

Individual Round — Arithmetic

- (1) How many positive divisors (factors) does 24 have?
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- (2) A dress whose original price is \$160 is on sale at 25% off. Eileen can also apply her 10% employee discount to further reduce the sale price. How much will she pay?
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- (3) What is the value of the following alternating sum?

$$1 - 2 + 3 - 4 + 5 - 6 + \dots - 2006 + 2007 - 2008$$

- (4) Consider the following sequence of numbers.

$$3, 7, 13, 21, 31, 43, 57, \dots$$

- a) What is the next term in the sequence?

- b) Find a general formula for the n th term of the sequence.

Individual Round — Algebra

- (1) Find a value for x that satisfies the equation $x + 12 = 7 - 2x$.
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- (2) Find both values of x that satisfy $\frac{10}{x} = x + 3$.
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- (3) Wesley's father and mother are the same age. Wesley is 23 years younger than they are. The sum of the ages of all three members of the family is 115. How old is Wesley?
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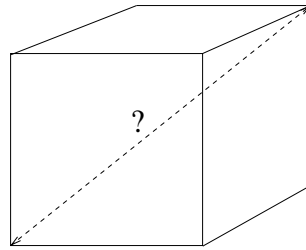
- (4) Suppose that n is a real number greater than 1, and $\sqrt[3]{n^3\sqrt{n^3n}} = n^k$. Find k .
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Individual Round — Geometry

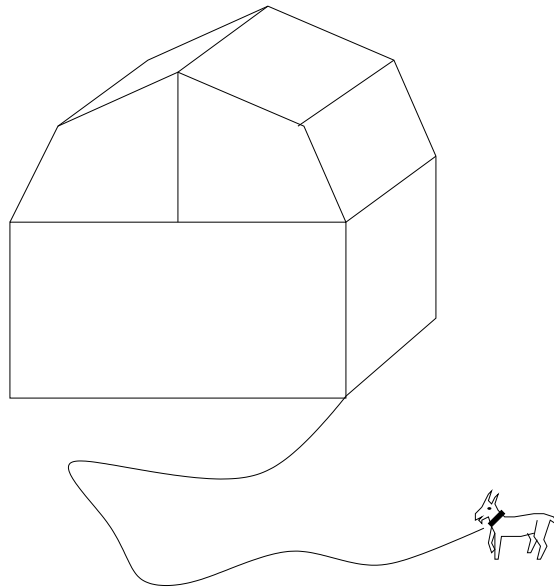
- (1) Recall that the formula for the area of a circle is $A = \pi R^2$, where R is the radius of the circle. What is the area of a circle whose *diameter* is 10?

- (2) If a square has an area of 144 square inches, what is its perimeter?

- (3) What is the distance between diagonally opposite corners of a $1 \times 1 \times 1$ cube?



- (4) A goat is tethered to the corner of a barn with a rope that is 100 feet long. If the barn is 50 feet by 50 feet square (as seen from above), what is the area of the region that the goat can graze in?



Team Round — CAPT

Estimate the following quantities. Use feet, square feet, and/or cubic feet (as appropriate) for units.

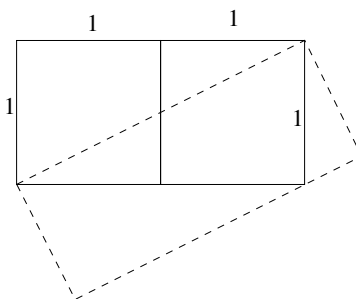
- (1) The height of the sundial outside the main entrance of Engleman Hall.
(The sundial is in the form of a giant half-cylinder.)

- (2) The total area of the five banners on the front of Buley Library that spell SCSU.

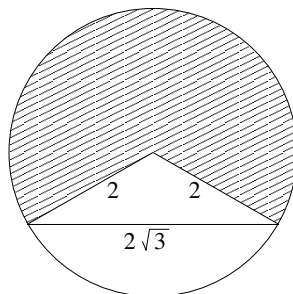
- (3) The volume of the circular planter in the center of the quad.

Team Round — General

- (1) Find the dimensions of the slanted rectangle. (Both of the squares are 1 unit on a side.)



- (2) In a circle of radius 2, two radii are drawn from the center to the endpoints of a chord of length $2\sqrt{3}$. Find the shaded area.



- (3) What is the sum of the first 2008 odd numbers?

- (4) How many (decimal) digits does 2^{2008} have?
