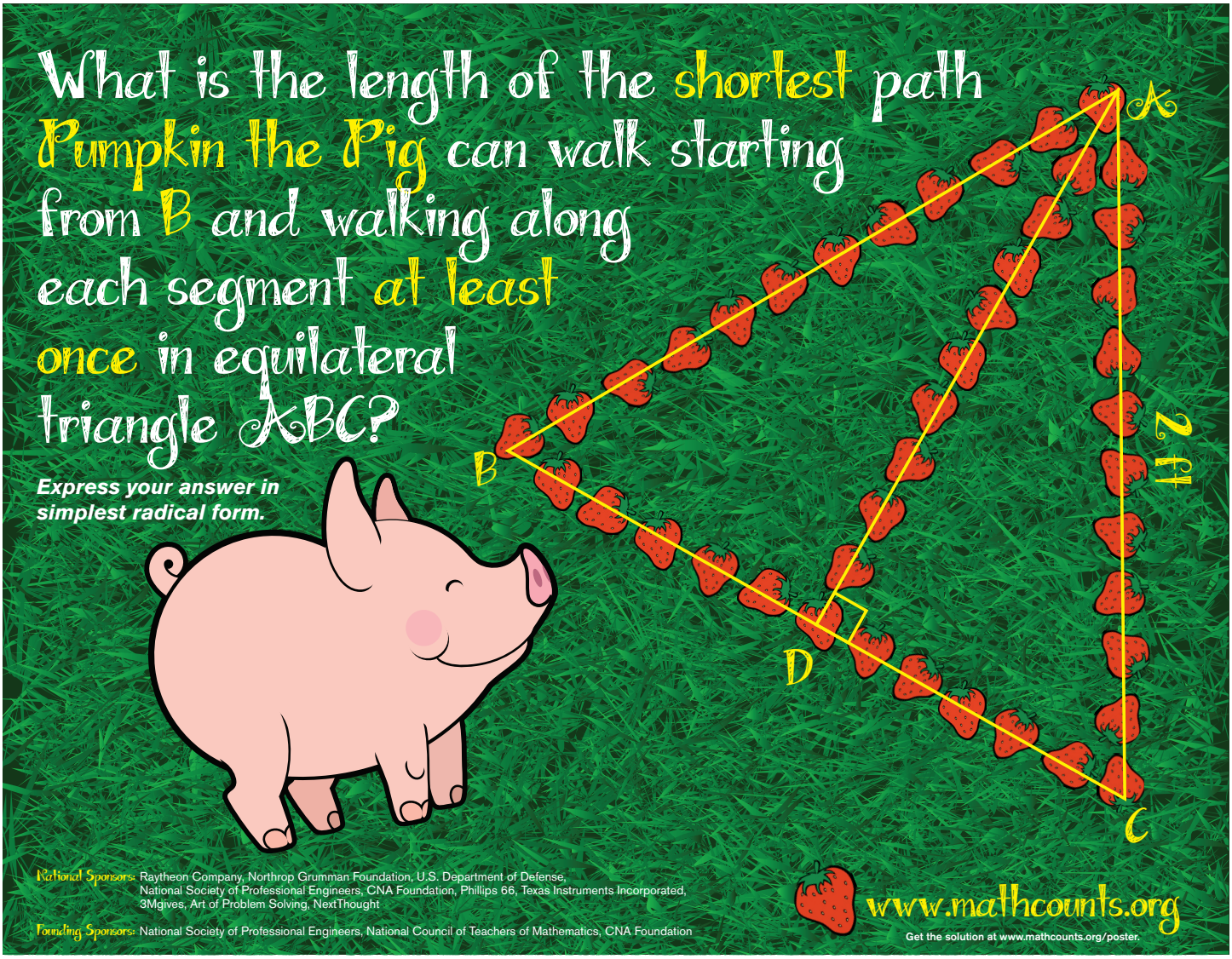
MATHCOUNTS Fall 2016 Newsletter Poster Problem



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Since triangle **ABC** is equilateral, we know every side is equal, and the perimeter is 2 ft + 2 ft + 2 ft = 6 ft. The segment AD, since it is perpendicular to side BC, is the height of the triangle and bisects side BC at D. Segments BD and CD are, therefore, each 1ft.

We could use the Pythagorean Theorem to find the length of AD, but triangle ADC is a 30-60-90 right triangle. A property of 30-60-90 right triangles is that the longer leg has length $\sqrt{3}$ times that of the shorter leg. Therefore, AD is $\sqrt{3}$ ft. This means the distance **Pumpkin the Pig** must travel to eat all the strawberries is at least $6 + \sqrt{3}$.

However, there is no way to walk a path along every segment without retracing any segment if **Pumpkin** starts at point B. One segment must be retraced, so let's choose one of the shortest segments, BD or DC, to retrace. As shown on the next page, two such paths **Pumpkin** can walk are B→A→C→D→B→D→A or B→D→A→C→D→B→A (Note: there are more than the two ways to get the same path length).

Thus, the shortest length of a path **Pumpkin** can take walking along each segment at least once is 6 + √3 + 1 = **7 + √3** ft.