Curriculum Burst 2: Angles in a Star

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The degree measure of angle A is …?
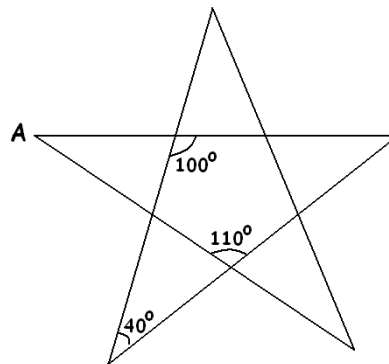
SOURCE: This is question # 21 from the 1999 MAA AMC 8 Competition.

QUICK STATS:

MAA AMC GRADE LEVEL
This question is appropriate for the 8th grade level.

MATHEMATICAL TOPICS
Geometry: Angles in triangles, straight angles (linear pairs) and vertical angles.

COMMON CORE STATE STANDARDS
7.G-5:   Use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and solve simple equations for an unknown angle in a figure.

MATHEMATICAL PRACTICE STANDARDS
MP1   Make sense of problems and persevere in solving them.
MP3   Construct viable arguments and critique the reasoning of others.
MP7   Look for and make use of structure

PROBLEM SOLVING STRATEGY
ESSAY 7:   **PERSEVERENCE IS KEY**

## THE PROBLEM-SOLVING PROCESS:

The most important step …

> **STEP 1:** Read the question, have an emotional reaction to it, take a deep breath, and then reread the question.

My reaction is … This looks like a geometry problem from a textbook.

I personally don't feel too overwhelmed by this question as I am sure I can just start writing in angles. Something will probably come of it. (And if nothing does … I'll panic then!)

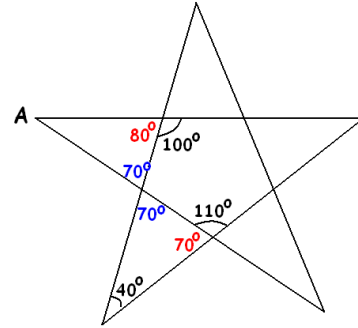Let's leap into it. I can see two angles I can write in right away.
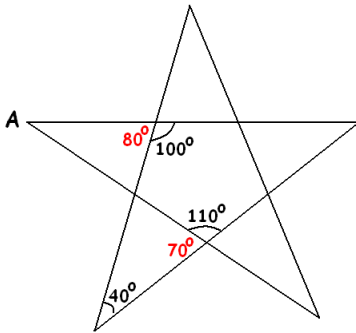
Actually, now I am stuck! Hmm.

Ooh! I see a triangle on the lower left with a $40°$ and a $70°$ angle in it. As three angles in a triangle sum to $180°$, its third angle has measure $70°$ as well.
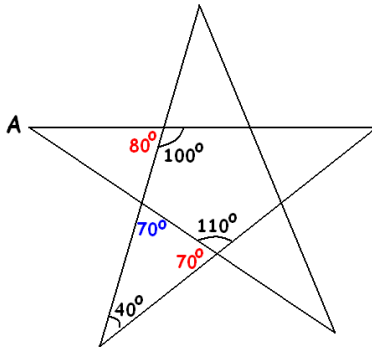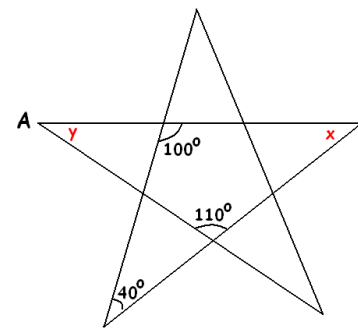

Okay. Still not sure where we're going.

Let's see. What else is there to we can do? (I am just plugging along.) Oh! There are vertical angles.
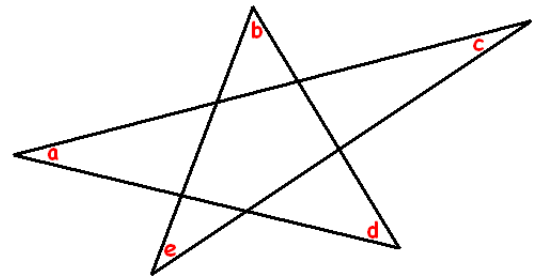

And now I see the triangle on the left. It has $70° + 80° + angle\ A = 180°$. This means the measure of angle A is $30°$!

Extension: In this picture, do you see
$40° + 100° + x = 180°$?

Do you also see $x + 110° + y = 180°$?

CLASSROOM SURPRISE: With rulers and pencils have students draw some lopsided five-pointed stars.

With protractors, measure the five angles in the points and compute their sum: $a + b + c + d + e$. What amazing thing does your class notice about this sum each and every time?

See the video www.jamestanton.com?/p=868 for an explanation.

Curriculum Inspirations is brought to you by the Mathematical Association of America, MAA American Mathematics Competitions, and Akamai.