

Don Bosco Technical Institute

37th Annual Mathematics

Contest

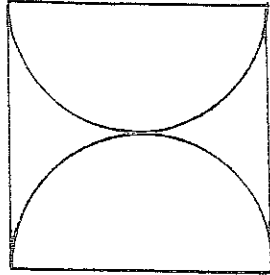
Saturday, April 25, 2009

DIRECTIONS:

- This test contains 50 questions
- Solve each problem, choose the best answer, and mark the corresponding letter on your SCANTRON answer sheet.
- You may write on this test. It is yours to take home
- You have ONE HOUR to complete the test
- No calculators may be used on this test.
- Communicating with other contestants is not permitted
- GOOD LUCK!

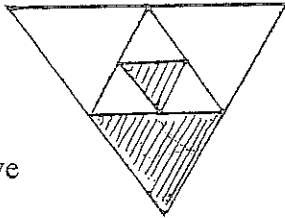
- 1) A square has two semi-circles inscribed in it as shown. If the area of the region inside the square but outside the semi-circles is $4 - \pi$ sq. in., what is the perimeter of the square?

- a) 4 in.
 b) π in.
 c) $4 - \pi$ in.
 d) 8 in.
 e) none of the above



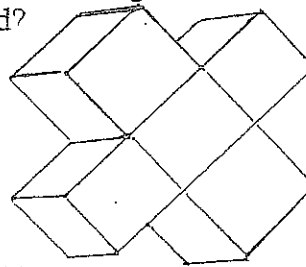
- 2) The large triangle has equal sides. Each smaller triangle is formed by joining the mid-points of the sides of a larger triangle. If the area of the shaded region is 15 square feet, what is the area of the unshaded region?

- a) 35 sq. ft.
 b) 45 sq. ft.
 c) 60 sq. ft.
 d) 75 sq. ft.
 e) none of the above



- 3) The figure shows five identical cubes glued together. If an edge on each cube measures 3 inches, what is the area of the surface that is exposed?

- a) 66 sq. in.
 b) 180 sq. in.
 c) 198 sq. in.
 d) 288 sq. in.
 e) none of the above

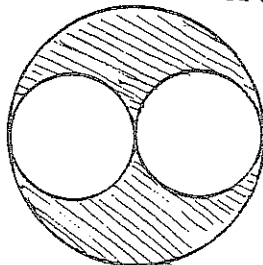


- 4) In a class of 30 students, 4 students speak German, 18 students speak Spanish while 9 students speak neither German nor Spanish. How many students speak both German and Spanish?

- a) 1
 b) 4
 c) 21
 d) 22
 e) none of the above

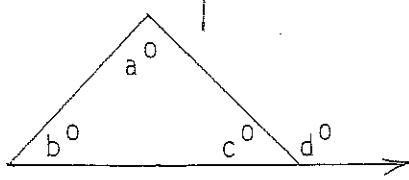
- 5) How many whole numbers less than 100 contain the digits 2 or 5, but not both 2 and 5?

- a) 34
 b) 36
 c) 38
 d) 39
 e) none of the above

- 6) The length of a rectangle is decreased by 20%. What increase should be made in the width to keep the area unaltered?
- 17.5 %
 - 18.5%
 - 20%
 - 25%
 - none of the above
- 7) From $13\frac{1}{3}$ subtract $11\frac{1}{2}$
- $\frac{5}{6}$
 - $1\frac{1}{6}$
 - $1\frac{5}{6}$
 - $2\frac{1}{6}$
 - none of the above
- 8) The two smaller circles are ^{of} equal size and just fit into the larger circle as shown. If the area of the shaded region is 8π square units what is the radius of the larger circle?
- 2
 - 4
 - 6
 - 8
 - none of the above
- 
- 9) A leaky faucet fills a cup in 10 minutes. IF there are 16 cups in a gallon, how many gallons of water are wasted in one day?
- 240
 - 120
 - 32
 - 9
 - none of the above
- 10) How many perfect cubes are there between 1,000 and 1,000,000?
- 88
 - 89
 - 999,900
 - 9,999,901
 - none of the above

In numbers 11 to 15, compare Column A and Column B. If the quantity in Column A is greater mark A. If the quantity in Column B is greater, mark B. If equal, mark C. If it cannot be determined, mark D.

	COLUMN A	COLUMN B
11)	3^2	2^3
12)	$\sqrt{\frac{1}{4}} + \sqrt{\frac{1}{25}}$	$\sqrt{\frac{1}{4} + \frac{1}{25}}$
13)	b	$d-a$
14)	Area of an equilateral triangle (equal sides) with perimeter 36 units	Area of a square of perimeter 36 units
15)	x^2	x^3



16) Mr. Gonzalez works twice as fast as Mr. Wong, and three times as fast as Mr. Brown. If Mr. Brown can complete a job in 12 hours, what part of the job can Mr. Wong do in 6 hours?

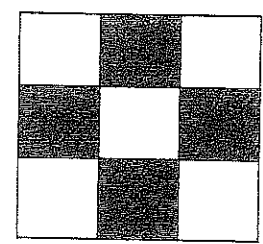
- a) $\frac{1}{12}$ b) $\frac{1}{3}$ c) $\frac{1}{2}$ d) $\frac{3}{4}$ e) 1

17) 2 pints = 1 quart; 4 quarts = 1 gallon. What fraction of a gallon is 6 pints?

- a) $\frac{1}{6}$ b) $\frac{2}{3}$ c) $\frac{3}{4}$ d) $\frac{4}{3}$ e) $\frac{3}{2}$

18) The four corner squares on this checkerboard are removed, leaving a cross whose area is 20 square inches. The perimeter of the cross in inches is

- a) 24
 b) $12\sqrt{5}$
 c) $16\sqrt{5}$
 d) 48
 e) 67



19) Suppose you know that $\sqrt{15}$ is approximately 3.89. Which of the following is the best approximation to $\sqrt{\frac{5}{3}}$?

- a) 0.2 b) 0.41 c) 1.30 d) 6.10 e) 3.66

20) A motorist on the 605 Freeway covers 0.8 miles in a minute. What distance in miles could she travel in 6 seconds?

- a) 0.08 b) 0.48 c) 0.8 d) 4.8

21) 8% of 36 is 72% of what number?

a) 2.06

b) 2.88

c) 3.24

d) 4

e) 40

22) What would the result be if $\frac{x+10}{2}$ is subtracted from $\frac{x}{2}+10$?

a) 5

b) x

c) $\frac{x}{2}$

d) $x+10$

e) none of the above

23) What is the average of one tenth, one hundredth and one thousandth?

a) 0.003

b) 0.01

c) 0.037

d) 0.111

e) 0.333

24) On a Math test the average of 20 scores is 84. If the two highest and two lowest scores are eliminated the average of the remaining scores is 88. What is the average of the four scores eliminated?

a) 68

b) 77

c) 86

d) 93

e) none of these

25) Six consecutive odd integers are given. The sum of the first three is 3. What is the sum of the last three?

a) 0

b) 4

c) 9

d) 21

e) none of these

26) One foot is what percent of one yard?

a) $\frac{1}{3}$

b) 3

c) $33\frac{1}{3}$

d) 333

e) none of the above

27) $(9x)^3$ and $9x^3$ have the same value if x is equal to?

a) 0

b) 1

c) 0 or 1

d) 9

e) none of the above

28) If car = 22 and bus = 42, then truck = ?

a) 50

b) 62

c) 65

d) 73

e) none of these

29) Find the next term of the sequence: /, 2, 9, 28, 65, ?

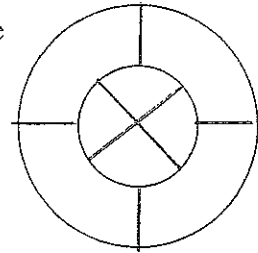
- a) 96
- b) 115
- c) 126
- d) 137
- e) none of these

30) Through what angle has the hour hand of a clock moved from 5:00 p.m. to 1:00 a.m.?

- a) 240°
- b) 245°
- c) 255°
- d) 270°
- e) none of these

31) What is the minimum number of colors which can be used to color this figure so that no two touching regions have the same color except at a point?

- a) 2
- b) 3
- c) 4
- d) 8
- e) none of these



32) One half of a number is 12. What is one third of the number?

- a) 2
- b) 6
- c) 8
- d) 24
- e) none of these

33) \$75 is divided among Maria, Gabe, and Anna in the ratio of 2:3:5 respectively. How much does Maria get?

- a) \$37.50
- b) \$15
- c) \$7.50
- d) \$5
- e) none of these

34) Mary is flipping coins. Her flips, in order, have been HHTHTTTT. On her next flip she has

- a) A better chance of getting a head
- b) A better chance of getting a tail
- c) An equal chance of getting either a head or a tail

35) The HCF of 2 numbers is 12 and their LCM is 72. If the numbers are in the ratio of 2:3, find them.

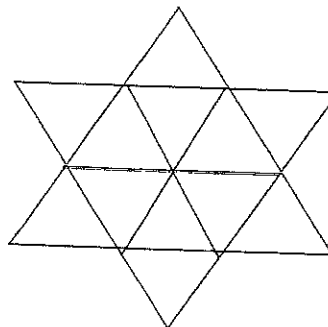
- a) 12, 18
- b) 24, 36
- c) 36, 54
- d) 48, 72
- e) none of these

36) Simplify $1 + \frac{1}{1 + \frac{1}{1+1} + 1}$

- a) $1\frac{2}{5}$ b) $1\frac{3}{5}$ c) $2\frac{1}{5}$ d) $2\frac{2}{5}$ e) none of these

37) How many triangles are there in the figure?

- a) 12
b) 14
c) 17
d) 20
e) 23



38) Three pieces of chalk together are as long as 2 popsicle sticks. How many pieces of chalk would be as long as a combination of 9 popsicle sticks and $7\frac{1}{2}$ pieces of chalk?

- a) $13\frac{1}{2}$
b) $16\frac{1}{2}$
c) 20
d) 21
e) none of these

39) Find a number half way between $\frac{2}{5}$ and $\frac{5}{7}$

- a) $\frac{3}{35}$ b) $\frac{1}{2}$ c) $\frac{4}{7}$ d) $\frac{39}{70}$ e) none of these

40) $11 \times 11 = 121$

$111 \times 111 = 12321$

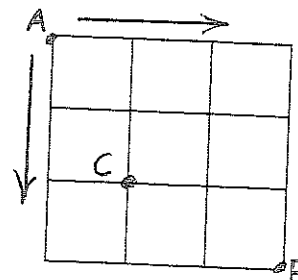
$1111 \times 1111 = 1234321$

In the product 11111×11111 , which digit does not appear twice?

- a) 1 b) 2 c) 3 d) 4 e) 5

41) Traveling only South and East how many routes are there from A to B that do not pass through C?

- a) 6
b) 11
c) 20
d) 27
e) none of these



- 42) Forty eight students were served at the bookstore. 31 bought pencils, 26 bought erasers while 3 didn't buy either. How many bought both pencils and erasers?
a) 5 b) 12 c) 19 d) 45 e) none of these
- 43) At McDonald's you can order McNuggets in boxes of 6, 9, or 20. By ordering two boxes of 6 you can get 12. But you can't get 13, since no combination of 6's, 9's and 20's adds up to 13. Which of the following cannot be ordered?
a) 43 b) 47 c) 51 d) 59 e) all are possible
- 44) For any positive real value of x , the expression $\frac{x-1}{x+1}$ is always less than
a) -1 b) $-\frac{1}{2}$ c) 0 d) $\frac{1}{2}$ e) 1
- 45) Find the next number in the sequence: 1, 5, 13, 29, ?
a) 36 b) 61 c) 55 d) 63 e) none of these
- 46) On the first day it was sold in stores, Superman #75 cost \$2.50. On the second day it was selling for \$10.75. What was the percentage increase in the cost?
a) 8.25 b) 23 c) 270 d) 330 e) 430
- 47) Which of the following two digit numbers is not a whole number multiple of the product of its digits?
a) 12 b) 15 c) 18 d) 24 e) 36
- 48) Half an hour ago it was twice as long after noon as it is from now until midnight. What time is it now?
a) 6:00 p.m. b) 7:30 p.m. c) 8:00 p.m. d) 8:10 p.m. e) none of the above
- 49) How many whole numbers are there between -10 and 10?
a) 18 b) 19 c) 9 d) 10 e) none of these
- 50) Oblong numbers are as follows: $2 = 1 \times 2$, $6 = 2 \times 3$, $12 = 3 \times 4$. What is the next oblong number?
a) 18 b) 20 c) 24 d) 36 e) none of these