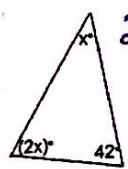


Triangle Sum Theorem, Isosceles Triangle Theorem, Exterior Angle Theorem

- **Triangle Sum Theorem:** All angles in a triangle have a sum of 180° .

1. Find x:

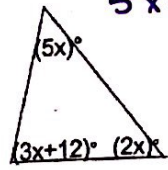


$$2x + 42 + x = 180$$

$$3x = 138$$

$$x = 46$$

2. Find x:



$$5x + 3x + 12 + 2x = 180$$

$$10x + 12 = 180$$

$$10x = 168$$

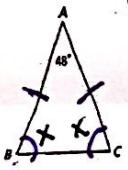
$$x = 16.8$$

• **Isosceles Triangle Theorem:** If two sides of a triangle are congruent, then the angles opp those sides are congruent

(CONVERSE)
• It works the other way too! If two angles in a triangle are congruent, then the sides opp those angles are congruent

* tick marks mean congruent

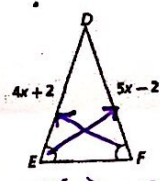
1. Find $m\angle B = 66$



$$180 = 48 + 2x$$

$$x = 66$$

2. Find $\overline{DF} = 18$



$$4x + 2 = 5x - 2$$

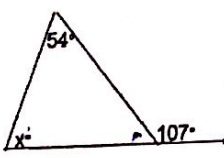
$$4x + 4 = 5x$$

$$4 = x$$

$$\overline{DF} = 5(4) - 2$$

• **Exterior Angle Theorem:** The measure of a triangles exterior angle is equal to the sum of the opp two angles

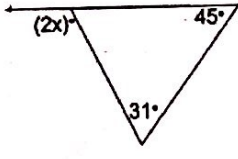
1. Find x.



$$54 + x = 107$$

$$x = 53$$

2. Find x:



$$31 + 45 = 2x$$

$$76 = 2x$$

$$38 = x$$

2
line

Transformations

Quadratic Functions

Quadratic Functions

Radical Functions

Congruence & Similarity

$$x = 23$$

$$2x + x = 104$$



$$\sqrt{32} = x$$

$$x^2 = 32$$

$$31 + 12 = 5x$$

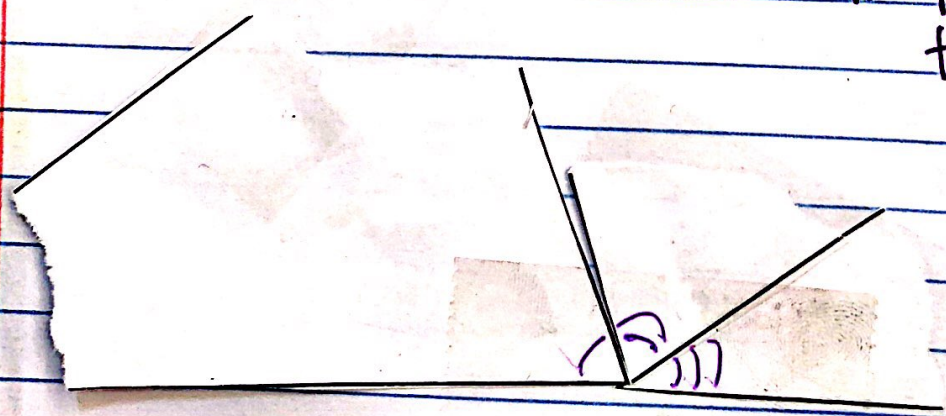


Sum of two angles + two angles

$$DE = 2(x) - 5$$

$$x = 10$$

* Tips of the triangle make a straight line



straight lines = 180°

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Corresponding

parts of

congruent

triangles are

congruent

Complete the following to find DE .

Because $\triangle ABC \cong \triangle DEF$, there is a sequence of rigid motions that maps $\triangle ABC$ to $\triangle DEF$.

This same sequence of rigid motions maps \overline{AB} to \overline{DE} .

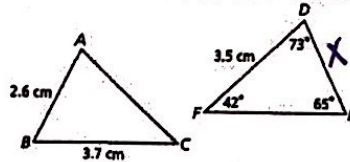
This means $AB \cong DE$.

Congruent segments have the same length, so $AB = \overline{DE}$

$AB = 2.6$, so $DE = 2.6$.

To find $m\angle B$, use similar reasoning to show that $\angle B \cong \angle E$.

So, $m\angle B = 65^\circ$.



EXAMPLES:

$\triangle RGK \cong \triangle MQB$. Write six congruence statements about corresponding parts.

Identify corresponding sides.

Corresponding sides are pairs of letters in the same position on either side of the congruence statement.

$\overline{RG} \cong \overline{MQ}$; $\overline{GK} \cong \overline{QB}$; $\overline{RK} \cong \overline{MB}$

$\triangle RGK \cong \triangle MQB$

Corresponding sides

Identify corresponding angles.

Corresponding angles are letters in the same position on either side of the congruence statement.

$\angle R \cong \angle M$; $\angle G \cong \angle Q$; $\angle K \cong \angle B$

$\triangle RGK \cong \triangle MQB$

Corresponding angles

REFLECT

2a. Given that $\triangle PQR \cong \triangle STU$, $PQ = 2.7$ ft, and $PR = 3.4$ ft, is it possible to determine the length of TU ? If so, find the length. If not, explain why not.

No, we are not given the corresponding side lengths.

2b. A student claims that any two congruent triangles must have the same perimeter. Do you agree or disagree? Why?

Yes, all side lengths are the same.