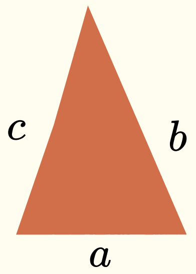
Think Academy Online Campus

Triangle



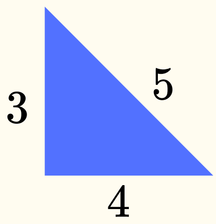
Triangle Inequality:

The sum of any two sides of a triangle is greater than the third side.

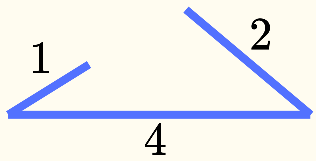
$a + b > c$, $a + c > b$, $b + c > a$

The difference of two sides is less than the third side.

$c - a < b$, $c - b < a$, $b - c < a$, $b - a < c$, $a - b < c$, $a - c < b$



Example:
$3 + 4 > 5$ ✓



Example:
$1 + 2 \leqslant 4$ ✗

If $a \geqslant b \geqslant c > 0$: $b + c > a$ ⟺ valid triangle.

⭐ For each group, determine whether the three side lengths can form a triangle.

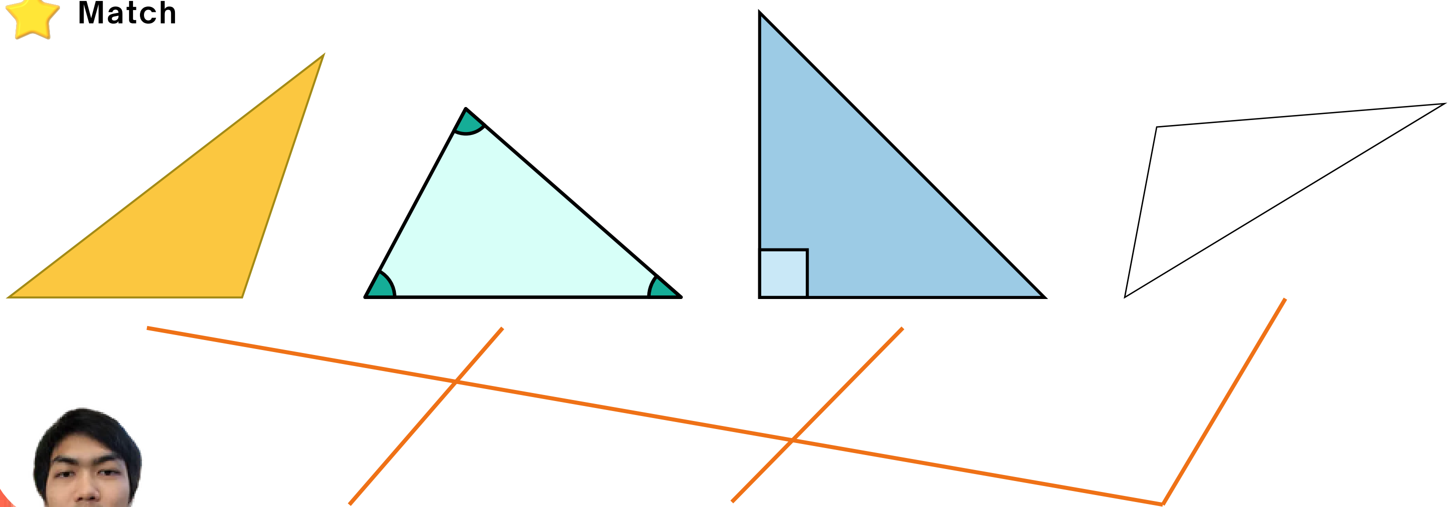
Group 1: $a = 13$, $b = 14$, $c = 15$	(A) Yes	(B) No	1: 13+14 > 15, yes
Group 2: $a = 2$, $b = 5$, $c = 2$	(A) Yes	(B) No	2: 2+2 < 4, no
Group 3: $a = 8$, $b = 15$, $c = 7$	(A) Yes	(B) No	3: 7+8 = 15, no
Group 4: $a = 0.6$, $b = 1.2$, $c = 1.5$	(A) Yes	(B) No	4: 0.6+1.2 > 1.5, yes
Group 5: $a = \frac{1}{2}$, $b = \frac{1}{6}$, $c = \frac{1}{3}$	(A) Yes	(B) No	5: $\frac{1}{6} + \frac{1}{3} = \frac{1}{2}$, no

⭐ In a triangle, two sides have lengths 32 and 47. Choose the possible length(s) of the third side from the options below: CDE

A. 10 B. 15 C. 23.5 D. 38 E. 62 F. 101

A. 10, 32, 47: $10 + 32 = 42 \leq 47$, no
B. 15, 32, 47: $15 + 32 = 47 \leq 47$, no
C. 23.5, 32, 47: $23.5 + 32 = 55.5 > 47$, yes
D. 32, 38, 47: $32 + 38 = 70 > 47$, yes
E. 32, 47, 62: $32 + 47 = 79 > 62$, yes
F. 32, 47, 101: $32 + 47 = 79 \leq 101$, no

⭐ Match



Acute triangle   Right triangle   Obtuse triangle

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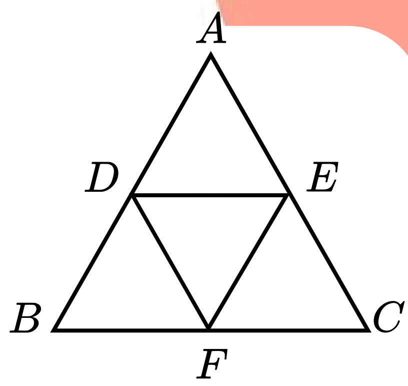
Triangle

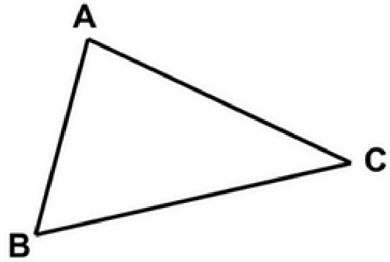
△ABC is equilateral. Points D, E, and F are the midpoints of sides AB, AC, and BC, respectively. There are __5__ equilateral triangles in the figure in total.

△ABC
△ADE
△BDF
△CEF
△DEF



Given that m∠A = 86° and m∠C = 39°, m∠B = __55__°.

m∠B = 180° - m∠A - m∠C
= 55°

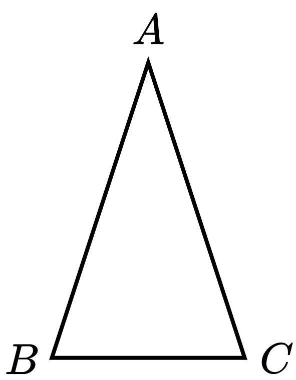


The perimeter of an isosceles triangle is 26 cm. The length of each equal side of the triangle is 10 cm long. The length of its base side is __6__ cm.

26 - 10 × 2 = 6 (cm)

Given that AB = AC and m∠B = 2m∠A, m∠C = __72__°.

m∠A + m∠B + m∠C = 180°, m∠B = m∠C
m∠A + 2m∠A + 2m∠A = 180°
5m∠A = 180°
m∠A = 36°
m∠C = 2m∠A = 72°



Challenge

We have learned that the sum of the interior angles of a triangle is 180°.
By dividing a quadrilateral into 2 triangles, we can find that the sum of its interior angles is 180° × 2 = 360°.
By dividing a pentagon into 3 triangles, we can find that the sum of its interior angles is 180° × 3 = 540°.
By dividing a hexagon into __4__ triangles, we can find that the sum of its interior angles is __720__°.
By dividing an *n*-sided polygon into __n - 2__ triangles, we can find that the sum of its interior angles is __180 (n - 2)__°.