Triangle Inequality Theorem

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

2. Determine if the given side lengths form a triangle.

a) 4, 5, 10 NO

b) 4, 5, 9 NO

c) 4, 5, 7 yes

The Triangle Inequality Theorem states that the sum of the lengths of any two sides of a triangle is greater than the length of the third side. Using this theorem, answer the following questions.

3. If two sides of a triangle are 1 and 3, the third side may be:

(a) 5 (b) 2 (c) 3 (d) 4

$2 < s < 4$

$1 + 3 > s$ $s + 1 > 3$

$4 > s$ $s > 2$

4. If the lengths of two sides of a triangle are 5 and 7, the length of the third side may ***not*** be:

(a) 12 (b) 7 (c) 3 (d) 5

$2 < s < 12$

5. Which set of numbers may represent the lengths of the sides of a triangle?

(a) {2,5,9} (b) {6,6,7} (c) {6,4,2} (d) {7,8,1}

6. If the lengths of two sides of a triangle are 4 and 10, which could be the length of the third side?

(a) 6 (b) 8 (c) 14 (d) 16

$6 < s < 14$

7. If the lengths of two sides of a triangle measure 7 and 12, the length of the third side could measure:

(a) 6 (b) 19 (c) 3 (d) 5

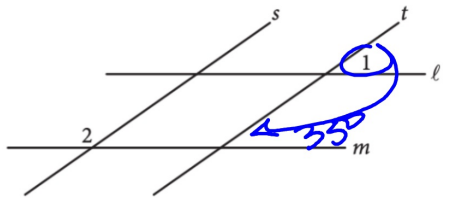
$5 < s < 19$

8. If the lengths of two sides of a triangle are 10 and 14, the length of the third side may be:

(a) 22 (b) 2 (c) 24 (d) 4

$4 < s < 24$

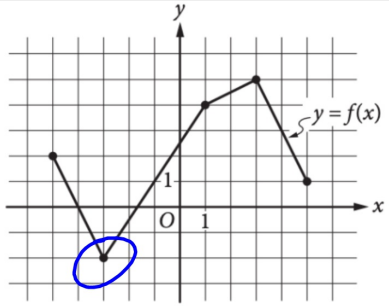
9.



In the figure above, lines ℓ and m are parallel and lines s and t are parallel. If the measure of $\angle 1$ is 35°, what is the measure of $\angle 2$?

A) 35°
B) 55°
C) 70°
D) 145°

10.

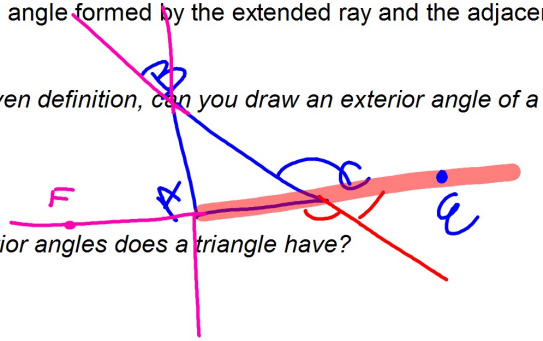


The complete graph of the function f is shown in the xy-plane above. For what value of x is the value of $f(x)$ at its minimum?

A) −5
B) −3
C) −2
D) 3

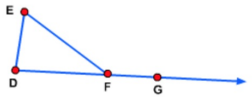
An exterior angle of a triangle is formed by extending a side of a triangle. The exterior angle is the angle formed by the extended ray and the adjacent side of the triangle.

- *Based on the given definition, can you draw an exterior angle of a triangle?*



- *How many exterior angles does a triangle have?*

15. ∠**EFG** is formed by an extended ray and the adjacent side of Δ**DEF**.



∠EFG

a. What type of angle is ∠**EFG**?

an exterior ∠.

b. What are ∠**D** and ∠**E** called with respect to the exterior angle ∠**EFG**?

are called remote int. ∠s b/c they are non adj int ∠s w/ ∠EFG

c. What is ∠**EFD** called with respect to ∠**EFG**?

adj int ∠s b/c it is the ∠ that shares a ray w/ ∠EFG

16. Write a conjecture relating the measures of an exterior angle of a triangle and its remote interior angles. Call this conjecture the **Exterior Angle Conjecture**.

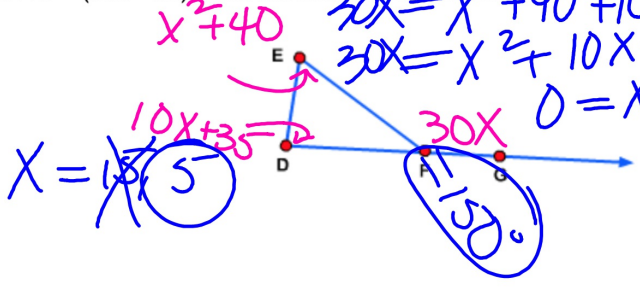
The measure of the ext. ∠ of a Δ is equal to the sum of the remote int. ∠s.

17. Fill in the blanks to complete the paragraph proof of the Exterior Angle Theorem.

straight line	Triangle Sum Theorem	right angle	Substitution
180°	m∠EFG = m∠E + m∠D	Angle Addition Postulate	m∠EDF

m∠EFG + m∠EFD = 180° because the angles form a straight line. m∠E + m∠D + m∠EFD = 180°, because of the Δ sum thm. So, by subst, m∠EFG + m∠EFD = m∠E + m∠D + m∠EFD. By the subtraction property of equality, [ ].

18. **REINFORCE** In the diagram below, m∠**EFG** = (30**x**)°, m∠**E** = (x^2 + 40)°, and m∠**D** = (10**x** + 35)°. Find the measure of ∠**EFG**.



$30x = x^2 + 40 + 10x + 35$

$30x = x^2 + 10x + 75$

$0 = x^2 - 20x + 75$

$x = 15$ or 5

75, 15, −5, −15

Complete: Cwk #17

Practice Worksheet on Exterior Angle Theorom & Triangle Angle Sum Theorem & Agile Mind

- Turn it in before you leave.

Hwk #26 - Triangle Sum Theorem Worksheet + Agile Mind