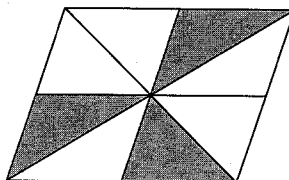


Mathcounts / AMC 8

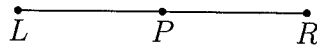
Name _____

- (1) _____ Angle A of parallelogram $ABCD$ measures 135° . Find the number of degrees in the difference between angle A and the smallest of the other three angles of the parallelogram.
- (2) _____ A man has a $10\text{ m} \times 10\text{ m}$ square garden. In the center is a $2\text{ m} \times 2\text{ m}$ square patch which he cannot use. He divides his usable space into four congruent rectangular patches. What is the number of meters in the perimeter of each rectangle?
- (3) _____ How many $\frac{1}{2}$ -inch cubes are needed to make 1 cubic foot?
- (4) _____ Find the number of square meters in the area of a regular hexagon inscribed in a circle of diameter 12 meters.
- (5) _____ In the parallelogram shown, the midpoints of opposite sides are connected with line segments. Likewise, the opposite vertices are connected. What is the probability that a point randomly selected inside the parallelogram will lie inside one of the shaded regions? Express your answer as a common fraction.



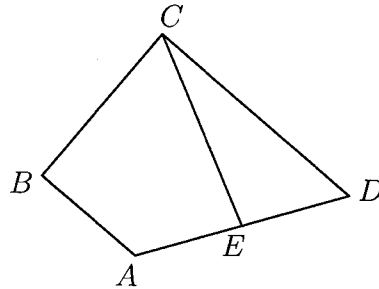
- (6) _____ Micah is building a corral for his pet buffalo. He equally spaces and consecutively numbers the posts as he pounds them around a circle. The seventh and seventeenth posts lie on the same diameter. How many posts are there?

- (7) _____ One side of a square A is a diagonal of square B. What is the ratio of the area of square B to the area of square A? Express your answer as a common fraction.
- (8) _____ A caterer wants to cut a circular pie into congruent wedges so that each person gets the same percent of the pie. If each person is to receive 12.5% of the pie, how many degrees should form the central angle of the wedge?
- (9) _____ The radius of a right circular cylinder is decreased by 20% and its height is increased by 25%. What is the absolute value of the percent change in the volume of the cylinder?
- (10) _____ Point P is the midpoint of segment LR and $LR = 8$ cm. If L is rotated clockwise around point P until equilateral triangle LPR can be formed, through how many degrees is L rotated?



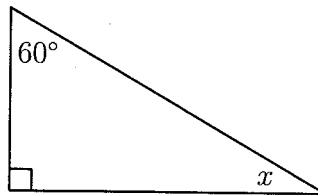
- (11) _____ Given that it takes four miles of fence to enclose a square 640-acre field, how many acres are in a square field enclosed by two miles of fence?
- (12) _____ A triangle is made of wood sticks of lengths 8, 15 and 17 inches joined end-to-end. Pieces of the same integral length are cut from each of the sticks so that the three remaining pieces can no longer form a triangle. How many inches are in the length of the smallest piece that can be cut from each of the three sticks to make this happen?
- (13) _____ Two concentric circles are drawn such that the inner circle covers 81% of the area of the outer circle. Given that the radius of the outer circle is ten units, how many units are in the radius of the inner circle?
- (14) _____ The radius of one of two concentric circles is 4 cm long, and the other is 9 cm long. How many centimeters are in the circumference of a circle which is concentric to the given circles and whose radius is equal to the average of the other two radii? ~~Express your answer in terms of π .~~

- (15) _____ In the diagram, $AB \perp BC$ and $BC \perp CD$. $AB = 8''$, $BC = 12''$, and $CD = 16''$. E is the midpoint of AD . How many square inches are in the area of $ABCD$?



- (16) _____ A popcorn company wants to create a circular cylindrical container with diameter 10 inches and volume 1256 cubic inches. How many inches should the height of the container be? Express your answer to the nearest inch.

- (17) _____ How many degrees are in the sum of the complement and supplement of x ?



- (18) _____ The area of a square is 49 square inches. Find the number of inches in the length of a diagonal. ~~Express your answer in simplest radical form.~~

- (19) _____ What is the common name for an equiangular quadrilateral?

- (20) _____ Given a cube with volume 40 cubic centimeters, find the number of centimeters in the length of an edge.

- (21) _____ A square is inscribed in a circle. The area of the square is 64 square inches. How many square inches are in the area of the circle? ~~Express your answer in terms of π .~~
- (22) _____ The lengths of the sides of an 8×8 cm² square are increased by 2 cm each. The area of the square has been increased by what percent? Express your answer to the nearest whole percent.
- (23) _____ Each dimension of a parallelogram is increased to four times its original size to form a similar parallelogram. If the new parallelogram has an area of 880 square units, what is the number of square units in the area of the original parallelogram?
- (24) _____ By what number is the number of cubic inches in the volume of a sphere multiplied when the number of inches in the radius is doubled?
- (25) _____ An expensive perfume is packaged in a box that has an octagonal base with area of ten square inches. The box is a prism. Given that the height of the box is four inches, what is the number of cubic inches in its volume?
- (26) _____ What is the number of centimeters in the length of a longer side of a rectangle which has a perimeter of 64 centimeters and an area of 192 square centimeters?
- (27) _____ Regular pentagon $ABCDE$ is inscribed in circle O . What is the number of degrees in the measure of $\angle OCE$?
- (28) _____ Point B is the midpoint of \overline{PQ} . \overline{PQ} is eight centimeters longer than \overline{PB} . What is the number of centimeters in the length of \overline{QB} ?
- (29) _____ What is the length of a diameter of a circle which has an area of 36π square units?

- (30) _____ How many non congruent quadrilaterals can be formed on this square dot grid if each vertex must coincide with a dot?

