MATHCOUNTS®

2013
■ School Competition ■
Sprint Round
Problems 1–30

Name _____

DO NOT BEGIN UNTIL YOU ARE INSTRUCTED TO DO SO.

This section of the competition consists of 30 problems. You will have 40 minutes to complete all the problems. You are not allowed to use calculators, books or other aids during this round. Calculations may be done on scratch paper. All answers must be complete, legible and simplified to lowest terms. Record only final answers in the blanks in the left-hand column of the competition booklet. If you complete the problems before time is called, use the remaining time to check your answers.

In each written round of the competition, the required unit for the answer is included in the answer blank. The plural form of the unit is always used, even if the answer appears to require the singular form of the unit. The unit provided in the answer blank is the only form of the answer that will be accepted.

Total Correct	Scorer's Initials

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1. _____ What is the value of $2 + 3 \times 4 - 5$?

2. $ _____ Barb, Dianna, Tina, Pat and Kera decide to go to lunch to celebrate Kera's birthday. They agree to split the bill equally. With tax and tip, the bill is $71.20. However, at the last minute, Kera's friends decide to pay her share and split the bill evenly among the four of them. What total amount does each of Kera's friends pay?

3. _____ degrees In right triangle ABC what is the arithmetic mean (average), in degrees, of the measures of the two smallest angles?

4. _____ An 8-inch by 10-inch photo is placed inside a frame with inner dimensions of 10 inches by 12 inches. What fraction of the interior area is occupied by the photo? Express your answer as a common fraction.

5. _____ cups Cleo's recipe for a dozen cupcakes calls for 1 cup of sugar. How many cups of sugar are needed to make 30 cupcakes? Express your answer as a mixed number.

6. _____ minutes   If 4 birds eat 4 worms in 4 minutes, how many minutes will it take 32 birds to eat 32 worms?

7. _____ days   Gretchen is trying to row her boat 20 miles up a river from the starting line to the finish line of a race. Gretchen starts out each morning at 7 a.m. and rows 10 miles upstream. Each night she floats 5 miles downstream. How many days will it take for Gretchen to get to the finish line?

8. _____   What number, when added to 1 and then divided by 7, has a result of 2?

9. _____ people   One hundred people were asked which flavor of ice cream they prefer out of chocolate, strawberry and vanilla. Based on the results shown, how many more people surveryed prefer chocolate than prefer strawberry?

Preferred Ice Cream Flavor

Chocolate 45%   Strawberry 25%   Vanilla 30%
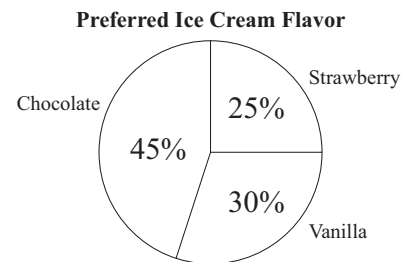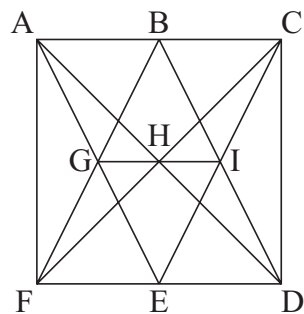
10. Point _____   A machine needs to be programmed to lay a single, continuous line of glue covering all of the segments of the pattern shown. The letters identify the points where the glue path can change direction. There is only one ending point for any path that starts at G, covers all segments, and never retraces any segment. At what point will every such path end?

A   B   C
H
G   I
F   E   D

11. _____ What common fraction is equivalent to 0.6%?

12. _____ students At the annual music festival, the number of Bayview Middle School students competing in the band, chorus and orchestra competitions is 14, 13 and 17 students, respectively. Four students will compete in all three competitions. Five students will compete in the band and chorus competitions. Six students will compete in the band and orchestra competitions. Seven students will compete in the chorus and orchestra competitions. How many students from Bayview Middle School will compete in this music festival?

Band   Chorus

Orchestra
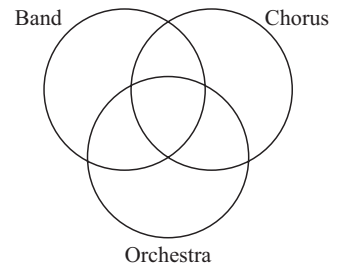
13. _____ ways Marie likes to jump up steps. She can jump up one step at a time, two steps at a time, or a combination of both. How many different ways can she jump up a set of five steps?

14. $ _____ The Writing Emporium sells pencils and pens individually. Alana buys a pencil and two pens for $1.10. Jeffrey buys two pencils and a pen for $1.00. How much does Edward spend to buy six pencils and six pens from the Writing Emporium?

15. _____ days Using the Mayan calendar, a uinal is 20 days, and a tun is 18 uinals. How many days are in 2 tuns?

16. _____ students

The student body at Central Middle School consists of 303 eighth graders, 312 seventh graders and 285 sixth graders. Ten percent of the students responded to a poll that asked when Field Day should take place. Of those who responded, 30% were in favor of having Field Day take place on the last day of school. How many students who responded to the poll were not in favor of Field Day taking place on the last day of school?

17. _____ field goals

Last season the Descartes Middle School football team scored 36 times, earning a total of 212 points. The team scored only field goals, each worth 3 points, and touchdowns, each worth 7 points (including all extra points). How many field goals did the team score last season?

18. _____ deliveries

Fatima plans to resume her summer job at the local supermarket, which requires the use of her personal vehicle to deliver groceries. Including tips, Fatima earns an average of $9.00 per delivery, and she anticipates spending $298 each month on gas and vehicle maintenance. If Fatima will work for three months, what is the minimum number of deliveries she must make to earn $3286 for tuition and cover her gas and vehicle maintenance expenses?

19. _____

What expression represents $5x(1 + 7y) + x(y - 5)$ when it is written in simplest form in terms of x and y?

20. _____

Estefan brings two bags of sandwiches to a party. One bag contains 6 peanut butter sandwiches, 4 cheese sandwiches and 2 ham sandwiches. The other bag contains 4 peanut butter sandwiches, 2 cheese sandwiches, 4 ham sandwiches and 2 chicken salad sandwiches. If John picks one sandwich from each bag at random, what is the probability both will be peanut butter sandwiches? Express your answer as a common fraction.

21. _____ units² Circle P is tangent to circle O at point A and to diameter BC at point O, as shown. With length 4 units, $\overline{OA}$ is a diameter of circle P and a radius of circle O. What is the area of the shaded region? Express your answer in terms of π.
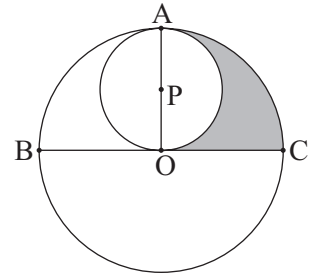
22. $ _____ Tim purchased a pair of running shoes for $79.20, which included a 10% sales tax. If the shoes were on sale for 40% off the original price, what was the original price of the running shoes?

23. _____ miles A bank robber hops into his getaway car and travels at an average speed of 60 mi/h into the countryside. Exactly two minutes after the robber leaves the bank, a police officer follows him from the bank along the same route. If the officer is traveling at an average speed of 75 mi/h, how far from the bank will the robber be intercepted?

24. _____ degrees Of the five coplanar lines shown, only *m* and *n* are parallel. What is the degree measure of $\angle 1$?
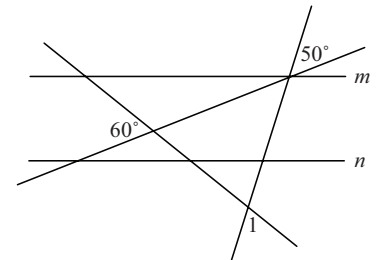
25. _____ years old Paul is three times as old as Manny. Alex is twice as old as Manny. Tim is one-fourth the sum of Paul's and Alex's ages. The sum of the ages of Alex, Tim and Paul is 75. How old is Manny?

26. _____ If $2n - 2(3m - 4) = 12$ and $n - 6 = 5m$, what is the numerical value of $3m + n$?

27. _____ mi/h During his morning commute to work in rush hour traffic, Justin's average speed was 30 mi/h. During his afternoon commute back home along the same route, his average speed was 60 mi/h. What was his average speed for the entire round trip?

28. _____ A bag contains 20 red marbles and 12 blue marbles. What is the probability that two marbles drawn at random, without replacement, will be the same color? Express your answer as a common fraction.

29. _____ cm A point P is located in the interior of rectangle ABCD such that PB = 25 cm. A point Q is located on $\overline{AB}$ such that $\overline{PQ}$ is perpendicular to $\overline{AB}$. If all lengths are measured in centimeters, AQ = PQ, $\overline{PQ}$ has the smallest integer length possible and $\overline{BQ}$ is of integer length, what is the length of $\overline{AB}$?
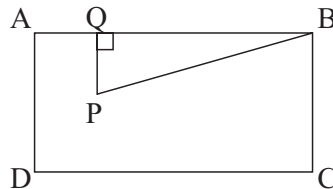
30. _____ in A regular hexagon with area $54\sqrt{3}$ in² is inscribed in a circle. What is the circumference of the circle? Express your answer in terms of π.