Washington State Math Championship 2005

Individual Test Grade 8

11. If $\frac{6}{5}$ of a number is 48, what is 90% of the number?

12. If $142 = \frac{5}{6}d \square 15$, then what is the value of d? (Answer to the nearest hundredth.)

13. The numbers 2,4,6, and 8 are used to replace the letters h, i, j, and k respectively. What is the smallest value of the expression that is still greater than one? (Answer in the form of a reduced mixed number.)

14. What is 0.03% of 2005?

15. I am the ratio of the fifth power of four to the third power of six. In my lowest terms, what number am I? (Write your answer as a fraction.)

16. Simplify $\dfrac{\frac{7}{8} \square \frac{5}{6}}{\frac{1}{2} + \frac{2}{3} + \frac{3}{4}}$

17. What percent of the integers from 51 through 75 are prime? (Round your answer to the nearest percent.)

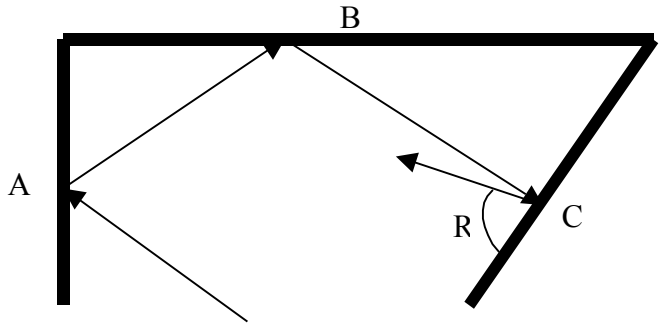
18. A certain microorganism is useful for breaking down organic waste. There needs to be at least one million of them to be effective. They triple their population every 4 hours. If there are 50 to start with, how long does it take to reach one million? (Round your answer to the nearest whole hour.)

19. The product of four consecutive positive integers is 11880. What is the mean of the four numbers?

20. What is $0.01\overline{6}$ as a common fraction?

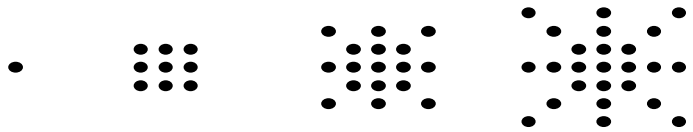
21. The length of a rectangle is three times the width. If the perimeter is 32 what does the area equal.

22. Mirrors reflect symmetrically. That is, a light beam the hits a mirror at 20˚ reflects at 20˚. Mirrors A and B form a right angle. Mirrors B and C form a 60˚ angle. A light beam hits mirror A at 35˚ to the surface. What is the angle of reflect, R, off mirror C?



23. How many dots are in the 11th figure?

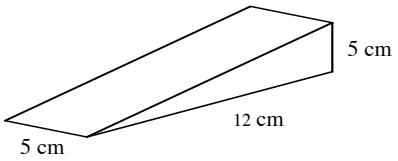
a. Fig. 1 Fig 2 Fig 3 Fig 4



24. If (a,b) ⊕ (c,d) = $\left[\frac{d^b}{a}\right] \left[\frac{c}{b^b}, \; ac^b\right]$ then find (4,2) ⊕ (4,8).

25. A certain solution is 25% salt. Another is 20% salt. 100 ml of water is added to 100 ml of the 25% solution. Then this mixture is added to 100 ml of the 20% solution. What percent of the new solution is salt?

26. What is the total surface area of the wedge shown in the figure below with a rectangular base 12 cm by 5 cm and a height of 5 cm?



27. Each time Mr. Vaughn triples the number of his employees, his yearly expenses increase by a factor of five thirds. Currently, he has three employees and yearly expenses of $70,000. What will his yearly expenses be if he were to have eighty-one employees?

28. The combined circumference of 2 different-sized circles is 603. If the area of the larger circle is 121 times the smaller, what is the area of the smaller circle? (Round your answer to the nearest whole number.)

29. What are the coordinates of the point of intersection of the graphs of $4x + 3y = 24$ and $3x = 31 + y$?

30. At Raskin Bobbins you can order an ice cream sundae in a child size, small, medium, large or super size. There are 31 flavors from which to choose. You can also choose from butterscotch, strawberry and fudge sauce. How many ways are there to order a sundae at that store? Assume that can choose only one ice cream flavor and sauce per sundae.