

**Washington State Math Championship 2005**

**Individual Test Grade 5**

11. Yumi bought  $4\frac{1}{2}$  pounds of satsuma oranges that are priced at 88¢ per pound. She gives the cashier a \$20 bill. How much change does she get back?
12. Evaluate:  $(6 \square 9)^2 \square 3 \bullet 7$
13. Tor Tilla Has \$20.15. He is going to buy two jars of salsa for \$1.59 each. He will spend the rest on chips that are priced at \$1.99 a bag. How much change will he have?
14. If a certain frog can jump 560 inches in 10 seconds, how many **yards** is it jumping per second? (Answer as a reduced mixed number.)
15. Billy Bob has bowled three games scoring 149, 172 and 191. He wants to average 175. What does he need to bowl for his fourth game?
16. What is the largest number under 1000 that is both a perfect square and a perfect cube?
17. On a map it is  $\frac{45}{8}$  inches from Seattle to San Francisco. The actual distance is 693.75 miles. If the distance from Seattle to Denver on the map is  $\frac{63}{4}$  inches, how far is the actual distance? (Round your answer to the nearest hundredth.)
18. For a biology field trip, a few classes are combined to create a group large enough to go. On the trip, the leaders were going to split the students up into 6, 8, or 10 groups of equal size, but they would have ended up with one extra student. Instead, they ended up splitting the students into eleven equal-sized groups with no students left over. What is the square root of the smallest possible number of total students?
19. If using a standard 52-card deck, what is the probability of drawing a club or a picture card? (Answer as a reduced fraction.)

20. A money market account is currently worth \$699.75. It has earned 3.5% interest every year for the past seven years. Assuming there have been no deposits or withdrawals, how much was originally invested?
21. The Super Scooper ice cream cone at Raskin Bobbins has five scoops of ice cream heaped on top of each other. How many different ways are there to arrange the order in which the ice cream is scooped? Assume that each scoop is a different flavor.
22. Given a four digit number, 55NN, for what value(s) of N will this four digit number be divisible by 8 and 9?
23. A bricklayer took six days to lay bricks to form a 120 foot long path. Each day she laid two feet more of path than the day before. How long was the path by the end of the third day?
24. When you go up a mountain the temperature drops approximately 4°F for every 1000 feet you ascend. If it is 87°F at sea level (altitude of 0 feet), what is the temperature at the top of Mt. McKinley which is 20320 feet high. (Round your answer to the nearest integer.)
25. You unexpectedly find 2 quarters, 1 nickel, and 2 pennies in your pocket after forgetting to empty your pockets before the last time you washed your pants. What is the probability that you will be able to match the change part of your bill for any purchase? (Write your answer as a reduced fraction.)
26. If  $\frac{6}{5}$  of a number is 48, what is 90% of the number?
27. If  $142 = \frac{5}{6}d \div 15$ , then what is the value of d? (Answer to the nearest hundredth.)
28. 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.)
29. What is 0.03% of 2005?
30. 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.)

**Washington State Math Championship 2005**

**Individual Test Grade 6**

11. What is the largest number under 1000 that is both a perfect square and a perfect cube?
12. On a map it is  $45/8$  inches from Seattle to San Francisco. The actual distance is 693.75 miles. If the distance from Seattle to Denver on the map is  $63/4$  inches, how far is the actual distance? (Round your answer to the nearest hundredth.)
13. For a biology field trip, a few classes are combined to create a group large enough to go. On the trip, the leaders were going to split the students up into 6, 8, or 10 groups of equal size, but they would have ended up with one extra student. Instead, they ended up splitting the students into eleven equal-sized groups with no students left over. What is the square root of the smallest possible number of total students?
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17. Given a four digit number, 55NN, for what value(s) of N will this four digit number be divisible by 8 and 9?
18. A bricklayer took six days to lay bricks to form a 120 foot long path. Each day she laid two feet more of path than the day before. How long was the path by the end of the third day?
19. When you go up a mountain the temperature drops approximately  $4^{\circ}\text{F}$  for every 1000 feet you ascend. If it is  $87^{\circ}\text{F}$  at sea level (altitude of 0 feet), what is the temperature at the top of Mt. McKinley which is 20320 feet high. (Round your answer to the nearest integer.)

20. You unexpectedly find 2 quarters, 1 nickel, and 2 pennies in your pocket after forgetting to empty your pockets before the last time you washed your pants. What is the probability that you will be able to match the change part of your bill for any purchase? (Write your answer as a reduced fraction.)

$$\frac{6}{5}$$

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

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

23. 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.)

24. What is 0.03% of 2005?

25. 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.)

$$\frac{\frac{7}{8} \div \frac{5}{6}}{\frac{1}{2} + \frac{2}{3} + \frac{3}{4}}$$

26. Simplify

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

28. 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.)

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

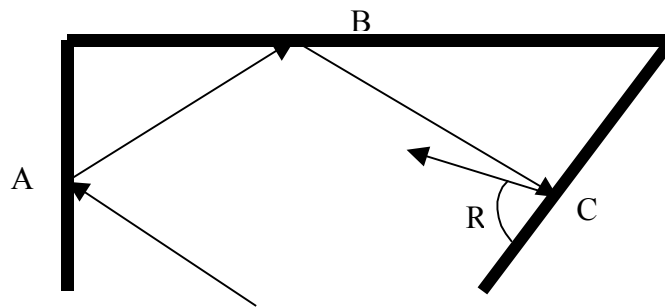
30. What is  $0.01\overline{6}$  as a common fraction?

**Washington State Math Championship 2005**

**Individual Test Grade 7**

11. The Super Scooper ice cream cone at Raskin Bobbins has five scoops of ice cream heaped on top of each other. How many different ways are there to arrange the order in which the ice cream is scooped? Assume that each scoop is a different flavor.
12. Given a four-digit number, 55NN, for what value(s) of N will this four digit number be divisible by 8 and 9?
13. A bricklayer took six days to lay bricks to form a 120-foot long path. Each day she laid two feet more of path than the day before. How long was the path by the end of the third day?
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17. If  $142 = \frac{5}{6}d \square 15$ , then what is the value of  $d$ ? (Answer to the nearest hundredth.)
18. 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.)
19. What is 0.03% of 2005?
20. 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.)
21. Simplify  $\frac{\frac{7}{8} \square \frac{5}{6}}{\frac{1}{2} + \frac{2}{3} + \frac{3}{4}}$

22. What percent of the integers from 51 through 75 are prime? (Round your answer to the nearest percent.)
23. 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.)
24. The product of four consecutive positive integers is 11880. What is the mean of the four numbers?
25. What is  $0.01\overline{6}$  as a common fraction?
26. The length of a rectangle is three times the width. If the perimeter is 32 what does the area equal.
27. Mirrors reflect symmetrically. That is, a light beam that hits a mirror at  $20^\circ$  reflects at  $20^\circ$ . Mirrors A and B form a right angle. Mirrors B and C form a  $60^\circ$  angle. A light beam hits mirror A at  $35^\circ$  to the surface. What is the angle of reflect, R, off mirror C?



28. How many dots are in the 11<sup>th</sup> figure?

Figure 1



Figure 2



Figure 3

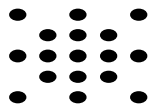
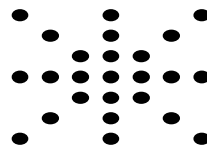


Figure 4



29. If  $(a,b) \oplus (c,d) = \left[ \frac{d^b}{a} \right] \left[ \frac{c}{b^b} \right]$ ,  $ac^b \left[ \begin{matrix} \\ \\ \end{matrix} \right]$  then find  $(4,2) \oplus (4,8)$ .

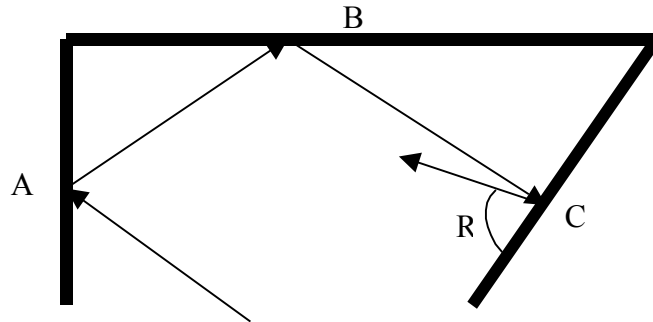
30. A certain solution is 25% salt. Another is 20% salt. 100 ml of water is added to 100 ml of the 25% solution. Then this mixture is added to 100 ml of the 20% solution. What percent of the new solution is salt?

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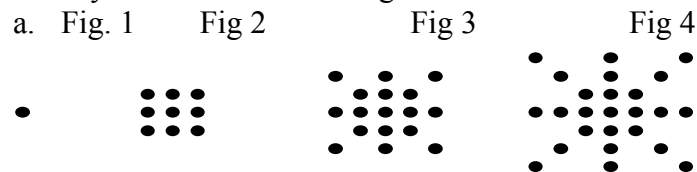
**Individual Test Grade 8**

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  $\frac{\frac{7}{8} \square \frac{5}{6}}{\frac{1}{2} + \frac{2}{3} + \frac{3}{4}}$
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?
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22. Mirrors reflect symmetrically. That is, a light beam that hits a mirror at  $20^\circ$  reflects at  $20^\circ$ . Mirrors A and B form a right angle. Mirrors B and C form a  $60^\circ$  angle. A light beam hits mirror A at  $35^\circ$  to the surface. What is the angle of reflection, R, off mirror C?



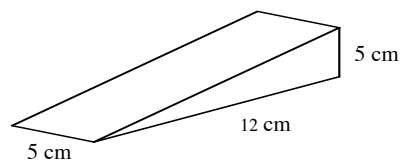
23. How many dots are in the 11<sup>th</sup> figure?



24. If  $(a,b) \oplus (c,d) = \begin{bmatrix} d^b \\ a \end{bmatrix} \begin{bmatrix} c \\ b^b \end{bmatrix}$ ,  $ac^b \begin{bmatrix} \\ \end{bmatrix}$  then find  $(4,2) \oplus (4,8)$ .

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.