
MATHCOUNTS®

2016
■ 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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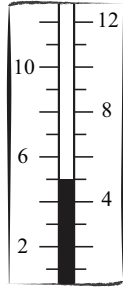
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1. _____ °C



What is the temperature according to this thermometer that measures temperature in degrees Celsius?

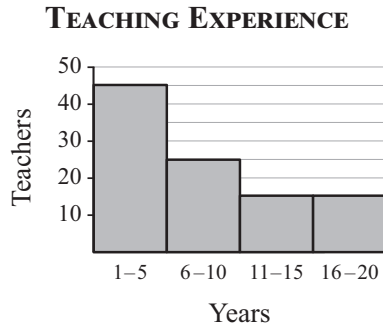
2. \$ _____

Cory has a summer job at the local grocery store. How much will Cory get paid to work 20 hours each week for 8 weeks if he earns \$10 an hour?

3. _____

What is the value of 21 divided by $\frac{7}{8}$?

4. _____ percent



The graph shows the results when 100 teachers reported the number of years they have been teaching. What percent of these teachers have been teaching more than 5 years but no more than 15 years?

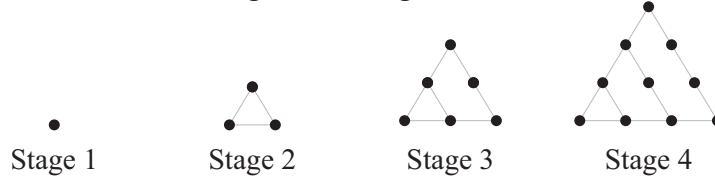
5. _____

Let $a \odot b = 2a - 3b$. What is the value of $(1 \odot 2) \odot 7$?

6. _____

If $\frac{8}{14} = \frac{4}{d}$, what is the value of d ?

7. _____ dots The figure shows the first four stages of a dot pattern. If the pattern continues, how many dots will be in the figure for Stage 7?



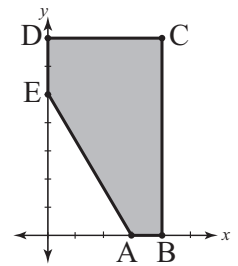
8. \$ According to this order form for Tessa’s art supplies, the total cost for the 20 items she ordered was \$150.00. Some of the details of Tessa’s order are missing from the order form, but based on the information given, what was the unit price for each sketch pad Tessa ordered?

| ORDER FORM | | | |
|-------------------|----------------------|-------------------------|-------------------------|
| ITEM | QUANTITY | UNIT PRICE | TOTAL COST |
| Paint Brush | <input type="text"/> | \$ 8.00 | \$ 48.00 |
| Acrylic Paint | 10 | \$ <input type="text"/> | \$ 75.00 |
| Sketch Pad | 4 | \$ <input type="text"/> | \$ <input type="text"/> |
| | 20 | | \$150.00 |

9. _____ feet A length of 240 feet of fencing is to be supported by a total of 13 evenly spaced fence posts, including one at each end, as shown. How far apart must the fence posts be spaced?



10. _____ units² This coordinate grid shows pentagon ABCDE with vertices A(3, 0), B(4, 0), C(4, 7), D(0, 7) and E(0, 5). What is its area? Express your answer as a decimal to the nearest tenth.

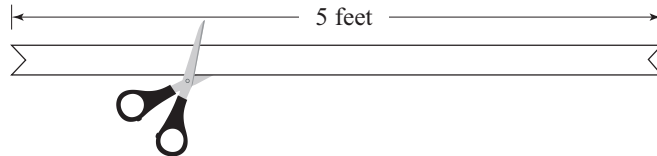


11. _____ cookies Maria baked a batch of cookies. She ate three cookies and then $\frac{4}{5}$ of the cookies were left. How many cookies did Maria bake?

12. _____ If $\heartsuit + \heartsuit = \spadesuit + \spadesuit$ and $\spadesuit = 16 - (\heartsuit + \heartsuit)$, what is the value of $\heartsuit + \spadesuit$?

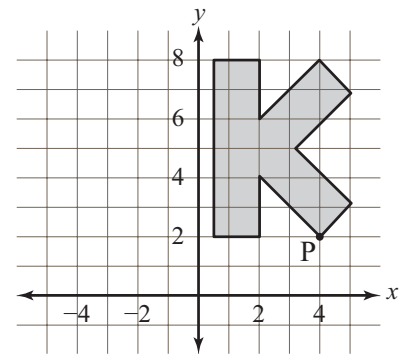
13. _____ pounds The weights of four students on a wrestling team are 100 pounds, 108 pounds, 113 pounds, and 119 pounds. What is the mean weight of the four students?

14. _____ inches A 5-foot ribbon is cut into two pieces with lengths in the ratio 1:4. How many inches long is the shortest piece?



15. _____ gallons While jogging, Cher's heart pumped 450 gallons of blood in 1 hour, 15 minutes. On average, how many gallons of blood did her heart pump each minute?

16. (,) What are the coordinates of the image of P, when this figure is reflected across the y -axis? Express your answer as an ordered pair.



17. _____ boxes The glee club had a fund-raiser selling cookies to raise money for a spring concert. The club kept half of the money collected from selling cookies for \$5 per box. How many boxes of cookies were sold if the glee club kept \$1250?

18. _____ cm The length of a rectangle is twice its width. The rectangle has an area of 128 cm^2 . What is its perimeter?

19. _____ integers How many two-digit positive integers less than 25 have the property that they are divisible by each of their digits?

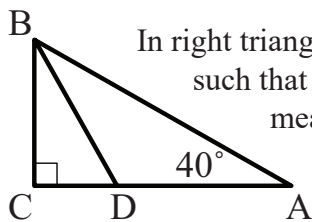
20. _____ The three-digit integer $5A4$ is a multiple of six. What is the sum of all the possible values for the digit represented by A ?

21. _____ coins The total cost of Keegan's lunch was \$4.56. He paid with a 5-dollar bill and received exact change. What is the fewest number of coins Keegan could have received?

22. _____ The line passing through $(-3, 2)$ and $(7, -1)$ intersects the x -axis at the point $(a, 0)$. What is the value of a ? Express your answer as a common fraction.

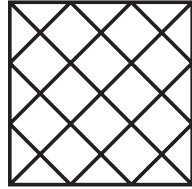
23. \$ _____ The prize money in a science fair is divided among the top three winners so that the amount awarded for first place is four times the amount for third place, and the amount for second place is three times the amount for third place. If the total amount of prize money is \$2400, what is the amount awarded for second place?

24. _____ degrees In right triangle ABC , shown here, $m\angle A = 40^\circ$, and D is on side AC such that segment BD bisects $\angle CBA$. What is the degree measure of $\angle BDC$?



25. _____ Addie's one-quart fruit salad is $\frac{1}{4}$ strawberries and $\frac{3}{4}$ blueberries. Ashlyn's one-quart fruit salad is $\frac{1}{2}$ strawberries and $\frac{1}{2}$ blueberries. When Addie and Ashlyn combine their fruit salads, what portion of the mixture is strawberries? Express your answer as a common fraction.

26. _____ triangles

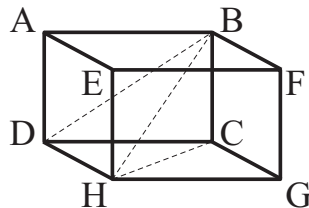


How many triangles are in the figure shown here?

27. _____ J.R.R. Tolkien, author of *The Hobbit*, stated in 1970 that on one of his birthdays the age he turned was the square root of the year. In what year was he born?

28. _____ hours Twins Cara and Dara drove from their house to the beach in exactly 5 hours, not including rest stops. First, Cara drove at an average speed of 40 mi/h and stopped at a rest area located halfway between their house and the beach. Then Dara drove from that location to the beach at an average speed of 60 mi/h. For how many hours did Dara drive?

29. _____ units³



For the rectangular solid shown, $AB = 12$ units, $BC = 8$ units and $AE = 6$ units. What is the volume of the tetrahedron $DHBC$?

30. _____ Bobby attends an event along with two friends. At the event, there is a drawing for three door prizes. Each person in attendance has an equal chance of winning a prize and no one can win more than one prize. If there are 20 people at the event, including Bobby and his two friends, what is the probability that Bobby and both of his friends each will win a prize? Express your answer as a common fraction.