

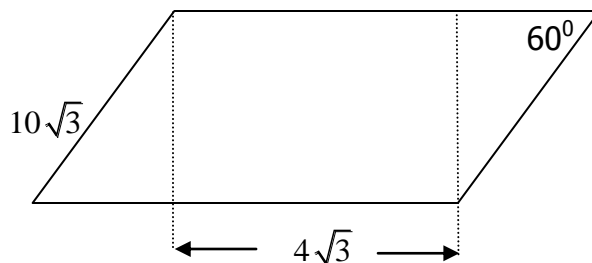
2009 Middle School Math Festival**Team Round: Geometry**

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. You have 260 feet of fencing. Let A = the maximum open area which can be enclosed by the fencing. If you have an open area of 1225 ft^2 which needs to be enclosed, let B = the minimum amount of fencing needed to enclose the area. Ignoring the units, find the sum of $A + B$.

2. What is the exact perimeter of the parallelogram to the right?

Drawing is not to scale.

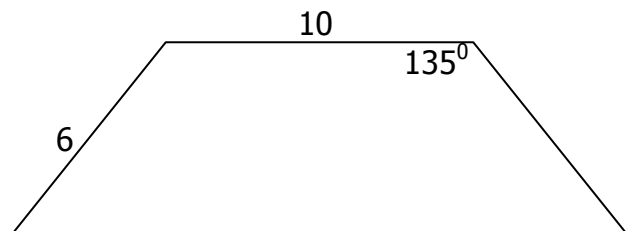


3. The coordinates of a triangle are $(-2.3, 1.8)$, $(2.7, -3.2)$, and $(-5.3, 0.8)$. Calculate the exact perimeter.

4. A square right pyramid has a vertical height of 15 and a slant height of 17. What is the total surface area of the pyramid.

5. What is the exact area of the isosceles trapezoid to the right?

Drawing is not to scale.



Team Round (2009): Geometry

6. 100 Japanese one-yen coins laid side-by-side measure 2 meters from end to end. Let A = the surface area of one coin, measured in mm^2 , and C = the circumference of one coin, measured in mm. Calculate $A + C$. Use $\pi = 3.14$.

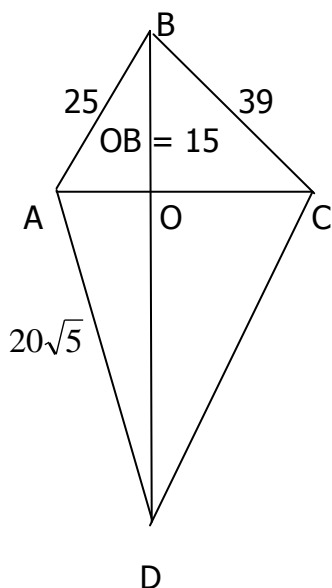
7. A bulldog is attached to one corner of a 12' by 12' shed using a 16'-long rope. Calculate the total area which the bulldog could roam, measured in terms of π .

8. A circle is inscribed inside a square. The area of the square is 18. Let A = the exact area of the circle and C = the exact circumference of the circle, both measured in terms of π . Calculate the product of A and C .

9. A = the slope of the line $3x - 8y = -2$
 B = the slope of a line parallel to the line $5x + 4y = 3$
 C = the slope of a line perpendicular to the line $2x - 5y = -4.3$

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

10.



The diagonals of quadrilateral ABCD are perpendicular. Calculate the area of quadrilateral ABCD.

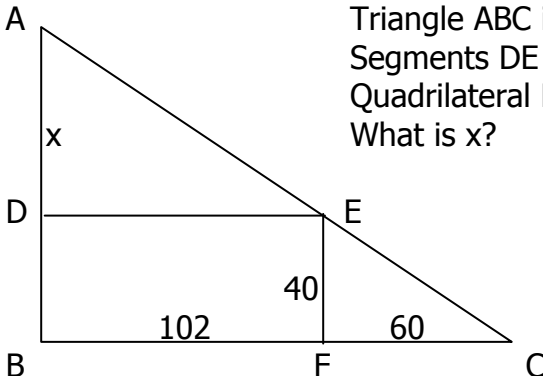
Drawing not drawn to scale.

Team Round (2009): Geometry

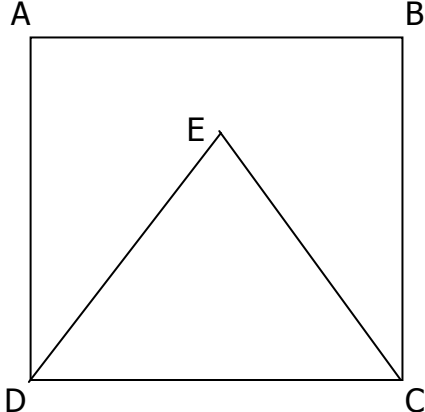
11. Noah's Ark can be approximated as a rectangular prism with a length of 300 cubits, a width of 50 cubits and a height of 30 cubits. Modern scholars believe a cubit was defined as the length of a forearm and is considered to be about 18 inches long. Using that approximation, what is the volume of Noah's Ark, measured in cubic feet?

12. A, B = the slope and y -intercept of the line containing the points $(3, -7)$ and $(-4, 3)$
 C = the slope of a line perpendicular to the line $7x + 2y = 25$

Calculate the sum of $A + B + C$. Write the answer as a mixed number.

13.  Triangle ABC is a right triangle.
 Segments DE and BC are parallel.
 Quadrilateral BDEF is a rectangle.
 What is x ?

14. A meat company packs sausages into a cylindrical can with flat ends. The diameter of the can is 6.5 cm and the height is 8 cm. Each sausage is also a cylinder with a flat end and the diameter of one sausage is 2 cm and is 7.5 cm long. How much empty space is in the can if it holds 8 sausages? Write the answer in terms of π .

15.  Square ABCD has an area of 200.
 Triangle DEC is equilateral.
 Calculate the exact area of triangle DEF.