

Louisiana Mu Alpha Theta

affiliated with
Mu Alpha Theta
National High School and Junior College
Honorary Mathematics Club

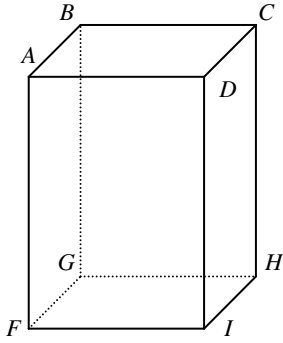
50th State Convention March 25-27, 2010 Baton Rouge, Louisiana

Theta - Geometry

TEST RULES

1. Do not begin test until you are told to do so.
2. You must supply your own #2 pencil.
3. Only ACT approved calculators are allowed on all tests.
4. Print your name and school in the name blank, your code in the date blank, and the area test in the subject blank on your Scantron answer sheet
5. Standard procedure for machine graded papers must be followed. Use only a #2 pencil, marking the appropriate spaces carefully.
6. In case of a tie, winners will be determined according to the order in which the answer sheet was turned into the moderator.
7. Do all scratch work on your test.

5. Name all segments skew to \overline{HI} .

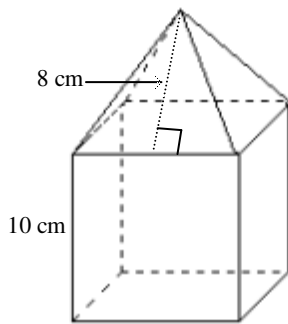


- A) $\overline{BC}, \overline{AD}, \overline{AF}, \overline{BG}$
 B) $\overline{FI}, \overline{GH}, \overline{DI}, \overline{CH}$

- C) $\overline{AD}, \overline{AB}, \overline{BC}, \overline{CD}$
 D) $\overline{BA}, \overline{BG}, \overline{AF}, \overline{FG}$

E) NOTA

6. The solid below is a composite of a cube and a square pyramid. The base of the solid is the base of the cube. Find the lateral area of the solid.



- A) 80 cm^2
 B) 660 cm^2

- C) 560 cm^2
 D) 720 cm^2

E) NOTA

7. Given the coordinates of the vertices of a quadrilateral, determine whether it is a square, a rectangle or a parallelogram. Then find the area of the quadrilateral.

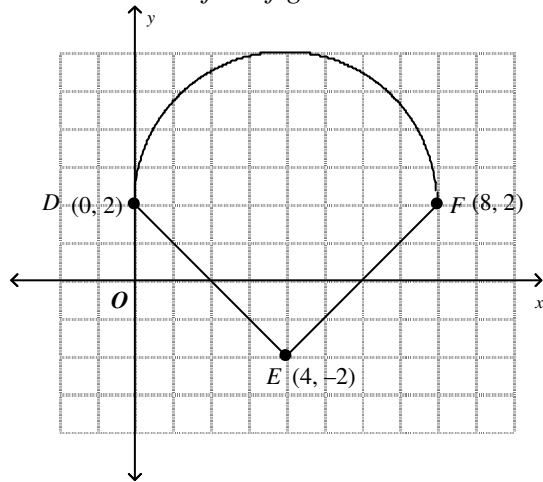
$N(-4, -4), O(3, -4), P(-3, 1), Q(4, 1)$

- A) parallelogram, 35 units^2
 B) square, 28 units^2

- C) rectangle, 30 units^2
 D) parallelogram, 40 units^2

E) NOTA

8. Find the area of the figure. Round to the nearest tenth if necessary.

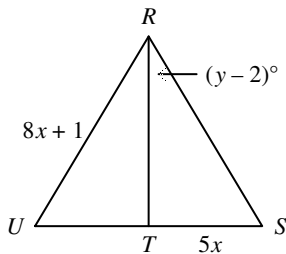


A) 57.1 units^2
 B) 66.2 units^2

C) 47.3 units^2
 D) 41.1 units^2

E) NOTA

9. Triangle RSU is an equilateral triangle. \overline{RT} bisects \overline{US} . Find x and y .



A) $x = -\frac{1}{3}, y = 32$

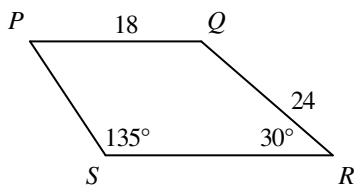
C) $x = \frac{1}{3}, y = 62$

E) NOTA

B) $x = \frac{1}{2}, y = 62$

D) $x = \frac{1}{2}, y = 32$

10. In trapezoid $PQRS$, $\overline{PQ} \parallel \overline{SR}$. Find the area of $PQRS$. Leave your answer in simplified radical form.



A) $144 + 72\sqrt{3}$

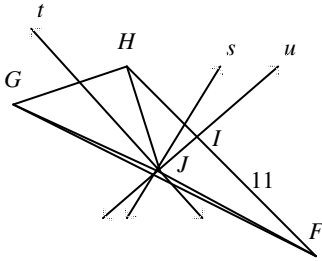
C) $288\sqrt{3} - 216$

E) NOTA

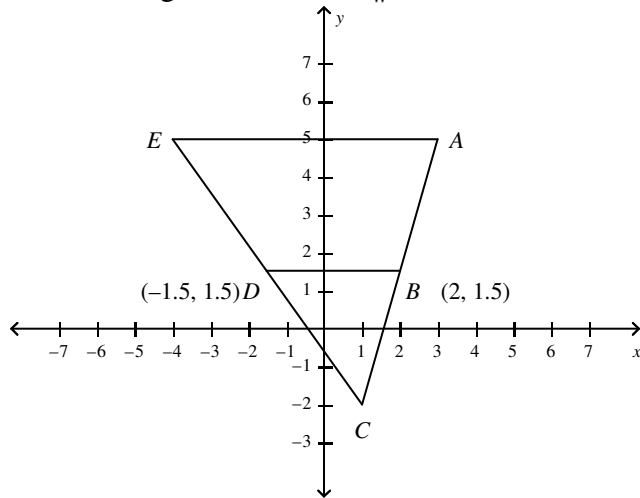
B) $72 + 72\sqrt{3}$

D) $144\sqrt{3} - 72$

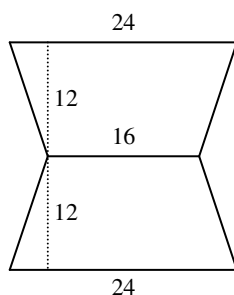
11. Lines s , t , and u are perpendicular bisectors of $\triangle FGH$ and meet at J . If $JG = 4x + 3$, $JH = 2y - 3$, $JF = 7$ and $HI = 3z - 4$, find x , y , and z .



- A) $x = 1, y = 5, z = 5$ C) $x = 5, y = 1, z = 5$ E) NOTA
 B) $x = 2.5, y = 2, z = 2.3$ D) $x = 0, y = 6, z = 2.3$
12. Find the length of \overline{AE} if $\overline{BD} \parallel \overline{AE}$ and \overline{BD} is a midsegment of $\triangle ACE$.

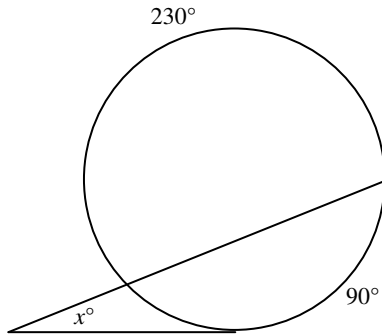


- A) 12.25 C) 49 E) NOTA
 B) 7 D) $\sqrt{12.25}$
13. A horse corral is situated on a triangular plot of land. Two sides of the plot are 150 feet long and they meet at an angle of 55° . A fence is to be placed along the perimeter of the corral. How much fencing material is needed?
- A) 125 ft C) 288.5 ft E) NOTA
 B) 138.5 ft D) 438.5 ft
14. Find the area of the figure. Round to the nearest tenth if necessary.



- A) 240 units² C) 960 units² E) NOTA
 B) 480 units² D) 1920 units²

20. Find x . Assume that any segment that appears to be tangent is tangent.



- A) 35 C) 25 E) NOTA
 B) 20 D) 30

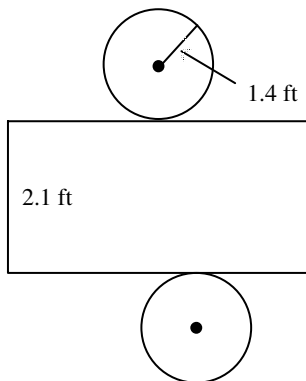
21. The Pythagorean triple 5, 12, 13 represents the lengths of the sides of a right triangle. Find the length of the altitude to the hypotenuse.

- A) $\frac{60}{13}$ C) $\frac{156}{5}$
 B) $\frac{65}{12}$ D) NOTA

22. While paddling a canoe up the river, Jan saw some beautiful flowers along the river bank. The canoe is 35 yards lower than the flowers. The distance from the canoe to the flowers is 225 yards. What is the angle of elevation?

- A) 8.8° C) 81.1° E) NOTA
 B) 8.9° D) 81.2°

23. Find the volume of the solid formed by the net. Use 3.14 for π when needed. Round to the nearest tenth.



- A) 12.9 ft^3 C) 9.2 ft^3 E) NOTA
 B) 18.5 ft^3 D) 4.1 ft^3

24. Find the length, d , in simplest radical form, of the diagonal of a cube with sides of s units.

- A) \sqrt{s} B) $\sqrt{2}s$ C) $\sqrt{3}s$ D) $3s$ E) NOTA

25. $m\angle A = 9x - 7$, $m\angle B = 7x - 9$, and $m\angle C = 28 - 2x$. List the sides of $\triangle ABC$ in order from shortest to longest.

- A) \overline{AB} ; \overline{AC} ; \overline{BC} B) \overline{BC} ; \overline{AB} ; \overline{AC} C) \overline{AC} ; \overline{AB} ; \overline{BC} D) \overline{AB} ; \overline{BC} ; \overline{AC} E) NOTA