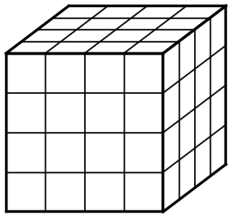
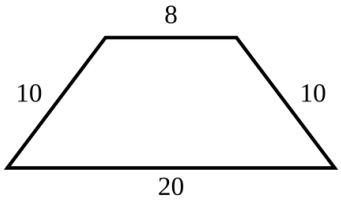
Math Contest: Geometry

Solve each problem. Show your work and circle your final answer.

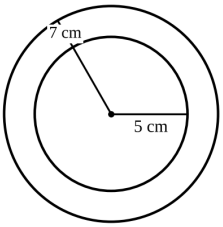
① A 4-by-4-by-4 cube is painted on all six faces and then cut into 64 unit cubes. How many of the unit cubes have exactly two painted faces?



② An isosceles trapezoid has bases of length 8 and 20 units and legs of length 10 units. What is the area of the trapezoid?

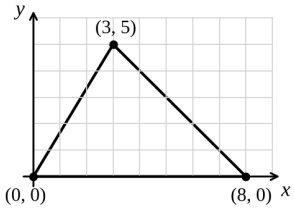


③ The radius of a circle is increased from 5 cm to 7 cm. By how many square centimeters does the area of the circle increase? Express your answer in terms of π.



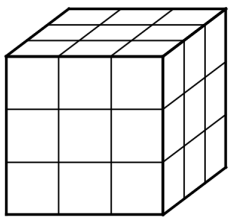
④ What is the distance between the points (-2, 3) and (4, 11) in a coordinate plane?

⑤ A triangle has vertices at (0, 0), (8, 0) and (3, 5). What is the area of the triangle?

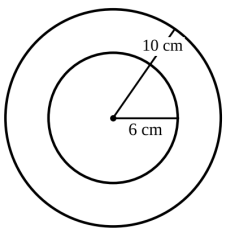


⑥ What is the sum of the interior angles of a convex heptagon?

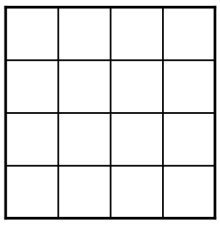
⑦ A 3-by-3-by-3 cube is painted on all six faces and then cut into 27 unit cubes. How many of the unit cubes have exactly one painted face?



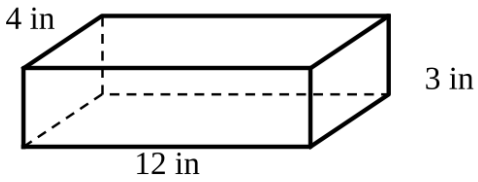
⑧ Two concentric circles have radii 10 cm and 6 cm. What is the area of the region between the circles? Express your answer in terms of π.



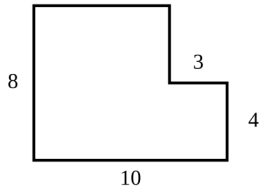
(9) How many squares of any size are there in a 4-by-4 grid of unit squares?



(10) A rectangular box measures 3 inches by 4 inches by 12 inches. What is the length of the longest line segment that can be drawn between two corners of the box?

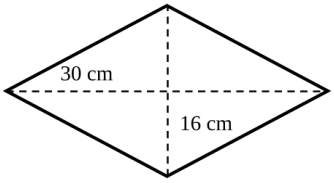


(11) A 10-by-8 rectangle has a 3-by-4 rectangle cut out of one corner, leaving an L-shaped figure. What is the perimeter of the figure?

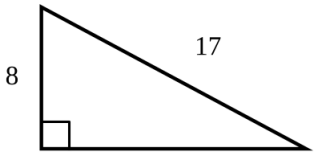


(12) The length of a rectangle is increased by 20% and its width is decreased by 10%. By what percent does the area of the rectangle increase?

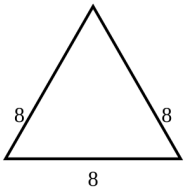
(13) The diagonals of a rhombus are 16 cm and 30 cm. What is the area of the rhombus?



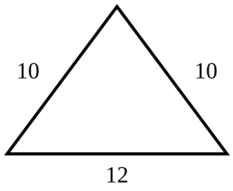
(14) A right triangle has a hypotenuse of length 17 units and one leg of length 8 units. What is the area of the triangle?



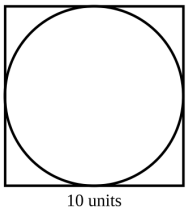
(15) What is the area of an equilateral triangle with side length 8 units? Express your answer in simplest radical form.



(16) A triangle has side lengths 10, 10 and 12 inches. What is the area of the triangle?



(17) A circle is inscribed in a square with side length 10 units. What is the area of the region inside the square but outside the circle? Express your answer in terms of π.



(18) A room is 12 feet by 15 feet and has 8-foot-high walls. The room has two windows, each 3 feet by 4 feet, and no other openings. How many square feet of wall (not including the windows) need to be painted?

(19) An angle measures 10° more than 4 times its supplement. What is the number of degrees in the angle?

(20) A cone has a base radius of 5 cm and a slant height of 13 cm. What is the volume of the cone? Express your answer in terms of π.

