Dick Schaff Math Superbowl XLV
Level 2 Huddle: 8th Grade Math – 2018

Directions: (1) Select the most correct answer for each question and mark it on your answer form.
(2) No calculators of any sort are allowed.
(3) Note that N.O.T. means "None of these."

1. What is the value of the expression $4^2 + 3^3$?

   a) 17 b) 25 c) 35 d) 43 e) N.O.T.

2. Jasmine rolls a six-sided die with sides 1, 2, 3, 4, 5, and 6. What is the probability that Jasmine does not roll a 4?

   a) $\frac{1}{6}$ b) $\frac{5}{6}$ c) $\frac{2}{3}$ d) $\frac{1}{36}$ e) N.O.T.

3. Solve for x in the following inequality: $11 - 3x < 4$.

   a) $x < \frac{7}{3}$ b) $x \geq \frac{7}{3}$ c) $x \leq 5$ d) $x > 5$ e) N.O.T.

4. Which number represents 3.6×10^{-3} in standard form?

   a) 0.0036 b) 0.036 c) 3600 d) 36000 e) N.O.T.

5. Jorge and his friends drove together to an amusement park. They bought four admission tickets that each cost the same amount. They paid \$12 total to park the car. The total for all of the tickets and the parking fee was \$116. If t represents the cost of a single admission ticket, which of the following equations represents the amount that Jorge and his friends spent at the amusement park?

   a) $4t + 12 = 116$ b) $12t + 4 = 116$ c) $4(t + 12) = 116$ d) $12(t + 4) = 116$ e) N.O.T.

6. Find the last digit of the sum $1! + 2! + 3! + 4! + 5! + \cdots + 2017! + 2018!$.

   a) 3 b) 2 c) 1 d) 0 e) N.O.T.

7. A rectangle has a length of 10 meters and a width of 20 meters. If each dimension is reduced by 5%, by what percent is the area of the original rectangle reduced?

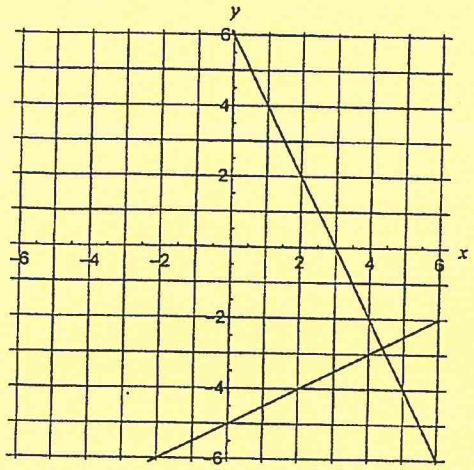
   a) 0.25% b) 10% c) 25% d) 9.75% e) N.O.T.

8. Which expression represents 4 less than twice a number n?

   a) $4 - 2n$ b) $2(n - 4)$ c) $2n - 4$ d) $4n - 2$ e) N.O.T.

9. An engineer is mapping the boundaries of a park on a coordinate grid. The park's headquarters are located at the origin. The equations $y = 2x - 5$ and $2x + 4y = 12$ represent two boundaries of the park. The park's entrance is located at the intersection of these two boundaries. Which coordinate grid correctly shows the two boundaries and the park's entrance?

a)



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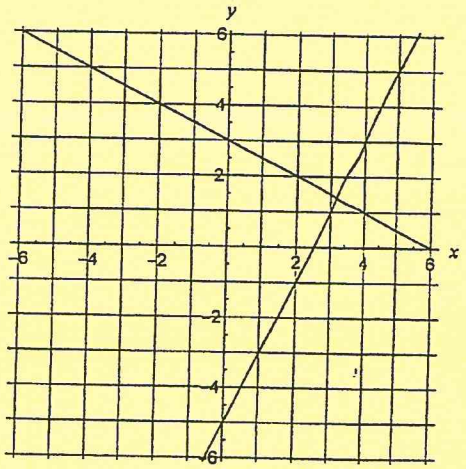

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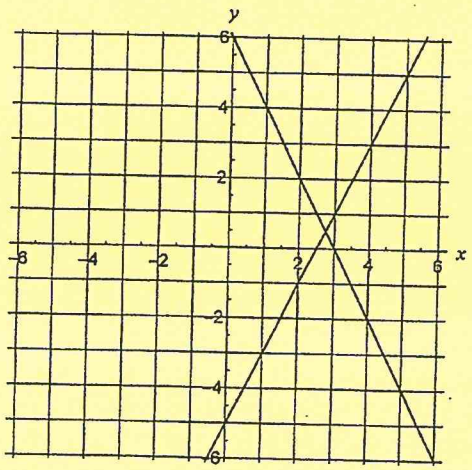

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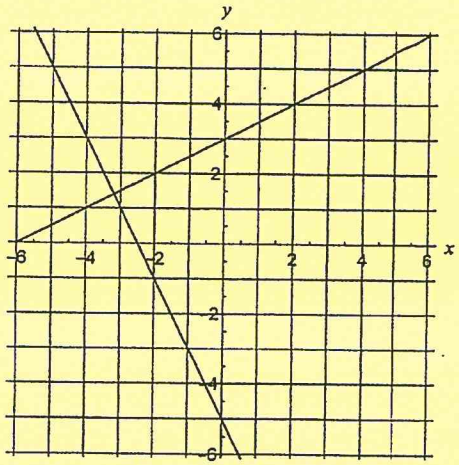


e) N.O.T.

10. A cleaning company charges s dollars per hour to clean floors and y dollars per hour to clean the rest of a house. When the company spends 2 hours to clean floors and 3 hours to clean the rest of a house, the total charge is \$84. When the company spends 1 hour to clean floors and 4 hours to clean the rest of a house, the total charge is \$87. Which ordered pair represents the hourly charges to clean floors and to clean the rest of the house?

a) (12, 20) b) (15, 18) c) (18, 15) d) (20, 12) e) N.O.T.

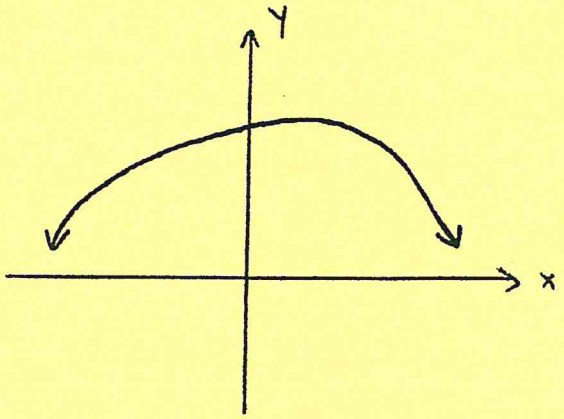
11. Tabitha jogged around a track 16 times. Each lap around the track is 400 meters. Which process could determine the total distance that Tabitha jogged?

a) Add 16 and 400 together.
b) Divide 400 by 16.
c) Multiply 400 by 16.
d) Subtract 16 from 400.
e) N.O.T.

12. Which of the following expressions is equivalent to $(7^{-2})^5$?

a) $\frac{1}{7^{10}}$ b) $(-49)^5$ c) 7^3 d) $\frac{1}{7^{32}}$ e) N.O.T.

13. The graph in the figure to the right represents a function. Which single transformation could be applied to the graph so that it no longer represents a function?



a) Reflection across the x-axis.
b) Reflection across the y-axis.
c) Rotation about the origin by 90°.
d) Translation 5 units to the left.
e) N.O.T.

14. Solve the system of equations given by $2y = 8$ and $15y = 2x - 4$.

a) $x = 4, y = 32$ b) $x = 30, y = 4$ c) $x = 4, y = \frac{4}{15}$ d) $x = \frac{23}{2}, y = 4$ e) N.O.T.

15. Which set of ordered pairs is a function?

a) $\{(4, 9), (7, -3), (5, 6), (4, -2)\}$
b) $\{(5, 10), (5, 20), (5, 30), (5, 40)\}$
c) $\{(\frac{1}{2}, \frac{1}{3}), (\frac{1}{4}, \frac{1}{5}), (\frac{1}{2}, -\frac{1}{3}), (\frac{1}{4}, -\frac{1}{5})\}$
d) $\{(10, 5), (20, 5), (30, 5), (40, 5)\}$
e) N.O.T.

16. The table below shows the number of games sold each month at a store, over a four-month period.

Month	Games Sold
1	377
2	284
3	191
4	98

For this four-month period, which of these statements best describes the relationship between the month and the number of games sold that month.

a) It is linear because the month increases by 1 each time.
b) It is linear because the digit in the hundreds place decreases by 1 each month.
c) It is linear because as the months increase, the number of games sold decreases.
d) It is linear because the number of games sold decreases by the same amount each month.
e) N.O.T.

17. Triangle M is similar to triangle N. Triangle M has two angles with measures of 32° and 93°, respectively. Which two angle measures could be included in triangle N?

a) 32° and 58° b) 16° and 46.5° c) 93° and 55° d) 64° and 93° e) N.O.T.

18. Which of the following numbers is irrational?

a) $-\frac{4}{3}$ b) $\sqrt{121}$ c) 11.12131415... d) $0.00\overline{59}$ e) N.O.T.

19. Find an equation of the line that passes through the points (5, 0) and (0, 8).

a) $y = -\frac{8}{5}x + 8$ b) $y = -\frac{5}{8}x + 8$ c) $y = -\frac{8}{5}x + 5$ d) $y = -\frac{5}{8}x + 5$ e) N.O.T.

20. Charlie is building a new deck and need to have a slab of concrete poured. He knows the contractor charges an initial cost of \$75 plus an additional \$2.50 per square foot of concrete. Which equation describes the cost y (in dollars) to pour a concrete slab with an area of x square feet?

a) $y = 2.5x + 0.75$ b) $y = 7.5x + 2.5$ c) $y = 75x + 2.5$ d) $y = 77.5x$ e) N.O.T.

21. Students from a local junior high school order sweatshirts and T-shirts in either purple or gold. Of the students who ordered a sweatshirt, the relative frequency of ordering a gold sweatshirt is half of the relative frequency of ordering a purple sweatshirt. Which two-way table could show the data from the orders?

a)

	Sweatshirt	T-Shirt
Purple	12	18
Gold	24	15

b)

	Sweatshirt	T-Shirt
Purple	70	17
Gold	35	93

c)

	Sweatshirt	T-Shirt
Purple	28	26
Gold	22	44

d)

	Sweatshirt	T-Shirt
Purple	45	50
Gold	25	25

e) N.O.T.

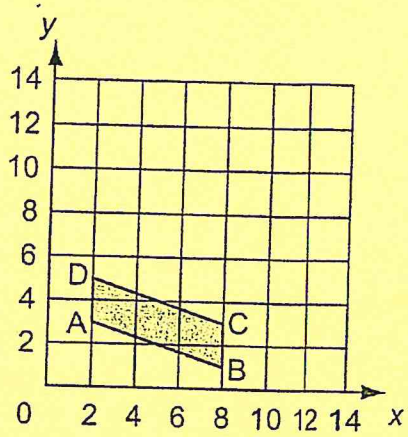
22. Jessica uses $\frac{2}{3}$ cup of sunflower seeds to make 4 cups of trail mix. Using this same proportion, how many cups of sunflower seeds would Jessica need to make 9 cups of trail mix?

a) $1\frac{1}{2}$ cups b) $1\frac{7}{12}$ cups c) $2\frac{11}{12}$ cups d) $3\frac{3}{8}$ cups e) N.O.T.

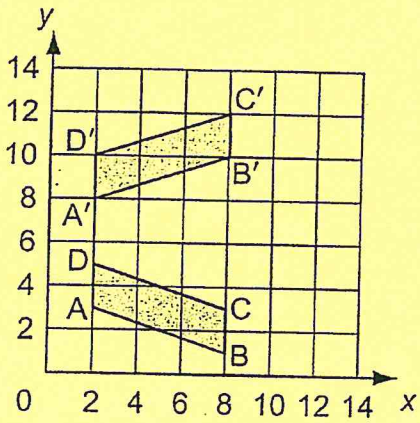
23. What is the difference between the volume of a cube with side length of 4 units and the volume of a cube with side length of 1 unit?

a) 3 cubic units b) 15 cubic units c) 27 cubic units d) 63 cubic units e) N.O.T.

24. The figure to the right shows a parallelogram $ABCD$ in the coordinate plane. Which of the following shows the image $A'B'C'D'$ of this parallelogram after the figure is translated 3 units up?



a)



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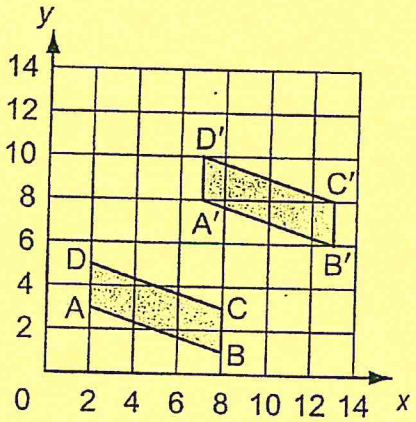

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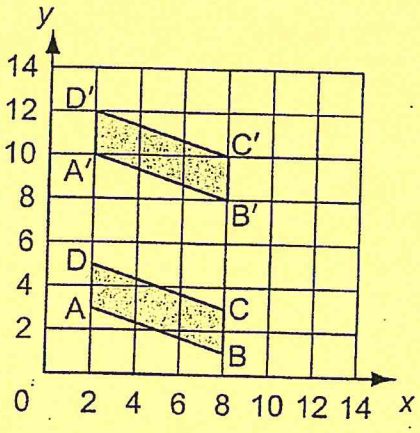

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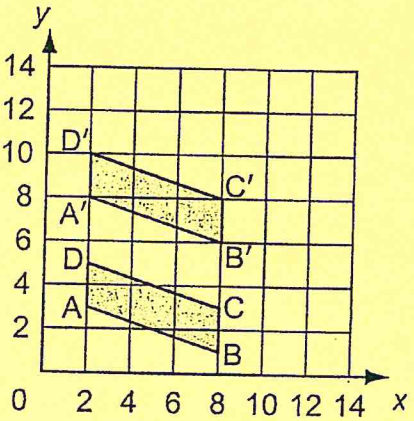


e) N.O.T.

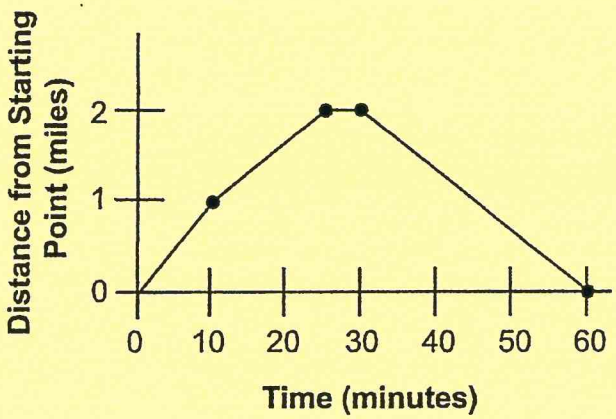
25. A taxi company charges an initial fee of \$2.60, plus an additional charge per mile. Ramona rides in a taxi from this company for 5 miles, and the total charge is \$16.60. What is the charge per mile for the taxi ride?

a) \$14.00 b) \$2.80 c) \$3.32 d) \$3.84 e) N.O.T.

26. Maria has a piece of rectangular paper that is 12 inches wide by 16 inches long. She drew a straight line along the diagonal of the paper. What is the length of the line that Maria drew?

a) 28 inches b) $\sqrt{112}$ inches c) $\sqrt{28}$ inches d) 20 inches e) N.O.T.

27. Curt jogged on a path that was 2 miles long, took a break, and then jogged back along the same path to where he started. He jogged at different speeds for different distances along the path as shown in the figure below.



Between which times did Curt jog the fastest?

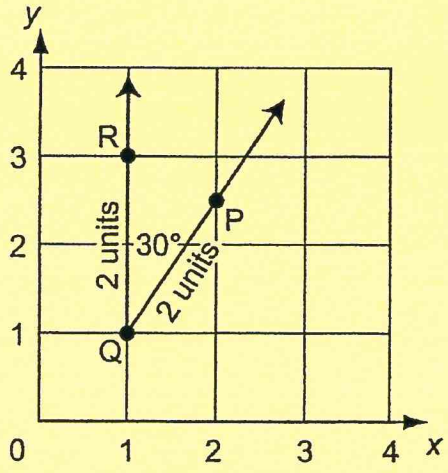
a) Between 0 and 10 minutes b) Between 10 and 25 minutes
c) Between 25 and 30 minutes d) Between 30 and 60 minutes e) N.O.T.

28. Trevor is making soup in a cylindrical cooking pot. It has a diameter of 10 inches and a height of 8 inches. Rounding π to 3.14, what is the approximate volume of the cooking pot?

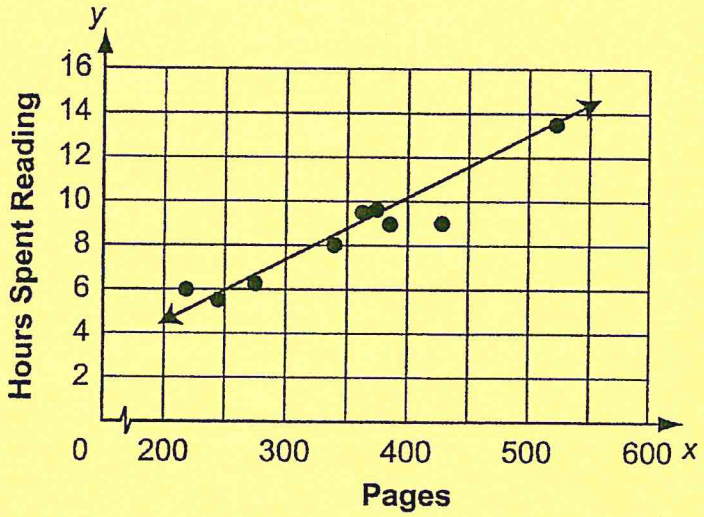
a) 251 cubic inches b) 502 cubic inches c) 628 cubic inches d) 2512 cubic inches e) N.O.T.

29. A dilation applied to $\angle PQR$ (shown in the figure to the right) creates $\angle P'Q'R'$ so that the length of $\overline{Q'R'}$ is 6 units. What is the measure of $\angle P'Q'R'$ after the dilation?

a) 5° b) 10°
c) 60° d) 90°
e) N.O.T.



30. Sandra read 9 books over the summer. She recorded the number of pages she read and the number of hours she spent reading each book. This information and a line of best fit are shown in the scatter plot below.



Based on the scatter plot, which statement is very likely to be true about the time Sandra spent reading?

a) Sandra read at a rate of approximately 50 pages per hour.
b) Sandra read at a rate of approximately 75 pages per hour.
c) Sandra would need about 2 hours to read a 150-page book.
d) Sandra would need about 12 hours to read a 470-page book.
e) N.O.T.