**Instructions: Choose the letter of the best answer. In all cases, E) NOTA means “none of these answers”. Figures are not drawn to scale.**

1)The standard hockey puck used in the Olympics has a volume of 128 cm3, while the hockey puck used for practice has a volume of 16 cm3. If the two hockey pucks are similar and the Olympic hockey puck’s surface area is 324 cm2, what is the surface area of the practice hockey puck in square centimeters?

**A) 54 B) 81 C) 108 D) 216 E) NOTA**

2) Find the perimeter of the triangle.

75

°

60

°

10

**A) B) C) D)**

**E) NOTA**

3) Chamara was hungry while watching Olympics at home. So, he decided to order pizza. However, he is a very picky eater and eats only triangular shaped pizza. Chamara decided he wants to cut a triangular piece from the circular shaped 10-inch diameter pizza. What is the largest possible area of the triangular pizza in square inches? (Assume the pizza has no thickness)

**A)  B)  C)  D) 25 E) NOTA**

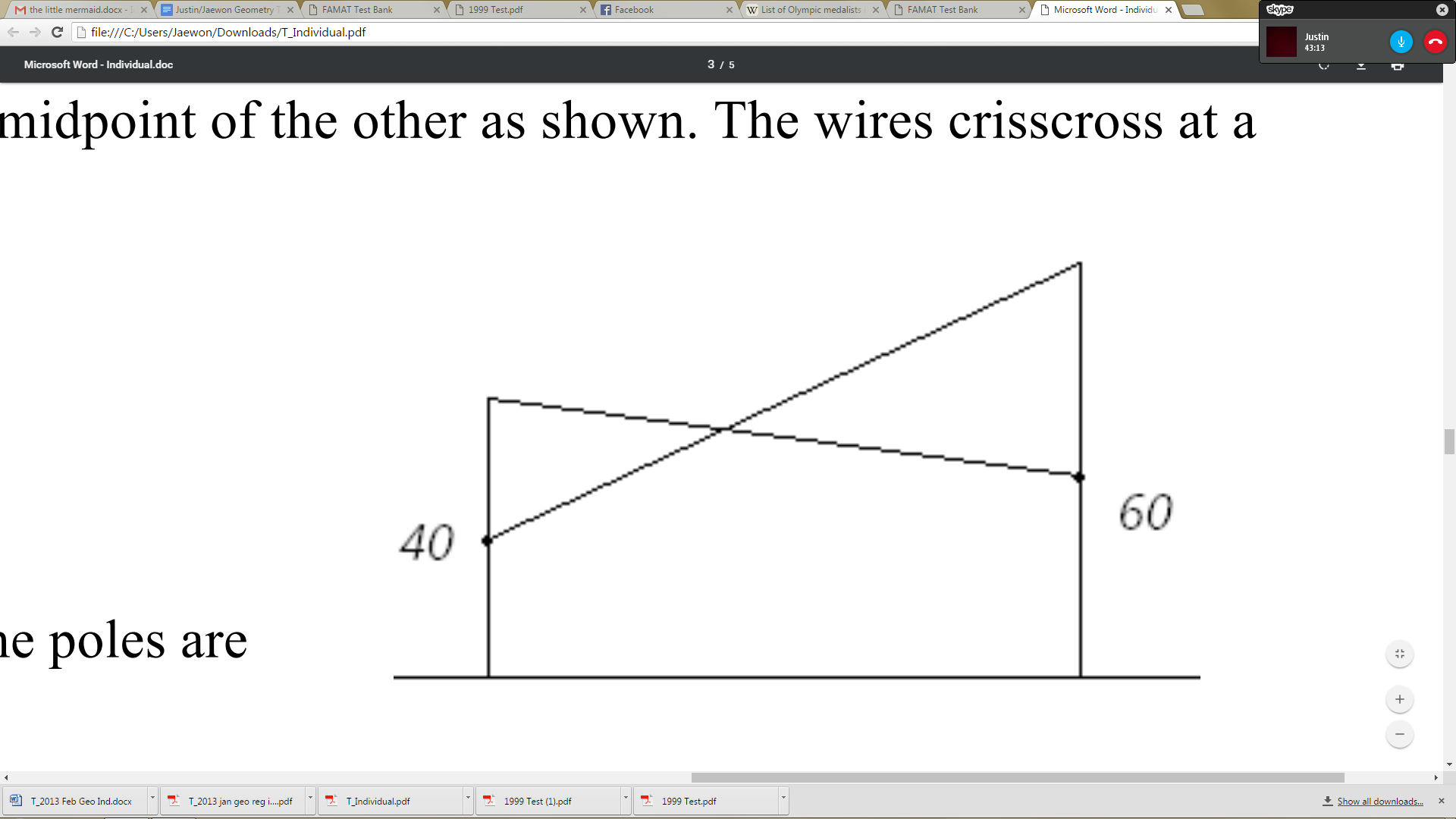
4) Which of the following statements are true?

I. If the diagonals of a convex quadrilateral are perpendicular, then it is a rhombus.

II. If the diagonals of a convex quadrilateral are congruent, then it is a rectangle.

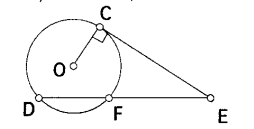
III. If the diagonals of a convex quadrilateral are perpendicular and congruent, then it is a square.

**A) I, II and III B) II and III only C) III only D) I and II only E) NOTA**

5) Two vertical poles are by the Olympic entrance, one 50 feet tall and the other 80 feet tall, standing 100 feet apart. There are two wires connecting from top of each pole to the midpoint of the other pole. The wires intersect at height of *h* above the ground. Find *h*.

**A)  B)  C) 25**

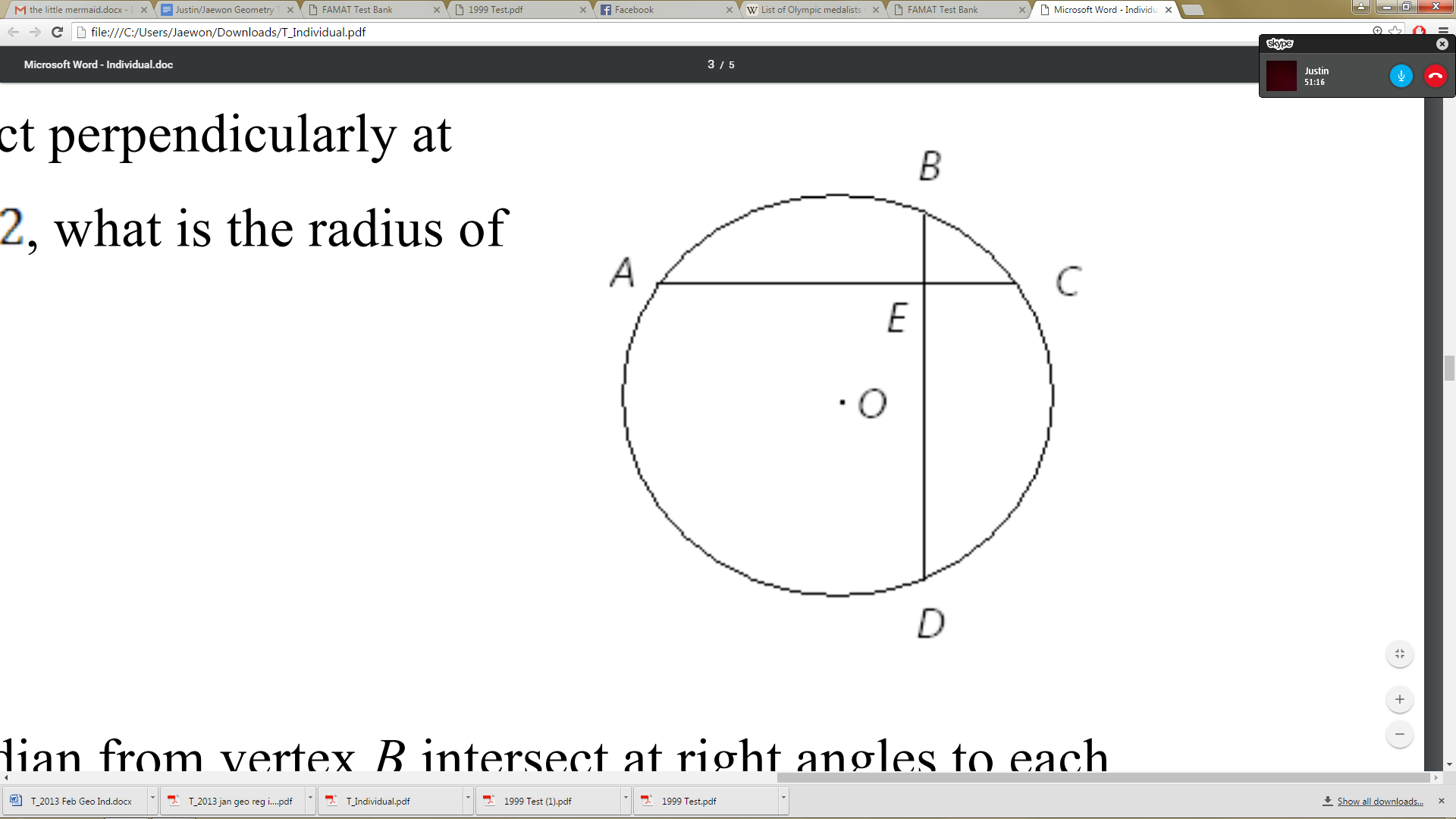
**D)  E)NOTA**

6) In circle O, CE=12 and EF=8, what is the length of ED?

**A)12 B)15 C)16 D)18**

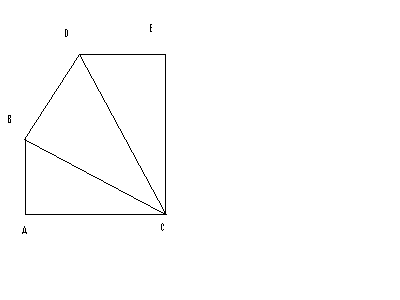
**E) NOTA**

7**)** AC and BD are two chords of circle O and they intersect perpendicularly at point E. If length of segment AE is 13, segment CE is 5, and segment DE is 15. What is the radius of circle O?



**A)  B)  C) **

**D)  E)NOTA**



8) In the figure, BAC, DBC, DEC, and ACE are right angles. ΔBDC and ΔEDC are congruent triangles. If AC = 18 and AB = . What is the length of segment EC?

**A) 12 B)  C) 15**

**D)  E) NOTA**

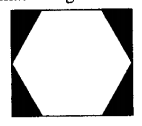
9) The area of a parallelogram ABCD is 36, AB = 12, and BC = 6.  Find the measure of each of the smaller angles in the parallelogram.

1. **B) C) D) E) NOTA**

10)The starting point of a curling game is (0,15) is on a Cartesian Coordinate. If the curling stone must pass through the center of the graph write an equation for the path of the curling stone that passes through the center of the graph and the starting point if the stone travels on a linear path..

**A)  B)  C)  D) **

**E) NOTA**



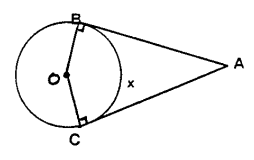
11) Jaewon was hired to create a floor for curling. He messes up entirely and the center of the floor ends up looking like the figure on the left. A regular hexagon with side length of 2 in is inscribed in a rectangle as shown on the left. Find the area of the shaded region.

**A) B) C) D) E) NOTA**

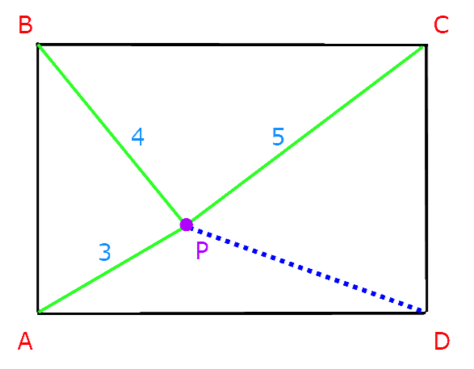
12) Find the number of sides of a regular n-gon whose number of diagonals is equal to

n2 – 4n – 7.

**A) 2 B) 5 C) 7 D) 12 E) NOTA**

13) During one point in a hockey game, Cayle is located at point A, Jason is located at point B, and Kevin is located at point C, as shown below. Find the measure of “x” in degrees, if angle A is 46 degrees?

**A) 92 B) 88 C) 122 D) 134 E) NOTA**

14) In the figure shown on the right, what is the length of PD?

**A)  B) 4.5 C) 4 D) **

**E) NOTA**

15) Jamie wants to watch a curling game. To do so, she must answer this question correctly: How many of these statements are true?

* The Law of cosines is c2 = a2 + b2 – abcosC
* A dodecahedron has 12 triangular faces.
* An icosahedron has 20 pentagonal faces.
* Skew lines are located in different planes.
* If the orthocenter and the centroid of a given triangle are the same point, then the triangle is equilateral.

**A)** **1 B) 2 C) 3 D) 4 E) NOTA**

16) Point A is located at (3, 9), point B is located at (-2, 5) and point C is located at

(8, 4). Where is the centroid of triangle ABC?

**A) (3, 6) B) (1.5, 3) C) (4, 5) D) (5, 4) E) NOTA**

17) What is the area of triangle ABC from question 15?

**A)  B) 35 C) 45 D)  E) NOTA**

18) Hockey practice starts at 12 PM, but Jennifer shows up exactly 12 minutes early. On an analogue clock, what is the measure of the angle, in degrees, formed by the hour hand and the minute hand the moment Jennifer arrived to hockey practice?

**A) 42 B) 66 C) 69 D) 72 E) NOTA**

19) Celebrating her team’s victory, Cayle makes a circular cake and shares it with her friends. Since she is lazy and does not want to cut the cake evenly, she randomly cuts the cake 5 times. What is the maximum number of pieces that Cayle can make with 5 cuts?

**A) 11 B) 15 C) 18 D) 31 E) NOTA**

20) Townsend shoots a hockey puck, sending it on the path of the line 4y = 3x - 6. George stands still on the point (-2,5), watching the puck slide. What is the shortest distance between the point (-2,5) and the hockey puck, at any given time?

**A) 4 B)  C) 6 D)  E) NOTA**

21)Find the inverse of the converse of the inverse of the contrapositive of the statement: If Joanna is good at curling, then Julia is bad at hockey.

**A) If Joanna is good at curling, then Julia is bad at hockey.**

**B) If Joanna is bad at curling, then Julia is good at hockey.**

**C) If Julia is not bad at hockey, then Joanna is not good at curling.**

**D) If Joanna is not good at curling, then Julia is not bad at hockey.**

**E) NOTA**

22) In order to qualify for curling at the Olympics, one must know which condition does not always define a plane. Which of the following conditions does not always define a plane?

**A) three non-collinear points B) two distinct intersecting lines**

**C) two parallel lines D) a line and a point**

**E) NOTA**

23) How many non-congruent triangles can be made from the set of segments whose lengths are 8 cm, 9 cm, 12 cm, and 20 cm?

1. **2 B) 3 C) 4 D) 5 E) NOTA**

24)If point C divides line segment AB into two segments so that  and line segment AC is 32 inches, what is the length of line segment BC?

1. **24 B) 64 C) 96 D) 128 E) NOTA**

25) If a circle with a radius of 10 has its radius decreased by 2, by what percent is the area of the circle decreased?

1. **20 B) 25 C) 36 D) 40 E) NOTA**

26) In right ∆ABC, AB is the hypotenuse and is 2 cm more than the longest leg. The other leg is half of AB. Give a possible length of the shortest leg, in cm.

1. ** B)  C)  D)  E) NOTA**

27)In the 2020 Olympics, there are rumors about possibly using octagonal shaped hockey pucks. The planned hockey puck is said to be a regular octagon with a side of length 12 cm. Find the area of this octagonal hockey puck in square centimeters. (Assume the hockey puck does not have a height)

1. **288 + 288 B) 144 + 576 C) 288 + 144**

**D) 576 + 144 E) NOTA**

28) A right rectangular prism with dimensions (in cm) of 12, 15 and 16 is inscribed in a sphere. Find the surface area of the sphere.

1. **625**  **B) 500**  **C)  D) 600**  **E) NOTA**

29) A box is shaped like a rectangular prism. The area of its base is 64 square inches and its volume is 5/27 cubic feet. Find the height of the box in inches.

1. ** B)  C)  D) 5 E) NOTA**

30) While Chamara was proving triangle congruency, he saw the term CPCTC. What does CPCTC stand for?

**A) Congruent Parts of Corresponding Triangles are Congruent**

**B) Congruent Parts of Composite Triangles are Congruent**

**C) Corresponding Parts of Congruent Triangles are Congruent**

**D) Corresponding Parts of Composite Triangles are Congruent**

**E) NOTA**