

Orange County Middle School Math Contest (2008)
Written Round – Middle School Courses – Form 1

- *Place all answers on the answer sheet provided.*
- *Do all of your work in the space provided on the test pages.*
- *Turn in your test at the end of this round.*
- *You may NOT use a calculator on this test.*

1. Calculate $-17 - (-5 - 13)$.

- A. -35 B. -25 C. 25 D. 1

2. The probability of winning is $\frac{2}{5}$. What are the odds of losing?

- A. 3 : 2 B. 3 : 5 C. 3 : 7 D. 7 : 3

3. You borrow \$1500 at 5% simple interest and will pay it back over a 2-year period. What will be the total cost of borrowing this money?

- A. \$150 B. \$1575 C. \$1653.75 D. \$1650

4. Calculate $45 \div \frac{5}{14}$.

- A. $\frac{1}{126}$ B. $\frac{14}{225}$ C. 126 D. $\frac{225}{14}$

5. What is the LCM of 18, 28, and 42?

- A. 2 B. 42 C. 126 D. 252

6. What is the per cent increase from 275 to 300?

- A. $8\frac{1}{3}\%$ B. $9\frac{1}{11}\%$ C. $9\frac{11}{12}\%$ D. 25%

7. Find the prime factorization of 540.

- A. $2^2 \times 3^3 \times 10$ B. $2 \times 3^3 \times 5^3$ C. $2^2 \times 3^3 \times 5$ D. $2^2 \times 3^4 \times 5$

8. Eight students need to form groups of two. How many different combinations of two person groups are possible?

- A. 28 B. 24 C. 16 D. 56

9. What number is 1.05% of 2100?

- A. 20 B. 22.05 C. 2000 D. 2205

10. Calculate $-8 - (-7)$

- A. 1 B. -1 C. 15 D. -15

11. What is the slope of the line $3x - 2y = 6$?

- A. -3 B. $-\frac{3}{2}$ C. $-\frac{2}{3}$ D. $\frac{3}{2}$

12. A virus takes up a volume of 9.5×10^{-20} cubic centimeters. Calculate the volume of 7.5×10^{17} viruses. Write the answer in scientific notation.

- A. $1.7 \times 10^{38} \text{ cm}^3$ C. $7.125 \times 10^{-2} \text{ cm}^3$
B. $1.7 \times 10^{-2} \text{ cm}^3$ D. $7.125 \times 10^{38} \text{ cm}^3$

13. What is the elapsed time between 7:32 P.M. and 4:27 A.M.?

- A. 8 hr 55 min B. 8 hr 40 min C. 10 hr 40 min D. 4 hr 55 min

14. Marisa, Jon, and Janet are all related. They are 13, 18, and 20 years old, but not necessarily in that order. Janet is *not* the oldest. The 13-year old is Jon's cousin. Marisa is older than Jon. How old is each person?

- A. Janet is 20, Jon is 18, Marisa is 13 C. Janet is 20, Jon is 13, Marisa is 18
B. Janet is 13, Jon is 18, Marisa is 20 D. Janet is 18, Jon is 13, Marisa is 20

15. How many different ways can six people line up for a photo if the tallest person must stand in the middle?

- A. 25 B. 36 C. 120 D. 720

16. Calculate: $(9 \times 6^2 - 9 \times 2^2) \div (4 + 5)$

- A. 8 B. 32 C. 140 D. 320

17. A van travels 180 miles on 6 gallons of gas. At the same rate, how many gallons of gas are needed to travel 750 miles?

- A. 75 gallons B. 25 gallons C. 50 gallons D. 225 gallons

18. Convert 2,231.5 milligrams to grams.

- A. 2.2315 g B. 223.15 g C. 22,315 g D. 0.0022315 g

19. Which of the following values is the smallest?

- A. 3.7×10^{-16} B. 2.8×10^{-15} C. 1.44×10^{-15} D. 1.5×10^{-18}

20. Calculate: ${}_{10}P_2 + {}_4P_3$

- A. 2160 B. 74 C. 66 D. 114

21. Find the mean of the data set, rounded to the nearest tenth.

{18.1, 17.9, 16.8, 18.7, 15.1}

- A. 17.9 B. 21.7 C. 17.3 D. 14.4

22. A lawn trimmer on sale for 45% off. The sales price is \$200. What was the approximate original price?

- A. \$90 B. \$110 C. \$365 D. \$445

23. A rectangle has a perimeter of 200 feet. The rectangle's length is 4 times longer than the width. Find the length, l , and width, w , of the rectangle.

- A. $l = 20$ ft, $w = 80$ ft C. $l = 298$ ft, $w = 72$ ft
B. $l = 80$ ft, $w = 20$ ft D. $l = 160$ ft, $w = 40$ ft

24. An average of 1.8% of Apex Alarm systems need a battery replacement after 3 years in operation. Seventy-two battery replacements are needed in the next three years. Estimate the number of Apex Alarm systems sold.

- A. 7,056 systems B. 4,000 systems C. 400 systems D. 1,333 systems

25. Find the area of a triangle with a base of 74 feet and a height of 17 feet.

- A. 91 ft^2 B. 148 ft^2 C. 182 ft^2 D. 629 ft^2

26. Which of the following numbers is an irrational number? $\sqrt{11}$, $\sqrt{81}$, $0.68\overline{48}$, -1

- A. $\sqrt{11}$ B. $\sqrt{81}$ C. $0.68\overline{48}$ D. -1

27. A television screen is 24 inches wide by 48 inches long. What is the length of the diagonal, to the nearest inch?

- A. 36 inches B. 48 inches C. 54 inches D. 2880 inches

28. Calculate: ${}_8C_4 + {}_{10}C_2$
- A. 115 B. 465 C. 1,770 D. 18,5664

29. Find the median of the data set. $\left\{\frac{1}{2}, \frac{1}{8}, \frac{5}{6}, \frac{3}{10}, \frac{5}{12}\right\}$
- A. $\frac{3}{10}$ B. $\frac{5}{12}$ C. $\frac{1}{2}$ D. $\frac{281}{240}$

30. A right triangle has one leg equal to 20 and the hypotenuse equal to 90. What is the approximate length of the other leg?
- A. 20 B. 70 C. 88 D. 92

31. A square pasture has sides of length 3^7 meters. What is the area and perimeter of the pasture?
- A. Area = 3^{14} m^2 , P = 3^{28} m C. Area = 3^{49} m^2 , P = 3^{28} m
 B. Area = 21^{14} m^2 , P = $4(3^7) \text{ m}$ D. Area = 3^{14} m^2 , P = $4(3^7) \text{ m}$

32. How many square feet are in one square yard?
- A. 3 ft^2 B. 9 ft^2 C. 12 ft^2 D. 81 ft^2

33. What is the approximate total surface area of a rectangular prism with $l = 15.5$, $w = 16.5$, and $h = 4.5$?
- A. 800 B. 2,300 C. 73 D. 575

34. Find the value of z for $6^{2z} = 6^8 \times 6^{z+3}$
- A. 11 B. 24 C. - 4 D. - 0.5

35. One day at 3:00 A.M., the temperature in Kodiak, Alaska was -11° F. At 10:00 A.M., the temperature was 24° F. What was the average change in temperature per hour?

- A. -35° F per hour B. 35° F per hour C. -5° F per hour D. 5° F per hour

36. What percent of 125 is 35?

- A. 28% B. 3.6% C. 2.8% D. 357%

37. The coordinates of three vertices of a rectangle are $(-1, -3)$, $(-1, -6)$, and $(0, -6)$. What are the coordinates for the fourth point?

- A. $(2, -3)$ B. $(2, -5)$ C. $(0, -5)$ D. $(0, -3)$

38. A person rolls two fair six-sided dice. What is the probability of rolling a sum for the two dice of 8?

- A. $\frac{1}{8}$ B. $\frac{5}{36}$ C. $\frac{5}{6}$ D. $\frac{2}{9}$

39. A square has a diagonal of length $\sqrt{6}$ mm. What is the area of the square?

- A. 3 mm^2 B. 6 mm^2 C. $\sqrt{3} \text{ mm}^2$ D. $4\sqrt{3} \text{ mm}^2$

40. After four quizzes, you have an average of 88%. You have one more test and want to earn an A, which requires a 90% average. What must you score on the final test to earn an A?

- A. 90 B. 98 C.) 100 D. Impossible