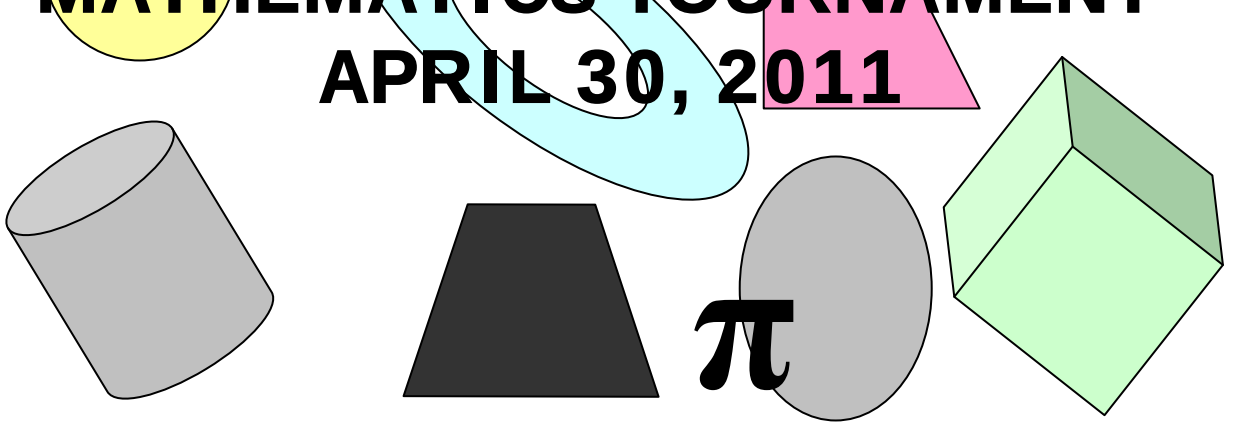
6TH GRADE

RANDOLPH SCHOOL MATHEMATICS TOURNAMENT APRIL 30, 2011



There are 30 multiple-choice questions and three tiebreakers on this test. Mark your answers on the scantron sheet. **If none of the answers is correct, choose E**. No aids such as calculators, notes, books, etc., may be used in completing the test. You may write on the test and use the scratch paper attached to the back of this test.

Cell phones are not allowed in the room. If it is determined that you are in possession of one during the testing, you will be disqualified.

Your score on this examination will be computed as **FOUR TIMES THE NUMBER CORRECT MINUS THE NUMBER INCORRECT**. Blanks are not counted as correct or incorrect in computing the score.

The tiebreakers count one-tenth of one point. It is recommended that you work on the tiebreakers only after you have completed all the multiple-choice questions. Write the answers to the tiebreakers in the designated spaces on the scantron sheet.

The time limit on the test is one hour. If you finish before time is called, you may leave the room, but you must also leave the testing area.

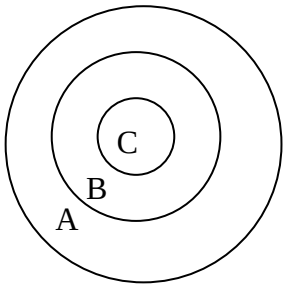
6th Grade Test

Randolph School Mathematics Tournament
April 30, 2011

1. Solve for x. $2x-7=-2$

A. -4.5 B. 2.5 C. 4.5 D. 10

2. When Brolex throws a dart at the target to the right, he is twice as likely to hit Region A as he is to hit Region B. He is three times as likely to hit Region B as he is to hit Region C. The probability that he misses the target entirely is $1/21$. What is the probability that he hits region B?



A. $\frac{3}{7}$ B. $\frac{1}{2}$ C. $\frac{2}{7}$ D. $\frac{1}{3}$

3. Evaluate. $4^5 \cdot 3^4 \cdot 2^3 \cdot 1^2 \cdot 0^1$

A. 663,552 B. 1 C. 720,000 D. 24^{15}

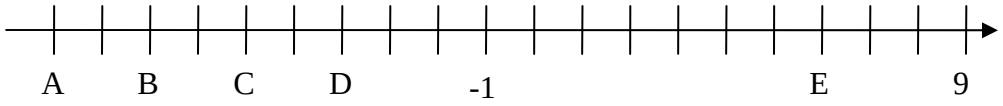
4. Suppose that $3x-16y=2$ and $-16x+3y=-41$. What is the value of $7x+7y$?

A. -13 B. 21 C. -7 D. $\frac{301}{19}$

5. At the Julia K. Wall school, all 250 students are required to take at least one of the three foreign languages that are offered: Hebrew, Latin, and Sanskrit. There are 120 students enrolled in Hebrew, 129 in Latin, and 91 in Sanskrit. There are 21 students taking Hebrew and Latin, 52 taking Hebrew and Sanskrit, and 29 taking Latin and Sanskrit. How many students at the Julia K. Wall school are taking Sanskrit and Latin, but not Hebrew?

A. 9 B. 12 C. 17 D. 40

6. On the number line below, the distance between B and E is the same as between 8 and what point?



A. A B. B C. C D. D

7. Given that $360=2^3 \cdot 3^2 \cdot 5$, how many integer factors does 360 have?

A. 6 B. 12 C. 24 D. 48

8. The result of dividing x by $1/4$ is 9 less than x. What is the value of x?

A. -3 B. $\frac{9}{5}$ C. $\frac{36}{5}$ D. 12

9. What is the decimal equivalent of $\frac{29}{45}$?

A. $0.6\overline{4}$ B. $0.\overline{64}$ C. 0.6 D. $0.51\overline{4}$

10. Each *exterior angle*—the angle formed by one side and the extension past their shared vertex of an adjacent side—of a regular polygon measures $24°$. How many sides does the polygon have?

A. 15 B. 20 C. 24 D. 30

11. The Kunin family has 4 children. At least three of the children are boys. Assuming that male and female births are equally likely, what is the probability that all four children are boys?

A. $\frac{1}{2}$ B. $\frac{1}{3}$ C. $\frac{1}{4}$ D. $\frac{1}{5}$

12. Suppose $2x+3y+4z=10$. Find the value of x if $y=\frac{1}{12}$ and $z=\frac{1}{16}$.

A. 19 B. 4.75 C. 4.25 D. 9.5

13. Two sides of a right triangle have lengths 9 and 12. Which of the following could be the length of the third side?

A. 6 B. $\sqrt{63}$ C. 8 D. 12

14. Simplify. $\sqrt{36+64}+|10-12|$

A. 36 B. 32 C. 16 D. 12

15. How many perfect squares are there between 400 and 1024, inclusive?

A. 11 B. 12 C. 13 D. 14

16. When drawing two cards without replacement from a standard 52-card deck, what is the probability of first drawing a red king and then a black card?

A. $\frac{1}{51}$ B. $\frac{1}{26}$ C. $\frac{1}{52}$ D. $\frac{13}{51}$

17. Let A be the smallest positive integer that leaves remainders of 2 when divided by 7 and 3 when divided by 11. Let B be the smallest positive integer that leaves remainders of 3 when divided by 4 and 6 when divided by 7. What is the value of $A+B$?

A. 85 B. 79 C. 73 D. 68

18. The tenth term of an arithmetic sequence with common difference 3 is 74. What is the first term?

A. 104 B. 101 C. 47 D. 44

19. What is the largest prime divisor of 9009?

A. 9 B. 11 C. 13 D. 91

20. Suppose that $a \uparrow b = a+b-\frac{a}{b}$. What is the value of $3 \uparrow \frac{1}{2}$?

A. 2 B. 0.5 C. –1 D. –2.5

21. What is the radius of a circle with a circumference of 16?

A. 8 B. $\frac{8}{\pi}$ C. 16 D. $\frac{16}{\pi}$

22. When George eats a hamburger, he can have any of the following toppings (including have none or all of them): ketchup, mustard, pickles, lettuce, tomatoes, or onions. If he never eats pickles with onions, how many days in a row could George eat a hamburger without ever having the same set of toppings on two different days?

A. 48 B. 72 C. 120 D. 720

23. When rolling a standard six-sided die, what are the odds of rolling a prime or a composite number?
A. 1:0 B. 1:5 C. 1:6 D. 6:1

24. What is 255_{10} written in base two?
A. 1111111_2 B. 11111111_2 C. 10000001_2 D. 1011111_2

25. Three boys and four girls are going to sit around a circular table. How many distinct arrangements are possible if every boy must sit next to two girls? (Two arrangements are considered distinct if one can not be arrived at from the other by rotation).
A. 1 B. 120 C. 720 D. 5040

26. Valerie went on a fishing trip. On the first day, she used one fourth of her worms. On the second day, she used half of the worms that remained. On the last day, she used two thirds of the worms she had left. She let the remaining 14 worms go. How many worms did Valerie have to start with?
A. 28 B. 56 C. 84 D. 112

27. A number is four more than three times its additive inverse. What is the number?
A. 1 B. –1 C. 2 D. -2

28. 4 cats can catch 36 rats in 14 days. How many rats can 2 cats catch in a dozen weeks?
A. 108 B. 144 C. 216 D. 432

29. On the planet of Ninuk, the forms of currency are the Maharba, the Xela, and the Ailuj. If one Maharba is worth a Xela plus an Ailuj, and two Xelas can be exchanged for one Maharba and two Ailujes, how many Ailujes can be purchased for one Maharba?
A. 2 B. 3 C. 4 D. 5

30. A ski jacket went on sale in February for 20% off. In March the already-lowered price was lowered by 30%. In April, the jacket was placed on clearance for 40% off the most recent price. At that point, it was purchased for $42. What was the original price of the jacket?
A. $125 B. $235 C. $300 D. $420

Tie Breakers

1. Three circles with radii of 3, 5, and 12 are mutually externally tangent. What is the area of the triangle connecting their centers?

2. What is the units digit of $3^{12}+5^{20}+7^{28}$?

3. How many distinct ways are there of arranging the letters of the word BIEBER?