

2011 Orange County Math Circle All-Girls Tournament
Grade 7 - 8 Individual Round

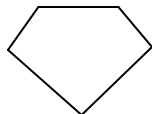
Name: _____ School: _____ Grade: _____

1. At Sharon's middle school, the 1st class starts at 8:34A.M. and ends at 9:27A.M. If there are 7 classes in a day and breaks between classes are 4 minutes each, how long, in minutes, is Sharon's school day?

2. How many multiples of 11 are there between 100 and 200?

3. What is the maximum number of points of intersection between a cube and a sphere?

4. What is the sum of the angles in this figure?



5. I have eight songs on my iPod. How many ways can I shuffle (randomly play) five songs in different orders?

6. Kelsey has \$100 dollars in her wallet. She buys a \$25 sweater using a "20% Off" coupon. She also buys two pairs of shoes for \$10 each. How much does she have left in her wallet?

7. How many times in a day do the minute and hour hands of a clock follow the same line, excluding 6:00 and 12:00?

8. Harriet had 2011 pencils at the beginning of the year. Being a very enthusiastic and hard working student, she uses up 15 pencils per day. How many pencils does she have left after 3 weeks?

9. You want to eat an orange that is 6 cm in diameter. After taking off the peel, you find out that all the orange peels have a total volume of 2 cm^3 . Assuming the orange is a perfect sphere, what fraction of the orange do you actually eat? (Volume of sphere = $\frac{4}{3}\pi r^3$)

10. Selena wants to paint her nails different colors on one hand. If she has nail polish in the colors of peach, tangerine, mellow yellow, cyan, lilac, and sapphire, how many ways can she paint her nails with different colors, not necessarily in different orders?

11. Find the sum of the first 12 terms of the following sequence: 2, -6, 10, -14, 18, ...

(A) -24 (B) -18 (C) 24 (D) -264

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12. Solve for x : $0.10(24 - x) + 0.25x = 3.45$
13. Three times the largest of four consecutive odd integers is three less than four times the smallest of the four consecutive odd integers. Find the smallest of the four consecutive odd integers.
14. Priscilla is looking for a pair of sandals. She sees that a pair of wedge sandals originally \$45.00 are marked 15% off and a pair of strap sandals originally \$38.00 marked "\$4 off". How much will she save if she buys one pair rather than the other pair?
15. Whenever I bake cookies, I use $2\frac{1}{2}$ cups of all-purpose flour for every 3 dozen cookies. How many cups of flour do I use for 9 cookies?
16. A watermelon is cut in half. Assuming it was a perfect sphere and that its diameter was 12 inches, what is the area of the inside of the fruit that can be seen?
17. Stella wants to pick a new outfit for every day of the year. If she owns 5 tops, 3 skirts, and 4 pairs of jeans, how many pairs of shoes must she have in order to wear a different outfit each day of the year?
18. Irene walks northeast from her house to school, then west to the park. If the distances between her house to her school and her house to the park are equal, how many times longer is the distance between her school and the park than her house to the park?
19. What is the value of $\frac{a+11b}{a-b}$ if $\frac{4a+3b}{a-2b} = 5$?
20. In a grid of 4×4 dots, how many lines contain at least 3 points?
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21. I want to eat a cup of frozen yogurt in either a small or medium cup. I can choose from any of the following flavors: mango, green tea, mocha, mint, or pineapple. If the toppings I can choose from are almonds, sprinkles, gummy bears, and cookie crumbs, how many different combinations of frozen yogurt can I make?

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22. A jar has 5 ladybugs with 2 dots, 6 lady bugs with 3 dots, 7 ladybugs with 4 dots and 8 ladybugs with 6 dots. The first ladybug I pull out has even number of dots. What is the probability that I will pull out a ladybug with an odd number of dots?
23. Darla wants to shop in 4 different stores at a mall. How many ways can she shop these stores in different orders?
24. The train arrives every 12 minutes. If Molly waits for from 5:45P.M. to 6:35P.M., how many times at most will the train arrive?
25. If the area of a rectangle is 24 square units, how many different sets of dimensions can the rectangle have?
26. A triangle's area is $\frac{5}{2}$ of its height. If its area is 20, what is the length of its base?
27. By putting parentheses around any of the numbers in this equation, how many different values can you get?
- $$2 + 3 \times 4 + 5$$
28. In middle school, $\frac{4}{7}$ of girls carry backpacks instead of purses. In high school, $\frac{5}{8}$ of girls carry purses instead of backpacks. What fraction less of girls carry backpacks in high school than in middle school?
29. The number of 5th and 6th graders here today is 9 less than the square of a number n . If there are fifty-five 5th and 6th graders in total, what is n ?
30. In a group of 8 people, at least how many people must be born on the same day of the week?

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31. A full cup of orange juice weighs 32 ounces and a half-full cup of orange juice weighs 19 ounces. What is the weight of the cup if it is empty?

32. There is a sparrow resting on a tree 5 meters high, which casts a shadow 3 meters long. If the tree was 35 meters high, how long would the tree's shadow be?

33. Find the 21st term of the sequence: $\frac{1}{3}, \frac{1}{2}, \frac{3}{5}, \frac{2}{3}, \frac{5}{7}, \dots$

34. The reciprocals of 4 positive integers add up to $\frac{19}{20}$. Three of these integers are in the ratio 1:2:3. What is the sum of the four integers?

35. Twelve people are present at a party. Each person shakes hands with everyone else. How many total handshakes are exchanged?

36. For how many positive integers n does \sqrt{n} differ from $\sqrt{300}$ by less than one?

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37. A frog is centered at the origin of a number line. If it can only take leaps in the positive direction of either 1 or 2 units per leap, how many ways are there to get to point (13,0) ?

38. Find the largest 5 digit number for when you multiply by a single digit number, you get a six digit number with digits identical in value.

39. Sally wants exactly 4 cups of punch. However, she only has a 5-cup pitcher and a 3-cup pitcher. Using only these two pitchers, how can she measure exactly 4 cups of punch?
Write out your solution.

40. How many triangles are in the following figure?

