

# Geometry Individual

*Haynes Mu Alpha Theta 2019*

## Instructions

1. You have 50 minutes for this test.
2. No calculators allowed on this test.
3. Do all scratch work on your test.
4. Provide exact answers unless otherwise stated.
5. Units are not required; if units are given, however, they must be correct.
6. For this test, trapezoids have exactly ONE pair of parallel sides.
7. Not all figures are to scale.
8. All cylinders and cones are right circular cylinders and cones (in other words, the types of cylinders and cones you learned about in class).
9. Put name and school code on answer sheet.
10. Good luck and have fun!

Name\_\_\_\_\_

School\_\_\_\_\_

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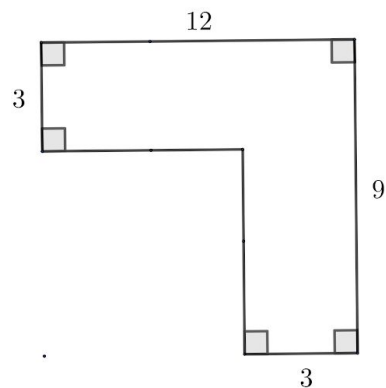
18. \_\_\_\_\_

19. \_\_\_\_\_

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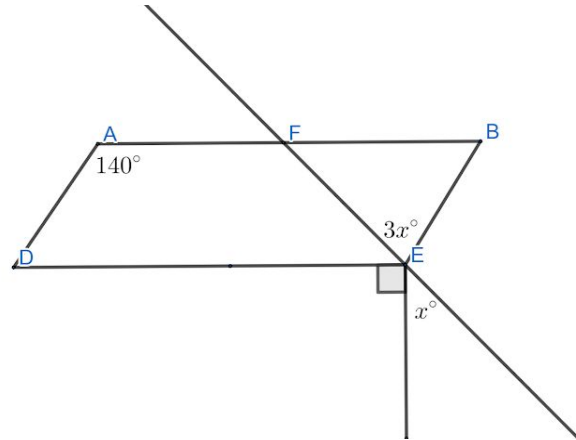
- 1) Benson is looking at a quadrilateral that has two pairs of parallel sides, and both of its diagonals are congruent. Which quadrilaterals are possible? (Select all answers)
  - i) a parallelogram that is not a rhombus or a rectangle
  - ii) a rhombus that is not a square
  - iii) a rectangle that is not a square
  - iv) a square
  - v) an isosceles trapezoid
- 2) “If Jonathan Poss is doing math, it is raining” is always a true statement. What are other statement must always be true as well? (Select one answer)
  - a) If Jonathan is not doing math, it is not raining.
  - b) If it is raining, Jonathan is doing math.
  - c) If it is not raining, Jonathan is not doing math.
  - d) If it is sunny, Jonathan is doing geometry.
- 3) Farmer Andrew has a rectangular garden, 40 feet long and 20 feet wide. He decides to put a 3 ft wide path around his garden. What is the area of the path?
- 4) A triangle has two angles with measures of  $35^\circ$  and  $65^\circ$ . What is the measure of the complement of the third angle?

- 5) Find the perimeter of the figure.

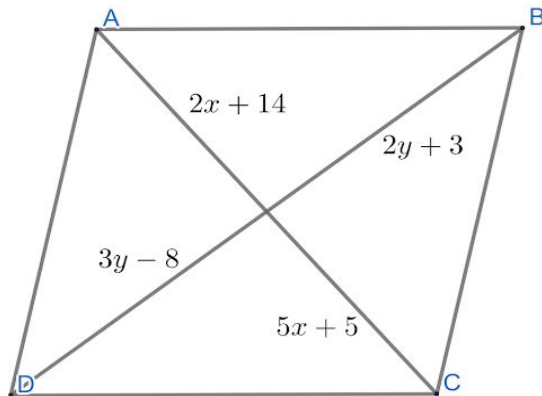


- 6) Jeffery is walking on a straight path from  $(-1, 4)$  to  $(11, -17)$  in the Cartesian plane. When Jeffery has completed exactly one-third of his journey, what coordinate will he be at?

- 7) ABED is a parallelogram.  
What is the value of  $x$ ?

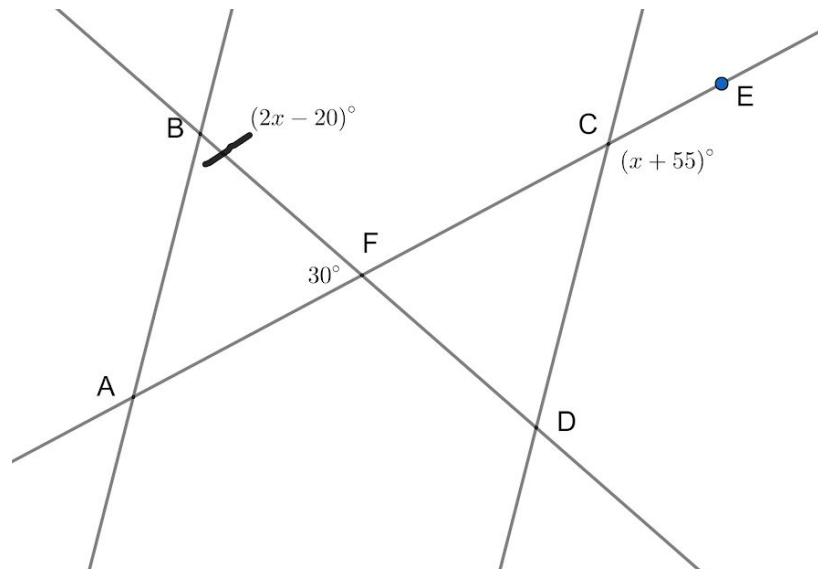


- 8) ABCD is a parallelogram. Find the value of  $x$  and  $y$ .



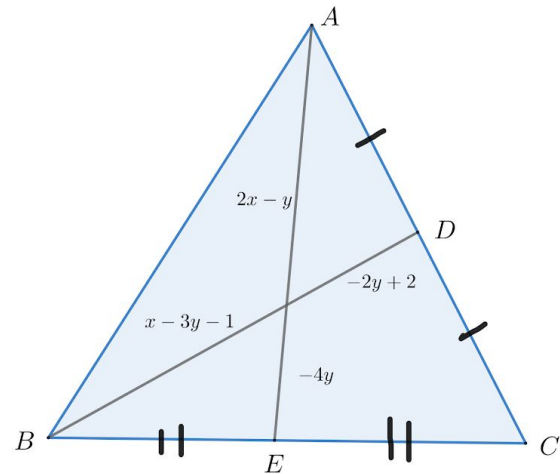
- 9) The ratio of the volumes of two spheres is  $8:27$ . If the surface area of the smaller sphere is  $144\pi$ , what is the radius of the larger sphere?

- 10) In the diagram, lines AB and DC are parallel,  $\angle ABF = (2x - 20)^\circ$ ,  $\angle BFA = 30^\circ$ , and  $\angle DCE = (x + 55)^\circ$ . Find  $\angle FAB$ .

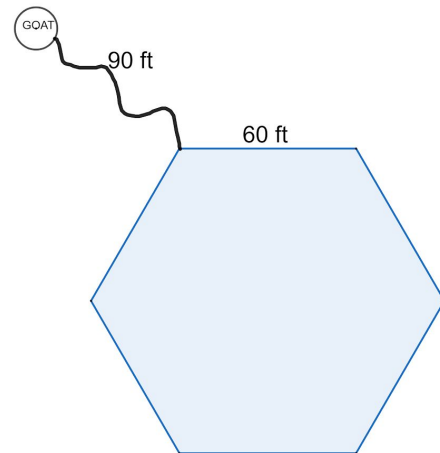


- 11) Kha is standing at (1, 8) in the Cartesian plane and is walking to his house at (7, 6). However, he must go to the river (the line  $y = 3$ ) at some point along his way home to pick up water. If Kha is to take the shortest path possible given these constraints, at what x-coordinate should he reach the river?
- 12) Heath is wrapping a present for Taylor. The present is a triangular prism. The area of one of the bases is  $16\sqrt{3} \text{ cm}^2$ . The ratio of the length of a base edge to the height of the prism is 1:4. What is the volume of Heath's present?

- 13) In triangle ABC,  $\overline{BD}$  and  $\overline{AE}$  are medians. Find  $x$  and  $y$ .

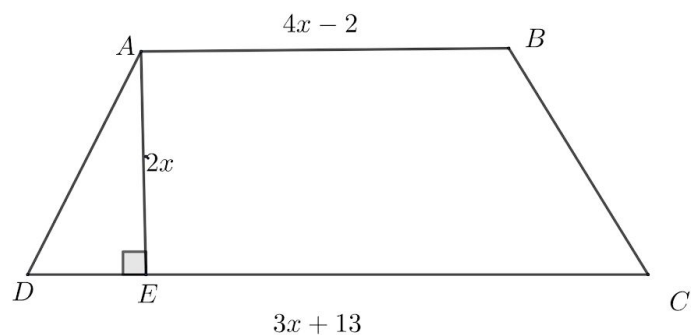


- 14) Aakash has a barn in the shape of a regular hexagon, 60 ft long on each side. Outside, he ties a goat to one vertex of the barn with a 90 ft leash. What is the area of the region the goat can graze?

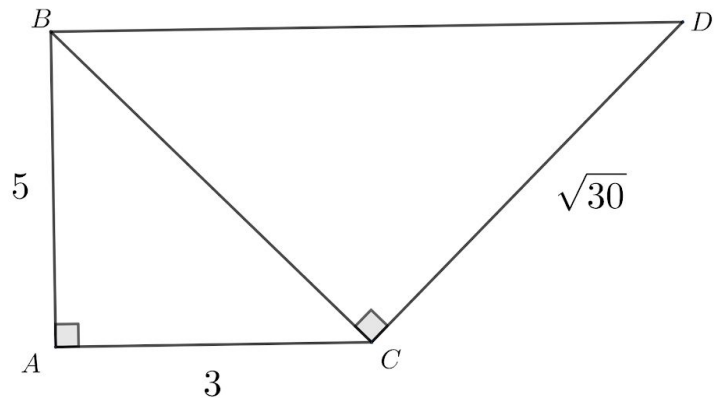


- 15) What is the acute angle between the hour and the minute hands of a clock at 3:20?

- 16) Trapezoid ABCD has an area of 96. If  $AB = 4x - 2$ ,  $DC = 3x + 13$ , and  $AE = 2x$ , find  $AB$ .



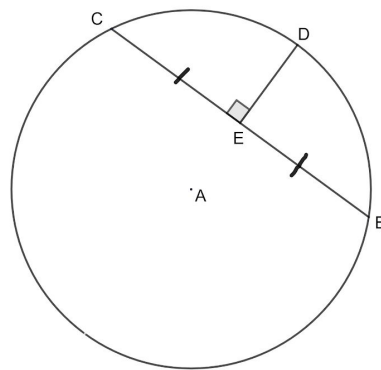
- 17) In the diagram at the right,  
find  $\sin D$ .



- 18) Hassan is selling lemonade to raise money for Haynes Mu Alpha Theta. He has a cylindrical jug with a diameter of 8 inches filled with lemonade 10 inches high. Eddie has 8 cone-shaped cups, each with a base diameter of 3 inches and a height of 4 inches. If Eddie fills all of these cups with Hassan's lemonade, how many inches will the height of the lemonade in the jug drop?

- 19) A circle of radius 9 is inscribed in a hexagon, which is inscribed in a larger circle. What is the circumference of the larger circle?

- 20) Kevin is building a circular swimming pool at Haynes. He lays a thin wooden plank (shown as  $\overline{BC}$ ) across the pool. If  $BC = 24$  meters and  $ED = 8$  meters, find the radius of the pool.



Answer Key

(Note: units are not required if they are in parentheses; if provided, however, units must be correct)

1. iii, iv
2. C
3. 396 (sq. ft)
4.  $10^\circ$
5. 42
6. (3, -3)
7.  $x=25$
8.  $x=3, y=11$
9. 9
10.  $80^\circ$
11.  $19/4$
12.  $512\sqrt{3} \text{ (cm}^3\text{)}$
13.  $x=7, y=-2$
14.  $5700\pi \text{ (ft}^2\text{)}$
15.  $20^\circ$
16. 10
17.  $\sqrt{34}/8$
18.  $3/2$  or 1.5 (inches)
19.  $12\pi\sqrt{3}$
20. 13 (m)