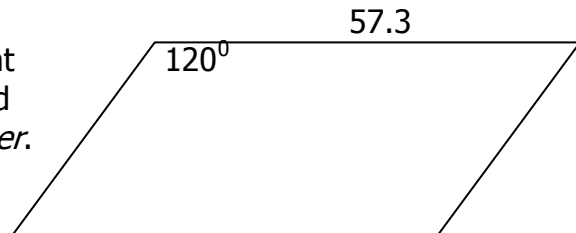


2008 Middle School Math Festival**Team Round: Geometry**

Unless stated in the problem, answers will be written as an integer or an exact decimal (i.e. do not round). Any problems requiring a common fraction or mixed number for the answer will always require the fractional part to be in lowest terms.

1. A regular hexagon is inscribed within a circle with a diameter of 12.5 inches. What is the positive difference between the area of the circle and the area of the hexagon, measured in square inches. Round your answer to the nearest *whole number*.

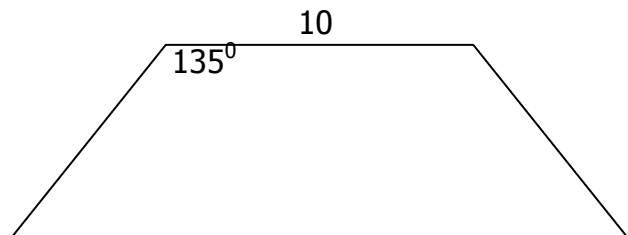
2. The area of the parallelogram to the right is 756.36. What is the perimeter? Round your answer to the nearest *whole number*.



3. The coordinates of a triangle are $(-2, 3)$, $(5, -2)$, and $(1, 7)$. Calculate the perimeter. Round your answer to the nearest *hundredth*.

4. A square pyramid has a base area of 25 and a slant height of 13. What is the sum of the volume and the total surface area of the pyramid. Round your answer to the nearest *whole number*.

5. The isosceles trapezoid at the right has a perimeter of $36 + 16\sqrt{2}$. What is the area of the trapezoid. Round your answer to the nearest *whole number*.



6. A dodecadon has four sets of three congruent angles with each set of angles in a ratio of 2:3:4:6. The twelve angles are labeled $a, a, a, a, b, b, b, b, c, c, c, c, d, d, d, d$.

Calculate $\frac{(a)(c)}{(b)(d)}$. Write the answer as a common fraction in lowest terms.

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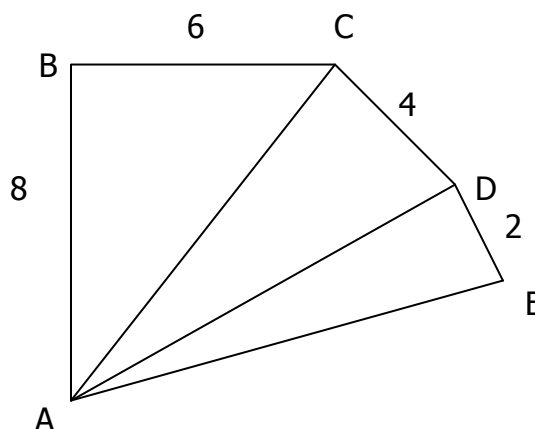
7. The area of one face of Cube A is 100 ft^2 . The volume of Cube B is 343 ft^3 .
Let x = volume of Cube A and y = total surface area of Cube B. Calculate xy .

8. Kite $ABCD$ has coordinates $A(-6, 0)$, $B(0, 3)$, $C(6, 0)$, and $D(0, -12)$. Calculate the sum of the perimeter and the area of the kite. Write the exact answer with any radicals in simplest radical form.

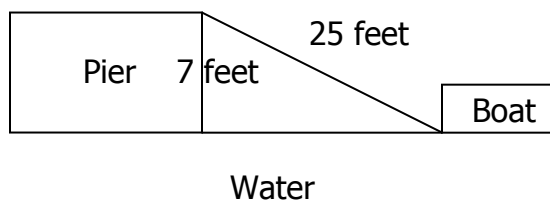
9. A = the slope of the line $8x - 3y = -5$
 B = the slope of a line parallel to the line $5x + 4y = 100$
 C = the slope of a line perpendicular to the line $5x - 2y = -1.5$

Calculate $A - B + C$. Write the answer as a common fraction in lowest terms.

10. In the figure to the right, $\angle B$, $\angle ACD$, and $\angle ADE$ are right angles. What is the length of AE . Write the answer in simplest radical form.



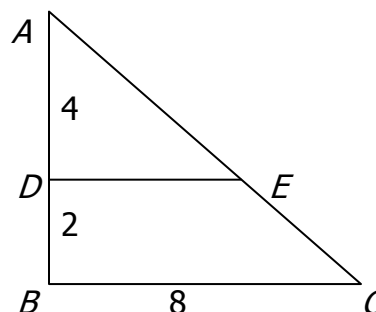
11. A boat is tied to a pier with a 25-foot rope so the distance from the top of the pier and the top of the boat dock 7 feet. If the water level goes down 8 feet during low tide, how much closer (in feet) is the boat to the base of the pier? Assume the rope is always taut.



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12. Let A and B be the slope and y -intercept of the line through the points $G(-4, 4)$ and $H(4, 0)$. Let C and D be the slope and y -intercept of the perpendicular bisector of \overline{GH} . Calculate $\frac{AB}{CD}$. Write the answer as a common fraction in lowest terms.

13. Calculate $AE + DE - EC$. Write the answer as mixed number with the fraction in lowest terms.



14. A hemisphere with a diameter of 6 inches sits on top of a cylinder with a diameter of 12 inches. From the bottom of the cylinder to the top of the hemisphere measures 12 inches. Calculate the sum of the numerical values of total volume (in^3) and total surface area (in^2). Write the answer in terms of π .

15. Triangle ABC is a right triangle with BD as the altitude. $AB = 7.5$ and $AC = 12.5$. Calculate the product of the four lengths AD , DC , BD , and BC .