Pythagorean Introduction

Geometry 8.0

We will dive right into using the Pythagorean Theorem.

We have been using the Pythagorean Theorem for several area applications and applications involving circles.

On a sheet of paper, sketch the following TIC-TAC-TOE board.

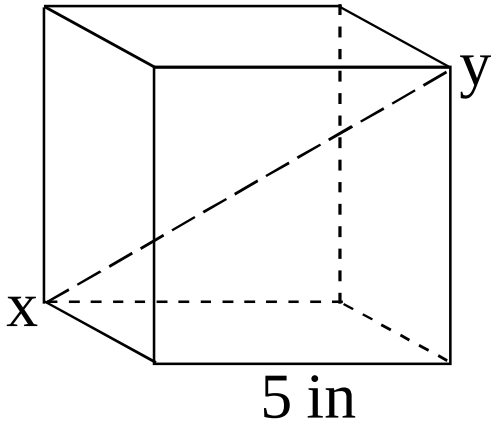
Around the room are nine problems, labeled A through I. You must complete three of the problems, each with a full explanation of the work and that you completed to solve the problem. Write-Ups should be neat enough to share with the class, legible, and work should be clearly shown.

A	B	C
D	E	F
G	H	I

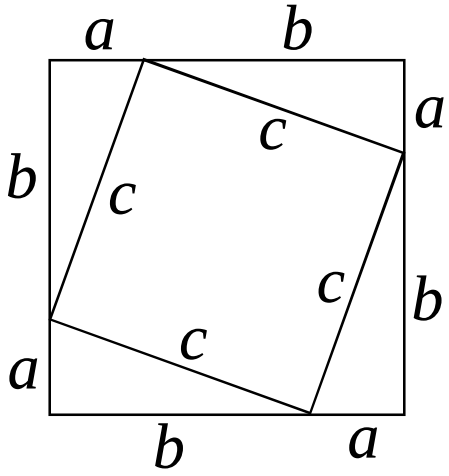
There are a limited number of copies of each problem, but each can be found online tonight. If you cannot complete three-in-a-row during the class period, do your best to complete three-in-a-row at home for homework tonight. If you absolutely cannot complete three in-a-row, complete at least 5 (whether or not they form a tic-tac-toe).

These problems will be the focus of the week's discussions and the goal is to have several students who are experts at each problem.

D. Determine the distance between the opposite corners of the following cube.



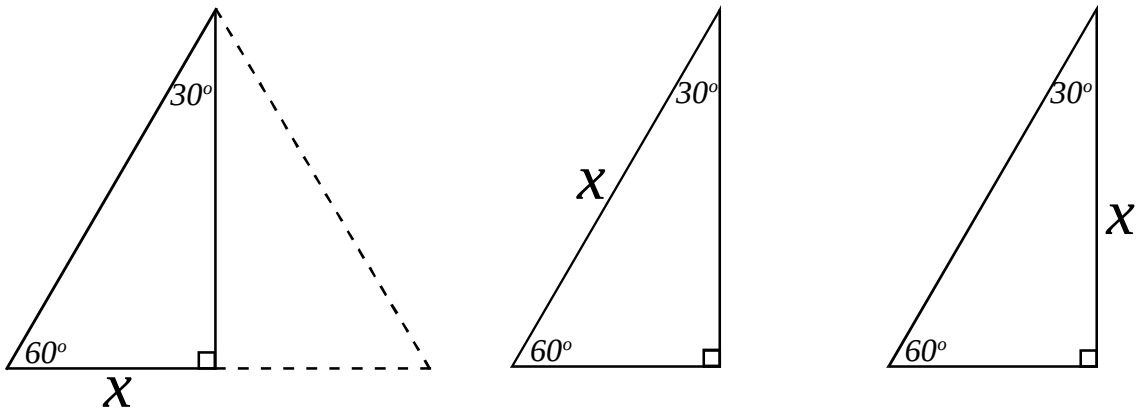
F. Using the diagram below, find a proof of the Pythagorean Theorem.



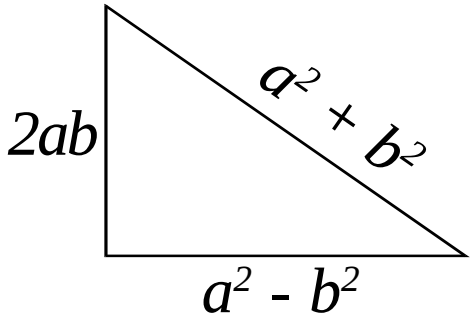
Hint: Find the area of the big square two different ways.

I. Graph the points (2, 7) and (-3, -5) onto the graph below. Find the distance between the points. Given two points (x_1, y_1) and (x_2, y_2), write a formula which you can use to determine the distance between any two points.

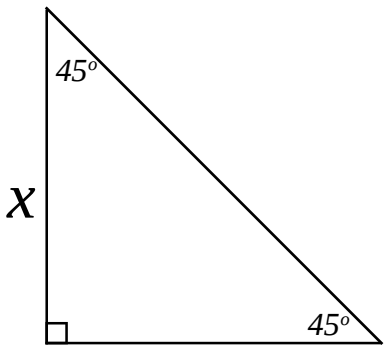
H. Find the missing lengths of each triangle below in terms of x. Write a paragraph (3-4 sentences) explaining the relationship between the sides of a 30-60-90 triangle.

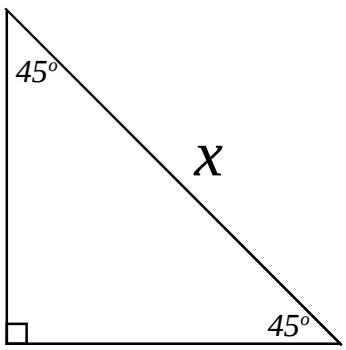


E. Choose two numbers, *a* and *b* where a>b. Plug them in to find the sides of the triangle below. Do it once more with different values for *a* and *b*. Figure out why this always works.

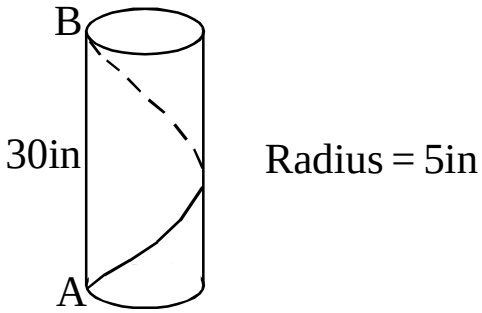


C. Find the missing lengths of each triangle below in terms of x. Write a paragraph (3-4 sentences) explaining the relationship between the sides of a 45-45-90 triangle.

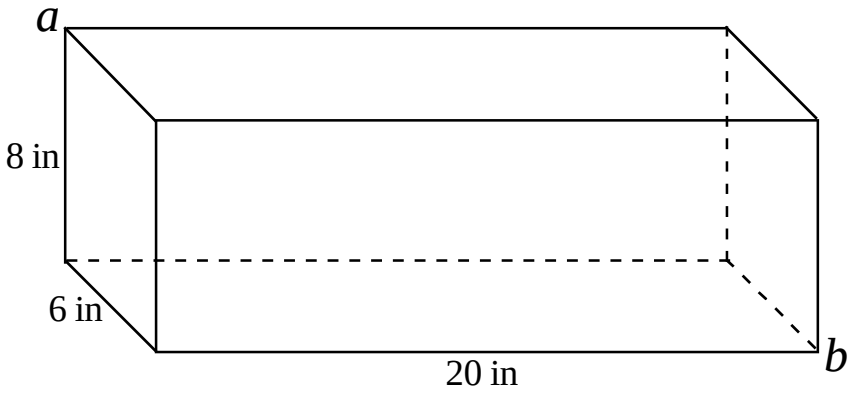




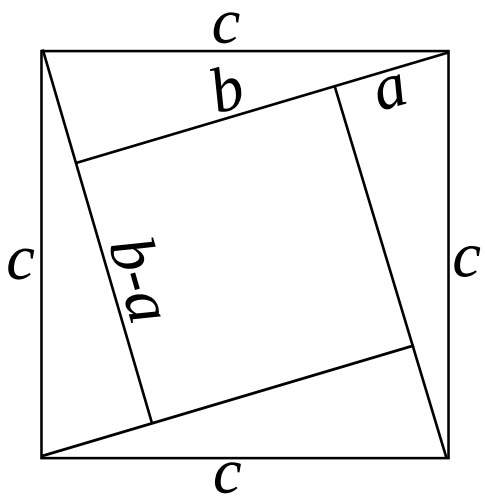
B. An ant is crawling up a cylinder from point *a* to point *b* in the diagram below. Instead of climbing straight up, he climbs around the pole (in a spiral) to reach point *b*. How much *farther* does the ant crawl by taking a lap around the pole than if he were to just climb straight up?



G. An ant is walking along the outside of a box. What is the shortest possible distance that the ant can travel to get from point *a* to point *b* ? (Hint: It is less than 30 inches, in fact, it is less than 27 inches).



A. Using the diagram below, find a proof of the Pythagorean Theorem.



Short legs are a, long legs are b, so the sides of the smaller square therefore has sides of length $(b - a)^2$.

Hint: Find the area of the big square two different ways.
