

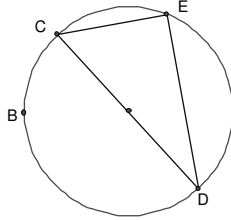
January Regional

The abbreviation NOTA denotes "None of These Answers."

Diagrams may not be drawn to scale

- The measures of two sides of a triangle are 12 inches and 13 inches. Find the range, in inches, of possible measures for the third side.
 - $1 < x < 25$
 - $1 < x < 25$
 - $x < 25$
 - $x > 1$
 - NOTA
- Clyde wishes to center a butcher-block table in a kitchen's work triangle, that is, at a location equidistant from the refrigerator, stove, and sink. Which point of concurrency does Clyde need to locate?
 - orthocenter
 - incenter
 - circumcenter
 - centroid
 - NOTA
- The line through A (4, 2) and B (-1, y) is perpendicular to a line with slope -5. Find y.
 - 3
 - 1
 - 27
 - 1
 - NOTA
- A rectangle has perimeter of 90 feet and one side with length 20 feet. What is the length, in feet, of the diagonal?
 - $10\sqrt{29}$
 - $5\sqrt{41}$
 - 45
 - 50
 - NOTA
- If the diagonals of a rhombus are x and y units long, find the area, in square units, of the rhombus in terms of x and y.
 - 2xy
 - $\frac{x^2 + y^2}{2}$
 - $\frac{x + y}{2}$
 - $\frac{xy}{2}$
 - NOTA

Geometry Individual Test

- A rectangular box measures 4 by 5 by 2 meters. What is the length, in meters, of the longest broomstick that can fit into the box?
 - $\sqrt{5}$
 - $2\sqrt{5}$
 - $3\sqrt{5}$
 - $5\sqrt{2}$
 - NOTA
- The measure of each interior angle of a regular polygon is eight times that of an exterior angle of the polygon. How many sides does the polygon have?
 - 16
 - 17
 - 18
 - 19
 - NOTA
- The chairs for a concert are arranged so that each row has the same number of chairs. Teresa has 10 rows of seats in front of her, and 3 rows of seats behind her. There are 5 seats to her left and 7 to her right. How many chairs are set up?
 - 181
 - 182
 - 169
 - 168
 - NOTA
- Given segment CD represents a diameter and minor arc ED measures 108° , determine the value of angle CDE .
 - 108°
 - 36°
 - 54°
 - 90°
 - NOTA
- Triangle ABC has vertices located at (3, 2), (-4, 5), and (8, 3) respectively. The triangle should be classified as _____ based on side lengths.
 - scalene
 - isosceles
 - equilateral
 - not a triangle
 - NOTA

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11. A farmer has x feet of fencing and wants to enclose the largest area possible with the fencing. In which of the following shapes should he lay the fencing in order to maximize the area contained?
- a. circle b. equilateral triangle
b. isosceles trapezoid d. square
e. NOTA
12. If one interior angle of an equiangular n -gon is 168° , how many sides does the n -gon have?
- a. 24 b. 28 c. 30 d. 32
e. NOTA
13. How many times in a 24-hour day are the minute and the hour hands of a clock perpendicular?
- a. 24 b. 36
c. 44 d. 48 e. NOTA
14. The hypotenuse of an isosceles right triangle has a length x . Find the perimeter of the triangle in terms of x .
- a. $3x$ b. $x(1 + \sqrt{2})$
c. $x\sqrt{2}$ d. $3x\sqrt{2}$ e. NOTA
15. A cruise ship leaves Tampa and travels 80 miles due west and then travels 150 miles due south. Upon completion of the voyage, how far, in miles, is the ship away from Tampa?
- a. 230 b. 170
c. $\sqrt{230}$ d. $10\sqrt{17}$ e. NOTA
16. If 28 lines are drawn on a plane, what is the maximum number of points of intersection possible?
- a. 28 b. 378 c. 392 d. infinite
e. NOTA

Geometry Individual Test

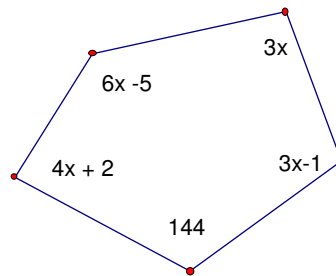
17. Given an isosceles triangle XYZ , if the area is 40cm^2 and the height is 8cm to the base, what is the length, in centimeters, of one of the two congruent sides?
- a. $\sqrt{89}$ b. 10
c. 6 d. 13 e. NOTA
18. Given triangle ABC with vertices $A(4, 5)$, $B(-1, 4)$ and $C(-2, -5)$, find the slope of the midsegment (defined as a segment connecting the midpoint of two consecutive sides) connecting segments AB and AC .
- a. -9 b. $-\frac{1}{9}$
c. 9 d. $\frac{1}{9}$ e. NOTA
19. Two times the measure of the supplement of an angle is equal to seven times the measure of the complement of the same angle. What is the measure of the angle?
- a. 36° b. 72°
c. 54° d. 110° e. NOTA
20. Consider the following statements:
- a. diagonals are congruent
b. diagonals are perpendicular
c. equiangular
d. two distinct pairs of parallel sides
- Which quadrilateral satisfies **all** of the following conditions?
- a. trapezoid b. rhombus
c. rectangle d. square e. NOTA
21. How many of the following statements are true:
- I. The exterior angle of a regular hexagon measures 60°
II. A regular 15-gon has interior angles that each measure 156°
III. If four interior angles in a pentagon measure 50° , 115° , 80° , and 120° respectively, the fifth angle must measure 175°
- a. 0 b. 1 c. 2 d. 3 e. NOTA

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22. Which one of the following does **not** represent a shortcut that proves two triangles are congruent?
- a. SSS b. AAS
c. AA d. ASA e. NOTA
23. The needle of a circular scale in the produce department of a grocery store is 20 cm long. What distance does the tip of the needle travel when it rotates 900° ? Leave your answer in terms of pi.
- a. 20π b. 40π
c. 100π d. 900π e. NOTA
24. Determine the contrapositive of the following conditional statement: If a shape is a triangle, then it has three sides.
- a. If a shape has three sides, then it is a triangle.
b. If a shape does not have three sides, then it is not a triangle.
c. If a shape is not a triangle, then it does not have three sides.
d. If a triangle exists it has three sides.
25. Five-foot-tall Diane casts an 84-inch shadow. How tall, to the nearest inch, is her friend if, at the same time of the day, his shadow is 1.5 feet longer than hers?
- a. 6 feet, 1 inch b. 6 feet, 2 inches
c. 6 feet, 6 inches d. 5 feet, 10inches
e. NOTA
26. A convex solid has 7 faces and 21 edges, how many vertices will it have?
- a. 14 b. 21
c. 16 d. 12 e. NOTA

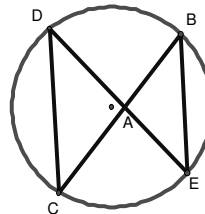
Geometry Individual Test

27. The definition of a parallelogram states, "If both pairs of opposite sides of a quadrilateral are parallel, then the quadrilateral is a parallelogram." Quadrilateral $ABCD$ has both pairs of opposite sides parallel. What conclusion can you make? What type of reasoning did you use?
- a. $ABCD$ is a parallelogram; deductive
b. $ABCD$ is a rectangle; inductive
c. $ABCD$ is a parallelogram; inductive
d. $ABCD$ is a rectangle; deductive
e. NOTA
28. In the polygon shown with degree measures given, determine the value, to the nearest tenth degree, of the largest angle:



- a. 165° b. 144°
c. 145° d. 115° e. NOTA

29. Find the measure of angle CDE if the measures of angles CDE and EBC are $(5x + 12)^\circ$ and $(15x - 42)^\circ$ respectively.



- a. 5.4° b. 39°
c. 78° d. 27° e. NOTA

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30. Identify three solid figures that could have the cross section shown below.



- a. cylinder, triangular prism, cube
- b. cone, rectangular prism, pyramid
- c. sphere, cylinder, cone
- d. cylinder, sphere, pyramid
- e. NOTA