

2854. A race at the annual Fireman's Fair is 1.293 kilometers long. Which of the following is another way to represent the length of the race?

- (1) 1.293 meters (3) **1,293 meters**
(2) 12.93 centimeters (4) 12,930 centimeters

3084. The Persian Gulf War lasted 213 days. Calculate the number of seconds that the war lasted.

Show your work.

213 days

$\times 24 \text{ hours in a day}$

5112 hours

$\times 60 \text{ minutes in a hour}$

306720

$\times 60 \text{ seconds in a minute}$

18,403,200 seconds

3085. Joan is watering her flower pot for a science experiment. The experiment calls for 2 liters of water. She only has a 50 mL measuring cup. How many times must she fill the measuring cup and pour it into the pot?

- (1) 50 times (3) 20 times
(2) 100 times (4) **40 times**

3442. Susie can run 21 yards in 7 seconds. How fast can she run in feet per second?

- (1) 3 feet per second (3) 10 feet per second
(2) **9 feet per second** (4) 12 feet per second

3443. For his science project, Benjy measured that there are 2,640 feet in a half-mile. Based on his measurement how many yards are there in a mile?

- (1) 880 (3) **1,760**
(2) 1,280 (4) 5,280

3444. How many inches are in 5.5 yards?

- (1) 66 (3) **198**
(2) 124 (4) 208

3445. Aditiya is standing under a 9 foot doorway. He is 70 inches tall. How much space is between his head and the door?

- (1) 37 inches (3) 40 inches
(2) **3 feet 2 inches** (4) 4 feet

3446. Homer measured the distance from his home to school one morning and found that it is 440 yards. About how many meters is Homer's house from his school?

- (1) **402** (3) 420
(2) 414 (4) 434

3448. Which is faster, 60 miles per hour or 60 feet per second?

- (1) **60 miles per hour** (3) Both are the same
(2) 60 feet per second

3447. In her science book Melissa reads that escape velocity from Earth is 7 miles per second. What is that in miles per hour?

- (1) 420 (3) 16,400
(2) 1,640 (4) **25,200**

3449. Elliot is 6 feet and 1 inch tall while his friend Vaughn is 64.5 inches tall. How much taller is Elliot than Vaughn?

- (1) 0.5 feet (3) $\frac{3}{4}$ feet
(2) **8.5 inches** (4) 10.5 inches

3678. A kilometer is about $\frac{6}{10}$ of a mile. If a caution sign says the speed limit is 40 kilometers per hour then what is the approximate speed limit in miles per hour?

- (1) 20 kilometers per hour (3) 26 kilometers per hour
(2) **24 kilometers per hour** (4) 32 kilometers per hour

3817. Which of the following is the longest time?

- (1) 1,300 minutes (3) 36,000 seconds
(2) **1 day** (4) 12 hours

1871. Two lines are either parallel or intersecting.

Is this statement true or false? Support your answer with a proof or examples, as appropriate.

False. The lines could be skew lines.

2119. What is the name for two lines which are not parallel, yet do not intersect?

- (1) perpendicular lines (3) arcs
(2) meridians (4) **skew lines**

2577. A piece of a line containing two endpoints is known as a

- (1) ray. (3) line.
(2) **line segment.** (4) perpendicular.

2578. How many endpoints does a ray have?

- (1) **1** (3) 3
(2) 2 (4) 0

3124. Two lines are always the same distance apart from each other. These lines are called

- (1) **parallel lines** (3) perpendicular lines
(2) skew lines (4) arcs

3125. What is the name for a line that has one end point and continues in one direction away from the point forever?

- (1) line segment (3) altitude
(2) line (4) **ray**

3126. Sam was on the beach one day. He saw a drawing of 2 lines in the sand. The 2 lines crossed and formed a 90° angle. What is a name of these two lines?

- (1) Parallel lines (3) **Perpendicular lines**
(2) Rays (4) Arcs

3127. Which of the following is the name for a section of a curve?

- (1) Skew line (3) Parallel
(2) **Arc** (4) Line segment

3128. What is another name for the two legs in a right triangle?

- (1) Parallel line segments
(2) **Perpendicular line segments**
(3) Arcs
(4) Hypotenuses

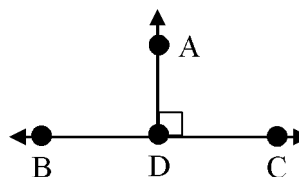
3133. A set of points on a plane that follow a path and continue indefinitely in both directions is called a

- (1) line segment (3) ray
(2) **line** (4) altitude

3464. What is the name of a line segment whose endpoints both lie on a circle, but doesn't pass through the center?

- (1) diameter (3) ray
(2) radius (4) **chord**

Base your answers to questions 3134 and 3135 on the diagram below.



3134. What is the name for \overline{AD} ?

- (1) Line (3) Ray
(2) **Line segment** (4) Skew line

3135. What is the relationship between \overline{AD} and \overline{BC} ?

- (1) Parallel lines (3) Skew lines
(2) **Perpendicular lines** (4) Vertical lines

3465. What is the name of a line which intersects a circle at two points?

- (1) radius (3) tangent
(2) **secant** (4) chord

3466. How many endpoints does a line have?

- (1) **0** (3) 2
(2) 1 (4) 3

3467. How many endpoints does a chord have?

- (1) 0 (3) **2**
(2) 1 (4) 3

3468. What is the name of the line segment opposite the right angle in a right triangle?

- (1) arc (3) **hypotenuse**
(2) chord (4) diameter

3688. Which of the following is an equation of a line that is not parallel to the other three?

- (1) $3 = 2y + 6x$ (3) $6x = 9 - 2y$
(2) **$2y = 6x + 4$** (4) $6x + 2y = 7$

3689. Which of the following is an equation of a line that is not parallel to the other three?

- (1) $7x - 5y = 6$ (3) **$5x + 7y = 3$**
(2) $5y - 7x = -2$ (4) $7x - 5y = -4$

3690. Which of the following is an equation of a line that is not parallel to the other three?

- (1) $3y - 6x = 5$ (3) $y = 2x - 1$
(2) $2y = 3 + 4x$ (4) **$6x + 3y = 2$**

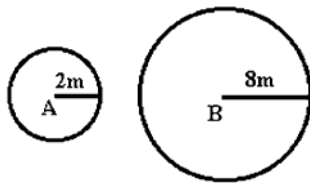
3746. Which of the following is the equation of a line with slope $\frac{1}{3}$ that passes through the point $(0, 5)$?

- (1) $y = \frac{1}{3}x + \frac{5}{3}$
(2) $y = 5x$
(3) **$y = \frac{1}{3}x + 5$**
(4) $y = 5x + 3$

3747. What is the equation of a line with slope $-\frac{3}{2}$ that passes through the point $(2, 0)$?

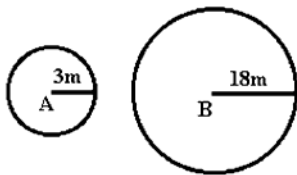
- (1) $y = -\frac{3}{2}x - 3$ (3) $y = 2x + \frac{3}{2}$
(2) $y = 2x - \frac{3}{2}$ (4) **$y = -\frac{3}{2}x + 3$**

84. How many times larger is the area of circle B than the area of circle A ?



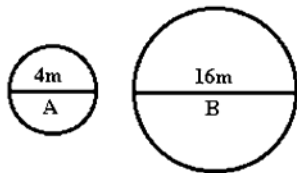
- (1) 2
- (2) 4
- (3) 8
- (4) **16**

85. How many times larger is the area of circle B than the area of circle A ?



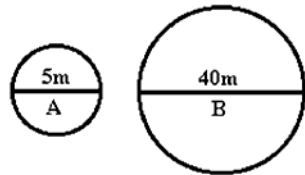
- (1) 1
- (2) 6
- (3) **36**
- (4) 216

86. How many times larger is the area of circle B than the area of circle A ?



- (1) 1
- (2) 4
- (3) **16**
- (4) 64

87. How many times larger is the area of circle B than the area of circle A ?

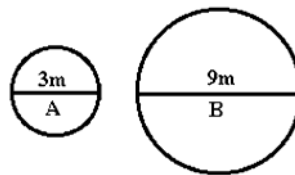


- (1) 5
- (2) 8
- (3) 40
- (4) **64**

362. The area of a circle is 4π . Find the circumference.

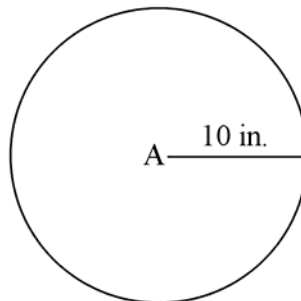
4π

88. How many times larger is the area of circle B than the area of circle A ?



- (1) 1
- (2) 3
- (3) **9**
- (4) 27

Base your answers to questions 657 and 658 on the following figure.



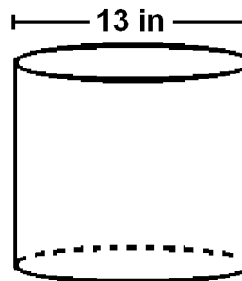
657. If the radius of the circle were doubled, what would be the change in its area?

- (1) $\frac{1}{4}$ as large
- (2) $\frac{1}{2}$ as large
- (3) 2 times as large
- (4) **4 times as large**

658. If the radius in the circle were tripled, what would be the change in its circumference?

- (1) one ninth as long
- (2) one third as long
- (3) **three times as long**
- (4) nine times as long

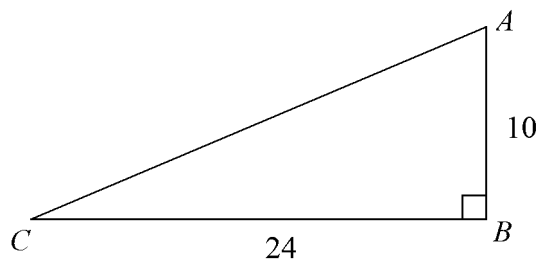
936. A cylindrical column 13 inches in diameter is strengthened by wrapping one steel band around the base, with no overlap.



What should be the length of the steel band?

13π in or 40.84 in

2916. Base your answer to the following question on the diagram below.

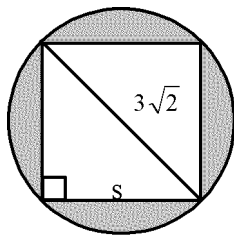


Find the measure of hypotenuse \overline{AC} .

Show your work.

26

2920. Base your answer to the following question on the diagram of a square inscribed in a circle shown below. The diagonal of the square is shown, running through the center of the circle (not shown).

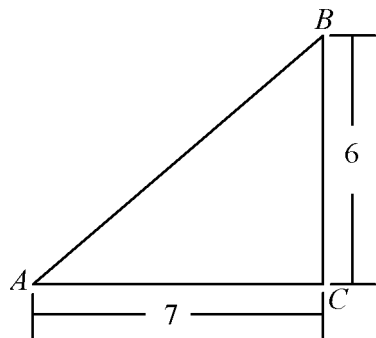


Find the length of side s of the square.

Show your work.

$$\begin{aligned} s^2 + s^2 &= (3\sqrt{2})^2 \\ 2s^2 &= 18 \\ s^2 &= 9 \\ s &= 3 \end{aligned}$$

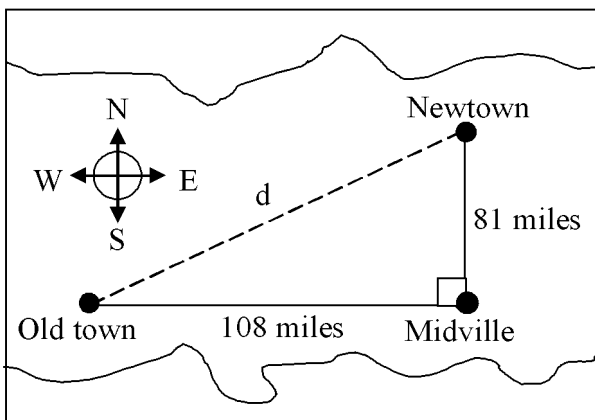
3331. What is the length of the hypotenuse of the triangle below?



- (1) 13
- (2) $\sqrt{13}$

- (3) 85
- (4) $\sqrt{85}$

Base your answers to questions 3111 through 3113 on the map below that shows the distances between three towns.



3111. What is the distance, d , between Old town and Newtown?

Show your work.

$$\begin{aligned} 108^2 + 81^2 &= d^2 \\ 11664 + 6561 &= d^2 \\ 18225 &= d^2 \\ d &= 135 \text{ miles} \end{aligned}$$

3112. A pilot is going to fly from Old town to Newtown. He needs to decide what compass heading to fly. If North is 0° , East is 90° , etc., then what compass heading should the pilot fly?

Show your work. Round your answer to the nearest degree.

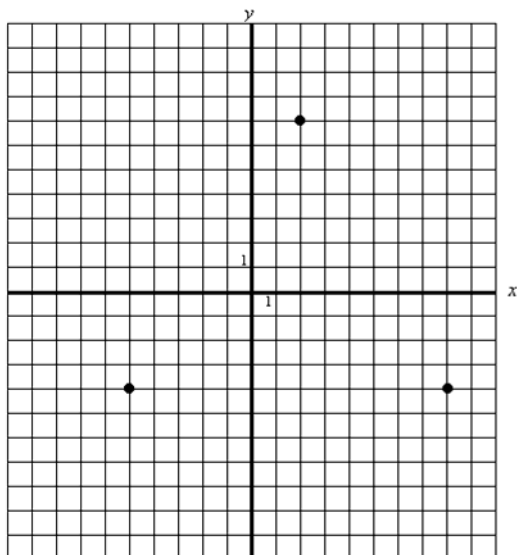
$$\begin{aligned} x &= \text{angle of triangle at Old town} \\ \tan x &= \frac{81}{108} \\ \tan x &= 0.75 \\ x &= 36.87^\circ \\ \text{To find heading: } 90 - 36.87 &= 53.13 = 53^\circ \end{aligned}$$

3113. Ariel needs to travel from Old town to Newtown. One option is to rent a car and drive along the road from Old town to Midville and then drive from Midville to Newtown. The other option is to fly from Old town to Newtown. The car rental costs $\$0.70/\text{mile}$. The flight would cost $\$1.00/\text{mile}$. Which option costs less money?

Explain your answer in the space below.

Car rental:
Distance = $108 + 81 = 189$ miles
 $189 \times \$0.80$ per mile = $\$132.30$
Flight:
 135 miles \times $\$1.00$ per mile = $\$135.00$
Therefore, driving will cost less money.

Base your answers to questions **813** and **814** on the following graph.



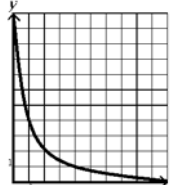
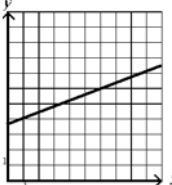
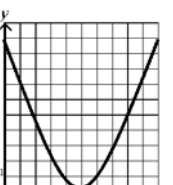
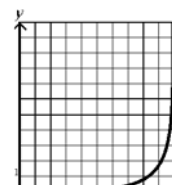
813. For what values of x and y is there no point graphed?

- (1) $x > 0$ and $y > 0$ (3) $x < 0$ and $y < 0$
 (2) $x < 0$ and $y > 0$ (4) $x > 0$ and $y < 0$

814. Connecting the two points below the x -axis will produce a

- (1) line perpendicular to the x -axis.
 (2) **line parallel to the x -axis.**
 (3) line parallel to the y -axis.
 (4) line segment left of the y -axis.

896. Which graph represents exponential growth?

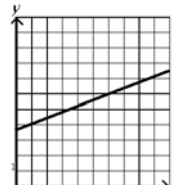
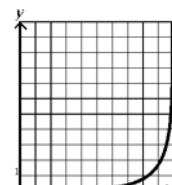
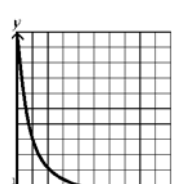
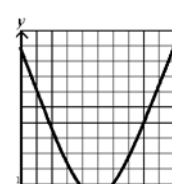
- (1)  (3) 
 (2)  (4) 

2115. In what quadrant does $(3, -4)$ lie?

- (1) I (3) III
 (2) II (4) IV

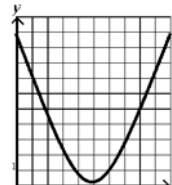
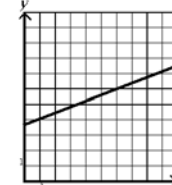
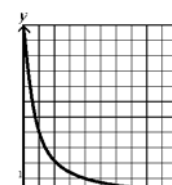
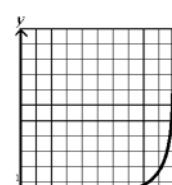
897. Half life is the length of time for half of a sample of radioactive material to decay. It appears as exponential decay.

Which graph can be used to show the radioactive decay of Uranium 238?

- (1)  (3) 
 (2)  (4) 

898. Population of bacteria in a petri dish doubles every second.

Which of the following graphs can be used to show the growth rate of bacteria?

- (1)  (3) 
 (2)  (4) 

2116. In what quadrant does $(-5, -4)$ lie?

- (1) I (3) III
 (2) II (4) IV

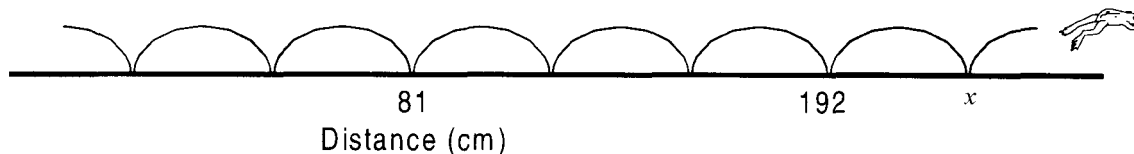
2191. The second coordinate of an ordered pair is 1, for example $(2,1), (5,1), (8,1)$. The line connecting these points is

- (1) a vertical line. (3) a diagonal line.
 (2) **a horizontal line.** (4) a curved line.

2287. The second coordinate of a set of ordered pairs is 5, e.g. $(1,5), (3,5),$ and $(5,5)$. The line connecting these points is

- (1) a vertical line. (3) a diagonal line.
 (2) **a horizontal line.** (4) intersecting lines.

1276. Suppose a frog made equal jumps across a road and the distances were measured and recorded as shown in the diagram below. How should the measure at point x be labeled to be consistent with the labeling of the frog's jumps?



(1) $x = 200$

(2) $x = 222$

(3) $x = 229$

(4) $x = 273$

8. When $x = 2$, the equation $x^3 + 4x - 5$ equals

(1) -5

(3) 9

(2) 7

(4) **11**

54. When $x = 4$, find the value of the expression.

$$\frac{2x^3 - 4x}{2}$$

(1) **56**

(3) 110

(2) 72

(4) 224

55. When $x = 5$, find the value of the expression.

$$x^2 - 11x + 25$$

(1) -55

(3) 55

(2) -5

(4) 105

56. When $x = 3$, find the value of the expression.

$$-x^2 + 2x + 11$$

(1) -4

(3) 14

(2) **8**

(4) 26

175. The variables w , x , y , and z each represent a different whole number. Given $w = 7$, use the properties of whole numbers to determine a value for each variable. For each variable, show the work you used to determine your answer.

$$w \times x = w$$

$$y - x = w$$

$$x + w = y$$

$$z \times y = z$$

$$x = 1$$

$$y = 8$$

$$z = 0$$

185. In the equation below, which value for x will make this statement true?

$$3(x - 7) = 69$$

(1) 4

(3) 21

(2) 10

(4) **30**

176. David has a can that contains only pennies, nickels, dimes, and quarters. There are more than \$3.00 and less than \$4.00 in the can. There are at least one penny, one nickel, one dime, and one quarter in the can.

Using the information above and the following clues, answer the question below:

- There are 9 times as many pennies as quarters.
- There are 3 times as many quarters as dimes.
- There is an equal amount of nickels and dimes

How much money is in the can?

(1) \$3.50

(3) \$3.52

(2) **\$3.51**

(4) \$4.68

204. Julie sold 27 glasses of lemonade and 16 glasses of orange juice. If she made \$25.00 and sold orange juice for \$0.50 a glass, how much did she sell each glass of lemonade for? Round your answer to the nearest cent.

(1) \$0.52

(3) **\$0.63**

(2) \$0.62

(4) \$0.68

205. In the equation below, which value for x will make the statement true?

$$7(x - 9) + 2 = 23$$

(1) 10

(3) **12**

(2) 11

(4) 13

216. Paco went to the movies. He spent a total of \$50. He spent \$10 on food and saw 8 movies. How much did each movie cost?

(1) \$4.00

(3) \$6.25

(2) **\$5.00**

(4) \$18.00

231. What value for c makes the following statement true?

$$243 = 3^c$$

(1) 3

(3) **5**

(2) 4

(4) 6

232. What value for m makes the following statement true?

$$1024 = 4^m$$

(1) 3

(3) **5**

(2) 4

(4) 6

2835. The equation below can be used to find the cost, including 5% tax, of s shirts. Ryan wants to know how many shirts he can buy for \$92.61. Solve the equation and write your answer below.

$$\$9.80s(1.05) = 92.61$$

Show your work.

9 shirts

2885. James is building a kite. He has a wooden rod that is 45 centimeters long. The directions require that this rod be cut into two pieces, one piece 5 centimeters longer than the other. He uses the equation below to determine where to make the cut.

$$x + (x + 5) = 45$$

The longer rod must then be cut into five equal pieces. Use the equation above to help you determine the length of these smaller pieces.

Show your work.

$x = 20$, therefore the longer rod is 25 cm. Cut into five equal pieces, each piece will be 5 cm long.

2947. A certain manufacturing company uses the formula

$$P = \$750M - \$1000E$$

to calculate monthly profits, where M = the number of machines built and E = the number of employees. If the company makes 900 machines in June and has 300 employees, what is the profit for the month of June?

- (1) **\$375,000** (3) \$12,000
(2) \$675,000 (4) \$300

2949. The ABC rental car company uses the formula

$$C = 2.00D + 0.50M$$

to calculate the cost, C , of renting a car, where D is the number of days the car is rented and M is the number of miles the rental car is driven. If Mr. Simon rents a car from the ABC company for 4 days and drives it 246 miles, how much will Mr. Simon have to pay?

- (1) \$494.00 (3) \$500.00
(2) **\$131.00** (4) \$125.00

2952. Justine always practices her cello 2.5 times the amount of time that Jane practices her cello. If Justine practiced for 6 hours this week, how many hours did they practice in total?

- (1) 15 hours (3) 21 hours
(2) 3.5 hours (4) **8.4 hours**

2950. Based on the formula below:

$$\frac{1}{x} + \frac{1}{y} = \frac{1}{z}$$

When $x = 4$ and $y = 20$, what would be the value of z ?

- (1) $\frac{3}{10}$
(2) $\frac{20}{4}$
(3) **$\frac{10}{3}$**
(4) $\frac{4}{20}$

2951. A certain type of bacteria multiply by the equation

$$T = 3D^2 - 1$$

where T = the total number of bacteria and D = the number of days the bacteria have been multiplying. If the bacteria multiply for 9 days, how many bacteria will there be?

- (1) 180 (3) 11
(2) **242** (4) 12

2953. George's go-cart drives at an average speed of 15 mph while Martin's go-cart drives at an average speed of 20 mph. If they both start at the same time from the same spot on a race course, how long will it take Martin to be 10 miles ahead of George?

- (1) 1 hours (3) 3 hours
(2) **2 hours** (4) 4 hours

2954. Kate wants to buy a pony that costs \$900. At her job, she makes \$43.00 a week while spending \$15.00 a week and saving the rest. How many weeks will it take her to have enough money to buy the pony if all of her savings are used for the pony?

- (1) **33 weeks** (3) 16 weeks
(2) 21 weeks (4) 11 weeks

2955. A software company uses the formula

$$P = \$150N - \$200E$$

to calculate its weekly profits, P , where N is the number of programs sold and E is the number of people employed by the company. If the company's profits for the last week were \$850 and there are 16 employees, how many programs did the company sell?

- (1) 16 programs (3) 50 programs
(2) 52 programs (4) **27 programs**

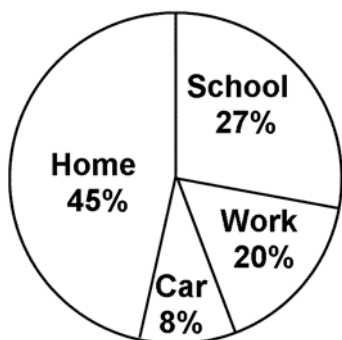
3562. If $y + 5$ is an even integer, then which of the following could be the value of y ?

- (1) **-3** (3) 0
(2) -2 (4) 2

A. Data Collection and Organization

Graphs: Bar, line, circle

Base your answers to questions 547 and 548 on the following circle graph which shows the portion of the time Billy spends at home, work, school, and in his car.



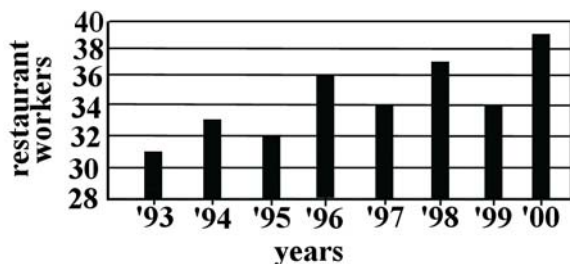
547. About how many hours in a day does he work?

- (1) 3
- (2) 5
- (3) 8
- (4) 20

548. About how many hours in a day does he spend at home?

- (1) 8
- (2) 11
- (3) 13
- (4) 16

556. The chart below shows the amount of workers on a restaurant staff from 1993-2000.



What is the decrease in the number of restaurant workers from 1998 to 1999?

- (1) 1
- (2) 2
- (3) 3
- (4) 5

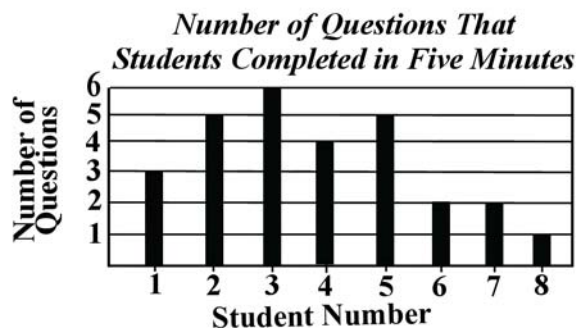
967. What type of graph best shows a continuation over time?

- (1) bar graph
- (2) **line graph**
- (3) pictograph
- (4) circle graph

968. What type of graph best uses pictures to illustrate data?

- (1) bar graph
- (2) line graph
- (3) **pictograph**
- (4) circle graph

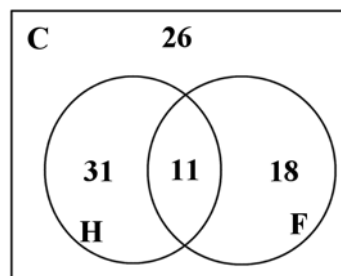
663. Base your answer to the following question on the bar graph below.



How many more questions did the fastest student complete than the slowest student?

- (1) 2
- (2) 3
- (3) 4
- (4) **5**

Base your answers to questions 665 through 667 on the Venn diagram below. C is the set of all of Ham's Burgers' customers yesterday. H is the set of customers who bought hamburgers. F is the set of customers who bought French fries.



665. How many customers bought both hamburgers and French fries?

- (1) **11**
- (2) 26
- (3) 31
- (4) 49

666. How many customers bought either hamburgers or French fries, but not both?

- (1) 11
- (2) 26
- (3) 37
- (4) **49**

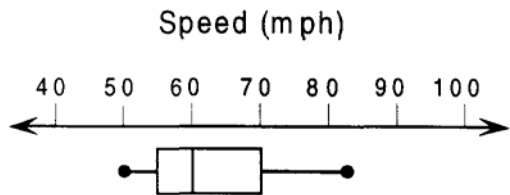
667. How many customers did not buy a hamburger?

- (1) 11
- (2) 18
- (3) **44**
- (4) 55

1003. Which type of graph should be used to show a piece of the total?

- (1) pictograph
- (2) line graph
- (3) **circle graph**
- (4) bar graph

1289. The speed for a sample of twenty-five cars is shown in miles per hour (mph) in the box-and-whiskers graph below.

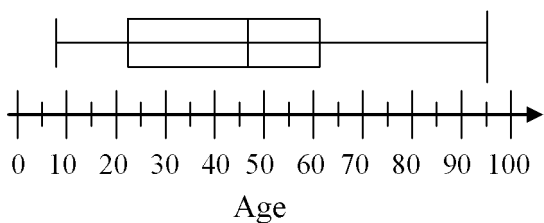


If an officer is writing speeding tickets to each driver in the sample whose speed is more than 70 mph, about what percentage of the drivers will be ticketed?

- (1) 25%
- (2) 40%
- (3) 75%
- (4) cannot be determined

Base your answers to questions 2989 through 2991 on the following box and whisker plot of the family members at the Claire Family Reunion.

Age of Attendees to Family Reunion



2989. According to the box and whisker plot, what is the age of the oldest person at the family reunion?

- (1) 23 years old
- (2) 47 years old
- (3) 61 years old
- (4) 95 years old

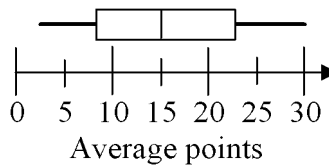
2990. What is the mean age of the family members attending the family reunion?

- (1) 8 years old
- (2) 23 years old
- (3) 47 years old
- (4) 61 years old

2991. The youngest 25% of the Claire family is under how many years of age?

- (1) 8 years old
- (2) 23 years old
- (3) 47 years old
- (4) 61 years old

Base your answers to questions 3159 and 3160 on the following box and whisker plot that shows the average points scored per game by the players on the Scott Middle School Basketball team.



3159. What was the average score on the team?

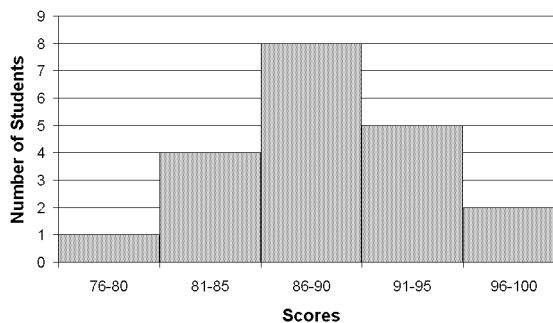
- (1) 7 points
- (2) 15 points
- (3) 23 points
- (4) 30 points

3160. What was the highest score on the team?

- (1) 7 points
- (2) 15 points
- (3) 23 points
- (4) 30 points

Base your answers to questions 3161 and 3162 on the following histogram of the scores on Mr. Stevens' last math test.

Histogram of Scores on Mr. Stevens' Math Test



3161. How many students scored between 91 and 100 on the test?

- (1) 5 students
- (2) 2 students
- (3) 7 students
- (4) 8 students

3162. How many more students scored in the 86-90 range than in the 76-80 range?

- (1) 7 students
- (2) 6 students
- (3) 5 students
- (4) 4 students

A. Patterns and Predictions

Odds

3503. The results of a random survey show that 35 out of 100 people plan to vote for Mrs. Bock for mayor. What is the best estimate of how many votes Mrs. Bock will receive if 300 people vote?
- (1) **100** (3) 150
(2) 135 (4) 165
3512. A spinner and a fair number die are used in a game. The spinner is divided into four equal sections labeled green, red, blue, and yellow and the faces of the die are labeled 1 through 6. What is the probability of spinning red and rolling a 2?
- (1) $\frac{1}{10}$
(2) $\frac{1}{24}$
(3) $\frac{5}{12}$
(4) $\frac{1}{6}$
3513. A spinner and a fair number die are used in a game. The spinner is divided into four equal sections labeled green, red, blue, and yellow and the faces of the die are labeled 1 through 6. What is the probability of spinning blue or red and rolling a 4?
- (1) $\frac{1}{18}$
(2) $\frac{1}{12}$
(3) $\frac{1}{6}$
(4) $\frac{3}{4}$
3514. A spinner and a fair number die are used in a game. The spinner is divided into four equal sections labeled green, red, blue, and yellow and the faces of the die are labeled 1 through 6. What is the probability of spinning green and rolling a 1 or 6?
- (1) $\frac{1}{24}$
(2) $\frac{1}{18}$
(3) $\frac{1}{12}$
(4) $\frac{1}{7}$
3537. A bag contains 50 cards labeled with the numbers 1 through 50. What is the probability of choosing a card that is labeled with a multiple of 3?
- (1) $\frac{16}{50}$
(2) $\frac{20}{50}$
(3) $\frac{25}{50}$
(4) $\frac{34}{50}$
3538. A bag contains 33 cards numbered 1 through 33. What is the probability of drawing a card that is numbered with a multiple of 5?
- (1) $\frac{5}{33}$
(2) $\frac{6}{33}$
(3) $\frac{15}{33}$
(4) $\frac{27}{33}$
3539. Felipe has a box with 200 trading cards. He randomly pulls out 15 and finds that 6 of them are red. Based on this ratio, of the original 200 cards, how many should Felipe expect to be red?
- (1) 40 (3) **80**
(2) 60 (4) 120
3544. Bethany has a large box containing 250 animal crackers. She randomly chooses 15 animal crackers and 3 of them are lions. Based on this ratio, of the original 300 animal crackers, how many lions should she expect to find?
- (1) 36 (3) 45
(2) 40 (4) **50**
3573. There are red, white and blue balloons in a package. If Brent chooses 1 balloon without looking, the probability it will be red is $\frac{1}{4}$. The probability it will be white is $\frac{7}{12}$. The probability it will be blue is $\frac{1}{6}$. What is the least number of balloons that could be in the package?
- (1) 4 (3) **12**
(2) 6 (4) 24
3583. A number cube has sides labeled 1 through 6. What is the probability of rolling a number that is a factor of 6?
- (1) $\frac{1}{3}$
(2) $\frac{1}{2}$
(3) $\frac{2}{3}$
(4) $\frac{5}{6}$
3584. The chance of rain on Saturday is 20%. The chance of rain on Sunday is 45%. What is the probability that it will rain on both Saturday and Sunday?
- (1) **9%** (3) 44%
(2) 15% (4) 65%
3610. Phil has a bag of gum balls containing 8 blue gum balls and 2 yellow gum balls. What is the probability of him choosing a blue gum ball at random, keeping it, and then choosing a yellow gum ball?
- (1) $\frac{4}{25}$
(2) $\frac{8}{45}$
(3) $\frac{1}{2}$
(4) $\frac{48}{90}$
3660. In a group of 20 people, 17 people are wearing sneakers while the others are wearing sandals. If one person is selected at random from this group, what is the probability of selecting a person wearing sandals?
- (1) **0.30** (3) 0.45
(2) 0.35 (4) 0.70