Dick Scaff Math Superbowl
Secondary Math I Huddle – 2019

Directions:
1. Select the most correct answer for each question.
2. Use $\pi = 3.14$ if needed.
3. NO CALCULATORS OR ELECTRONIC DEVICES MAY BE USED.
4. Note that N.O.T. means "none of these."

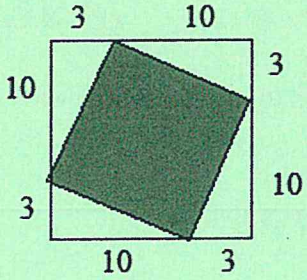
1. Ari begins with some money in a jar and adds the same amount to the jar every day. At the end of the 3rd day, the jar had \$24. At the end of the 9th day, the jar had \$42. How much money was in the jar at the beginning?

   (A) \$5 (B) \$10 (C) \$15 (D) 20 (E) N.O.T.

2. Evaluate the expression: $-2x^2 - 5x + 14$ for $x = -3$

   (A) - 19 (B) -10 (C) 11 (D) 38 (E) N.O.T.

3. Find the area of the shaded region which is inscribed in a square whose sides are 13 units as shown:




   (A) 99 sq. units (B) 109 sq. units (C) 139 sq. units (D) 169 sq. units (E) N.O.T.

4. The equation $4x^3 + 36x = 0$ has how many real solutions?

   (A) one (B) two (C) three (D) none (E) N.O.T.

5. Solve: $2x - 4 + 0.8x = 1.6$

   (A) 0.56 (B) 2 (C) 4.6 (D) 26 (E) N.O.T.

6. For two consecutive integers, the larger is 10 less than twice the smaller integer. Find the larger integer.

   (A) 3 (B) 4 (C) 11 (D) 12 (E) N.O.T.

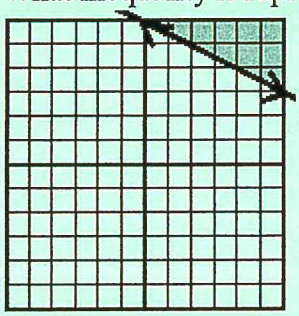
7. Ed's old printer can print 2/3 as fast as his new printer. If the 2 printers work together to print 300 pages, how many pages are printed by the old printer?

(A) 120 (B) 140 (C) 160 (D) 180 (E) N.O.T.

8. Find the equation of the line perpendicular to the line $y = -3x + 7$, passing through the point (2, -7)

(A) $y = -3x + 6$ (B) $y = 1/3\,x - 2/3$ (C) $3y - x = -21$ (D) $3x + y = 7$
(E) N.O.T.

9. What inequality is represented by the gray shaded region?

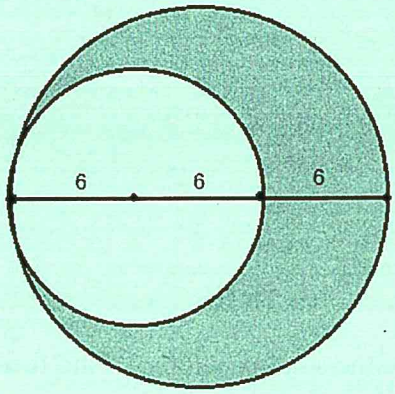


(A) $y \geq 6$ (B) $x - 2y \geq 6$ (C) $2x - y \geq 12$ (D) $x + 2y \geq 12$ (E) N.O.T.

10. Sal bought ham at \$3/pound and cheese at \$5/pound. If 18 pounds total were bought for a cost of \$76, how many pounds of cheese were bought?

(A) 6 lb. (B) 8 lb. (C) 10 lb. (D) 12 lb (E) N.O.T.

11. Find the area of the shaded region in square units, given that the radius of the smaller circle is 6 units:




(A) $45\pi$ (B) $72\pi$ (C) $108\pi$ (D) $50\pi - 100$ (E) N.O.T.

12. If two equations are graphed and the lines are determined to be parallel, which of the following must be true?
    (A) The slopes of the lines are negative reciprocals
    (B) The lines pass through the origin
    (C) The system of equations has no solution
    (D) The system of equations is dependent
    (E) N.O.T.

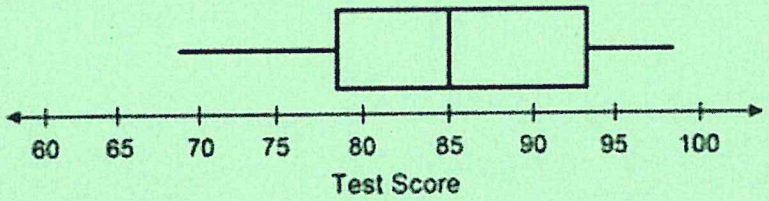
13. A student mixes a 20% acid solution with a 40% acid solution to produce 20 liters of a 28% acid solution. How much of the 40% solution was used?

    (A) 8 liters (B) 10 liters (C) 12 liters (D) 14 liters (E) N.O.T.

14. The distance between the points (4, -7) and (-1, 2) is

    (A) -12 (B) 12 (C) $-\frac{9}{5}$ (D) $\sqrt{119}$ (E) N.O.T.

15. Using the box and whisker plot below, which of the following is true?




    (A) The mean is 85.
    (B) More students scored above 85 than below.
    (C) The upper quartile is 98.
    (D) The score 75 falls within the interquartile range.
    (E) N.O.T.

16. Ben and Jerry have the following test scores:

| | | | | | |
|---|---|---|---|---|---|
| Ben | 79 | 82 | 91 | 82 | 86 |
| Jerry | 64 | 100 | 73 | 73 | 81 |

    Which of the following statistics is higher for Jerry's scores than for Ben's?

    (A) Mean (B) Median (C) Mode (D) Standard Deviation (E) N.O.T.

17. Three coins are tossed. Given that at least one coin is a head, what is the probability that all 3 coins are heads?

    (A) 1/7 (B) 1/8 (C) 7/8 (D) 1 (E) N.O.T

18. For what value of $x$ is the function $f(x)$ defined? $f(x) = \dfrac{x - \dfrac{5x+4}{x+5}}{\dfrac{1}{x-4} + \dfrac{1}{x}}$

(A) - 5 (B) 4 (C) 0 (D) 2 (E) N.O.T.

19. Find the sum of the positive even integers between 2 and 2000 inclusive.

(A) 4002 (B) 4004 (C) 204,402 (D) 1,001,000 (E) N.O.T.

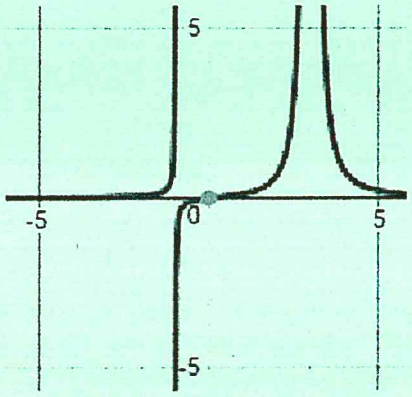
20. Solve for x: $\log_4 x = -\frac{5}{2}$

(A) $\frac{1}{32}$ (B) $-\frac{5}{8}$ (C) -10 (D) Undefined (E) N.O.T

21. Which function is the most suitable equation for the graph below?

(A) $y = \frac{x}{(x-3)(x+1)}$ (B) $y = \frac{x^2}{(x-3)(x+1)}$ (C) $y = \frac{x}{(x-3)(x+1)^2}$ (D) $y = \frac{x}{(x-3)^2(x+1)}$

(E) N.O.T.




22. Ten people stand in line. The first goes to the back of the line, and the next person sits down, so the person who was third is now first in line. Now that person goes to the back of the line and the next person sits down. This process is repeated until only one person remains. What was the original position in line of the only remaining person?

(A) 5th (B) 6th (C) 7th (D) 8th (E) N.O.T.

23. In a group of students, 64 took math, 94 took chemistry, 58 took physics, 28 took math and physics, 26 took math and chemistry, 22 took chemistry and physics, and 14 took all 3 courses. How many students took only one course?

(A) 60 (B) 106 (C) 122 (D) 216 (E) N.O.T.

24. The volume of a box is 80 cubic inches. The box has a square base. If all dimensions are integers, how many square inches of paper are required to cover the surface of the box?

(A) 80 (B) 112 (C) 322 (D) more than one answer (E) N.O.T.

25. For the function $f(x) = e^{2x}$ , find the value of *f(0)*.

(A) 0 (B) 1 (C) 2 (D) $e$ (E) N.O.T.

26. For the function $f(x) = e^{2x}$ , find the slope of the line tangent to *f(x)* when $x=0$.

(A) 0 (B) 1 (C) 2 (D) $e$ (E) N.O.T.

27. Which of the following is NOT a solution of the equation $x^4 - 3x^2 - 4 = 0$?

(A) $i$ (B) 2 (C) -2 (D) -1 (E) N.O.T.

28. If \$1000 is charged on a credit card with a monthly interest rate of 2% compounded monthly, what is the balanced owed on the credit card after 1 year ?

(A) \$1020 (B) \$1024 (C) \$1240 (D) \$2024 (E) N.O.T.

29. A number decreased by 28% of itself equals 144. Find the number

(A) 2 (B) 72 (C) 172 (D) 200 (E) N.O.T.

30. The perimeter of a room is 150 feet. The length of the room is 6 feet less than twice the width. What is the length, in feet?

(A) 27 (B) 36 (C) 48 (D) 144 (E) N.O.T.