Investigating Angles in a Triangle
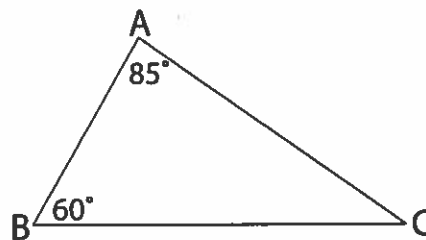
At Home At School

Quick Review

➤ The sum of the **interior angles** in a triangle is 180°.

$$60° + 74° + 46° = 180°$$
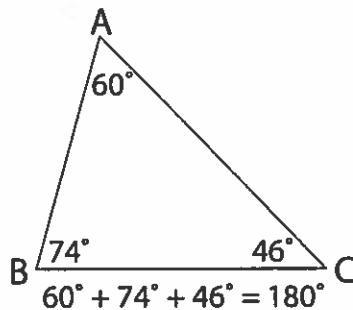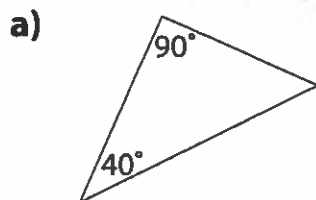
➤ To find the measure of ∠C in triangle ABC:
$$∠A + ∠B + ∠C = 180°$$
Since ∠A = 85° and ∠B = 60°,
$$85° + 60° + ∠C = 180°$$
$$145° + ∠C = 180°$$
$$180° - 145° = 35°$$
So, the measure of ∠C is 35°.

Try These

1. Determine the measure of the third angle without measuring.

   a)

   _____

   b)

   _____

   c)

   _____
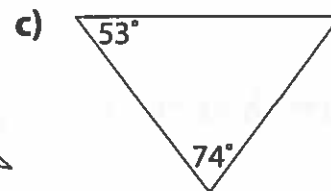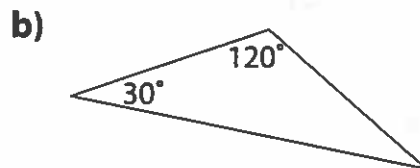
2. Two angles of a triangle are given.
   Find the measure of the third angle.
   Show your work.

   a) 70°, 60° ____ _____
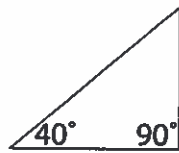
   b) 25°, 90° ____ _____

   c) 110°, 40° ____ _____

1. Determine if a triangle can be drawn with the angle measures given.
   If a triangle can be drawn, draw and label it.

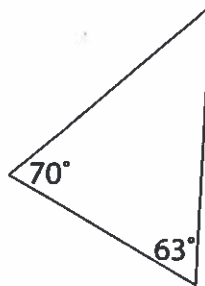   **a)** 35°, 65°, 80°   **b)** 55°, 50°, 50°   **c)** 45°, 45°, 90°   **d)** 95°, 45°, 50°

2. Determine the measure of the third angle without measuring.

   a)

   40°   90°

   _____

   b)

   70°

   63°

   _____

   c)

   51°

   69°

   _____
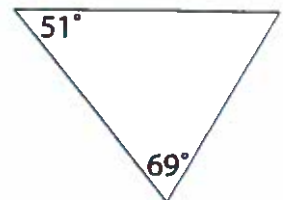
3. Two angles of a triangle are given.
   Find the measure of the third angle.

   a) 62°, 85° _____   **b)** 60°, 25° _____   **c)** 37°, 90° _____

Stretch Your Thinking

Can you construct triangle DEF? Explain.

∠D = 109°
∠E = 60°
∠F = 12°

_____

_____

Investigating Angles in a Quadrilateral

Quick Review

At Home At School

➤ The sum of the interior angles in a quadrilateral is 360°.

$130° + 80° + 90° + 60° = 360°$
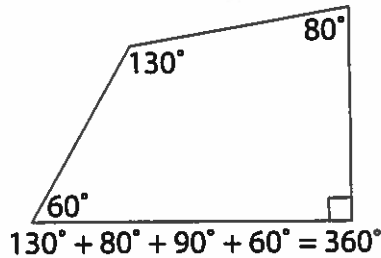
➤ To find the measure of ∠G in quadrilateral DEFG:

$∠D + ∠E + ∠F + ∠G = 360°$

Since $∠D = 30°$, $∠E = 135°$, and $∠F = 75°$,

$30° + 135° + 75° + ∠G = 360°$

$240° + ∠G = 360°$

$360° - 240° = 120°$

So, the measure of ∠G is 120°.
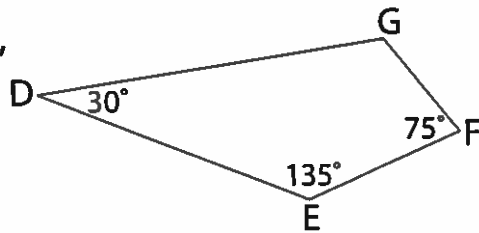
Try These

1. Determine the measure of the fourth angle without measuring.

a) 113° 113° 67°

b) 80°

c) 42° 122° 60°

_____   _____   _____
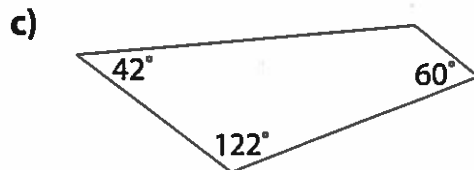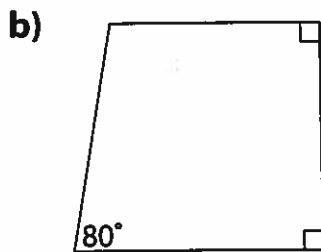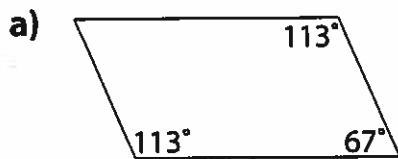
2. Three angles of a quadrilateral are given.
   Find the measure of the fourth angle.

   a) 25°, 70°, 110° _____   b) 42°, 38°, 100° _____

   c) 90°, 90°, 41° _____   d) 115°, 95°, 63° _____

   e) 107°, 36°, 49° _____   f) 116°, 72°, 49° _____

1. Determine if a quadrilateral can be drawn with the angle measures given.
   If a quadrilateral can be drawn, draw and label it.

   a) 90°, 75°, 60°, 135°   **b)** 50°, 45°, 70°, 120°   **c)** 125°, 70°, 85°, 80°

2. Find the measure of the fourth angle in each quadrilateral.

Quadrilateral	∠J	∠K	∠L	∠M
A	149°	80°	26°	
B	120°	75°	97°	
C	76°	75°	84°	
D	150°	100°	70°	
E	37°	83°	151°	

Stretch Your Thinking . . . .

Is it possible to make a quadrilateral with 3 obtuse angles and 1 right angle?
Explain.

_____

_____

_____

_____

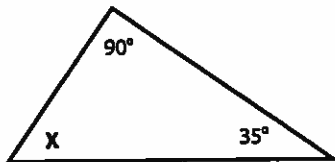# Why did the pencil like working on cars?
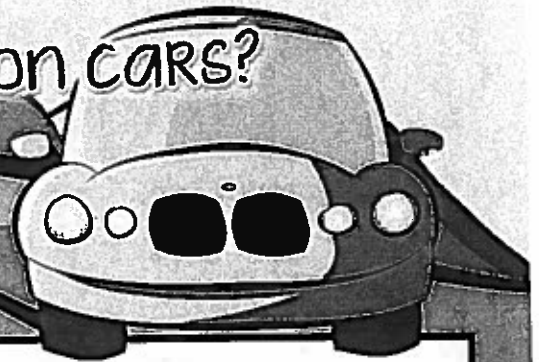
① A triangle's angles total _____ degrees.

B 360   **S** 180   **R** 90   **L** 100

② A quadrilateral's angles total _____ degrees.

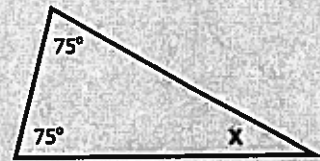**P** 360   **K** 180   **M** 90   **R** 100

③ A triangle has three equal angles. What do they measure?

A 45°   **N** 60°   **Z** 90°   **C** 100°

④ A parallelogram has two angles that each measure 25°. What must the other two angles each measure?
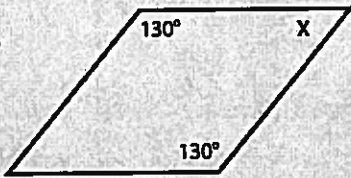
B 90°   **G** 110°   **W** 155°   **H** 310°

⑤ Find angle **X**: _____

C 45°   **N** 60°
M 55°   **Q** 100°

(triangle with angles 90°, 35°, X)

⑥ Find angle **X**: _____

F 5°   **V** 10°
H 30°   **A** 110°

(triangle with angles 75°, 75°, X)

⑦ Find angle **X**: _____

L 50°   **R** 90°
S 130°   **D** 155°

(parallelogram with angles 130°, X, 130°)

⑧ Find angle **X**: _____

A 77°   **G** 91°
I 103°   **U** 215°

(quadrilateral with angles 110°, X, 77°, 70°)
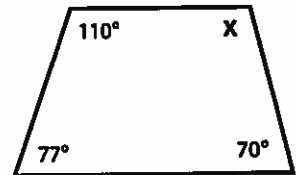
⑨ Find angle **X**: _____

I 15°   **O** 36°
A 57°   **P** 112°

(triangle with angles 20°, X, 103°)
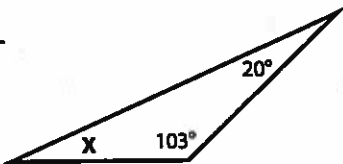
⑩ Find angle **X**: _____

S 12°   **L** 90°
P 68°   **C** 77°

(quadrilateral with angles X, 88°, 90°, 105°)
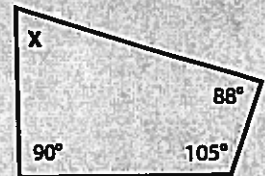
⑪ Find angle **X**: _____

I 75°   **E** 90°
O 180°   **U** 200°

(quadrilateral with angles 90°, X, 90°)

(riddle answer boxes)

6 11   4 9 1   9   5 11 10 6 9 3 8 10 9 7   2 11 3 10 8 7

Why was the index finger upset about not being in charge?
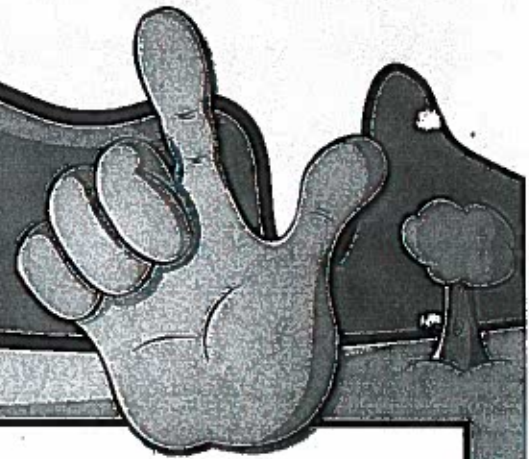
Find the missing angle for problems 1–12:

1) 110°, 39°, ?
- **K** 21°
- **R** 31°
- **S** 121°
- **D** 29°

2) 61°, ?
- **K** 29°
- **B** 35°
- **N** 68°
- **R** 209°

3) 16°, 29°, ?
- **Q** 35°
- **P** 45°
- **M** 135°
- **A** 305°

4) 60°, 60°, 60°, ?
- **T** 20°
- **S** 40°
- **F** 60°
- **E** 90°

5) 133°, 14°, ?
- **N** 33°
- **T** 14°
- **P** 100°
- **D** 107°

6) 45°, 45°, ?
- **F** 45°
- **N** 55°
- **E** 60°
- **L** 90°

7) ?, 45°, 138°, 93°
- **I** 76°
- **O** 84°
- **U** 104°
- **M** 93°

8) 97°, ?, 110°, 36°
- **S** 36°
- **M** 97°
- **B** 117°
- **N** 207°

9) ?, 125°, 37°, 112°
- **D** 86°
- **C** 90°
- **F** 106°
- **W** 130°

10) 101°, 109°, 103°, ?
- **S** 27°
- **T** 47°
- **R** 51°
- **H** 57°

11) 78°, ?, 149°, 59°
- **W** 34°
- **B** 54°
- **M** 64°
- **H** 74°

12) ?, 45°
- **E** 105°
- **A** 115°
- **I** 135°
- **O** 205°

13) A ladder is leaning against a wall of a building. The ladder makes a 57° angle with the ground. What angle does it make with the building?

- **I** 23°
- **E** 33°
- **O** 57°
- **P** 123°

14) Three angles of a trapezoid measure 100°, 90°, and 75°. What is the measure of the other angle?

- **E** 85°
- **U** 95°
- **O** 115°
- **I** 175°

11	13		9	12	9	5		10		6	12	2	13		10	11	13		1	14	6	13	7	4	10	11	14	3	8