

Geometry Step by Step
From the Land of the Incas

Geometry: Langley's Problem

Given:	Find:
<ul style="list-style-type: none"> ABC: isosceles B = 20° CAD = 60° ACE = 50° 	<ul style="list-style-type: none"> ADE = x
Solution:	
<ul style="list-style-type: none"> 1. ABC isosceles: ∴ A = C = 80° 2. AEC isosceles: AEC = 50° ∴ AE = AC 3. ADC: ADC = 40° (sum of the angles in a triangle) 4. AF = AC (construction) ∴ AFC = C = 80° and CAF = 20° 5. AFD isosceles because DAF = ADF = 40° ∴ AF = DF 6. AEF equilateral (AE = AF, EAF = 60°) ∴ EF = AF = AE and AFE = 60° ∴ DFE = 180° - 80° - 60° = 40° 7. DFE isosceles (EF = DF) ∴ E = D = x + 40° ∴ (x + 40°) + (x + 40°) + 40° = 180° 	

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The famous **Langley problem** is a type of problem called "*Adventitious Angles*" problem because it is a matter of chance that we will be able to solve this problem. It appears to be an easy problem, but it is deceptively difficult.

- Reference: The Mathematical Gazette, UK
- Author: Edward M. Langley
- Title: A problem
- Page: 173
- Issue: October 1922
- Category: M Note 644

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