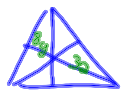
Warm up: p. 254

 # 3 - 8



$24 = \frac{2}{3}(24+6x)$

$\frac{2}{3} = 24$ $\boxed{x=2}$

$\frac{1}{3} = 6x$

$12 = 6x$

$\frac{2}{3}CE = 32$

$\frac{1}{3}CE = 8y$

$16 = 8y$

$\boxed{2 = 4}$

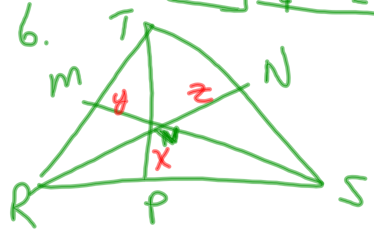
$9z+6 = \frac{2}{3}(9z+6+6z)$

$9z+6 = \frac{2}{3}(15z+6)$

$9z+6 = 10z+4$
$-9z \quad -9z$

$\boxed{z=2}$ $6 = z+4$
$-4 \quad -4$

6.



$TP = 18$ $x = 6$

$MS = 15$ $y = 5$

$RN = 24$ $z = 8$

4. $3x+3 = 90$
$-3 \quad -3$

$3x = 87$

$x = 29$

$IJ = 57$

$x+8 = 37$

$x-9 = \underline{20}$

9. $5y-6 = 24$
$+6 \quad +6$

$5y = 30$

$y = 6$

OBJECTIVES:
- **use indirect proofs with algebra and geometry**
- **apply the Triangle Inequality Theorem**
- **determine the shortest distance between a point and a line**

Sections 5-3 & 5-4 1-6-12

indirect proof -- assuming the conclusion is false & show this contradicts the hypothesis

Steps for Writing an Indirect Proof:

1. **Assume that the conclusion is false.**
2. **Show that this assumption leads to a contradiction.**
3. **Show that the false conclusion leads to an incorrect statement, therefore the original conclusion must be true.**

Example 1: State the assumption you would make to start an indirect proof for each statement.

a. **$AB \neq MN$**

$AB = MN$

b. **$\triangle PQR$ is an isosceles triangle**

$\triangle PQR$ is not an isos. $\triangle$

c. **$x < 4$**

$x \nless 4$ or $x \geq 4$

d. **If 9 is a factor of *n*, then 3 is a factor of *n*.**

3 is not a factor of n

Example 2: Given: $2x - 3 > 7$
Prove: $x > 5$

Step 1: Assume $x \not> 5$

$x \leq 5$

Step 2: Why is this a contradiction?

$2(5)-3>7$

$7 \not> 7$

$2(3)-3>7$

$6-3>7$

$3 \not> 7$

Step 3: This assumption contradicts $2x-3>7$

Therefore, $x > 5$.

<u>Triangle Inequality Theorem</u> --The sum of the lengths of any two sides of a triangle is greater than the length of the third side.

Example 3: Determine whether the given measures can be the lengths of the sides of a triangle.

a. 2, 4, 5

$2+4>5$ yes

$2+5>4$ yes

$4+5>2$ yes

b. 6, 8, 14

$6+8>14$

no

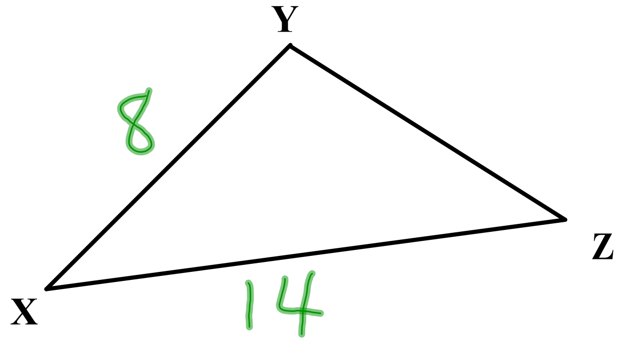
Example 4: In ΔXYZ, $XY = 8$ and $XZ = 14$. Which measure cannot be YZ?

A. 6

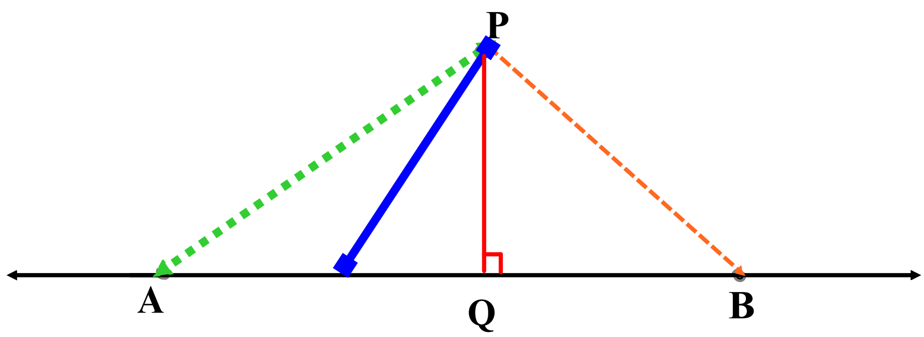
B. 10

C. 14

D. 18

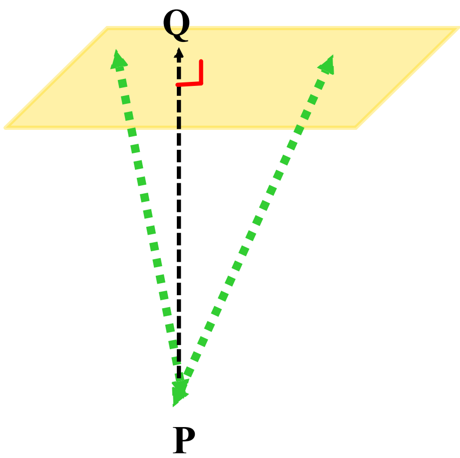


Theorem 5.12 - -The perpendicular segment from a point to a line is the shortest segment from the point to the line.



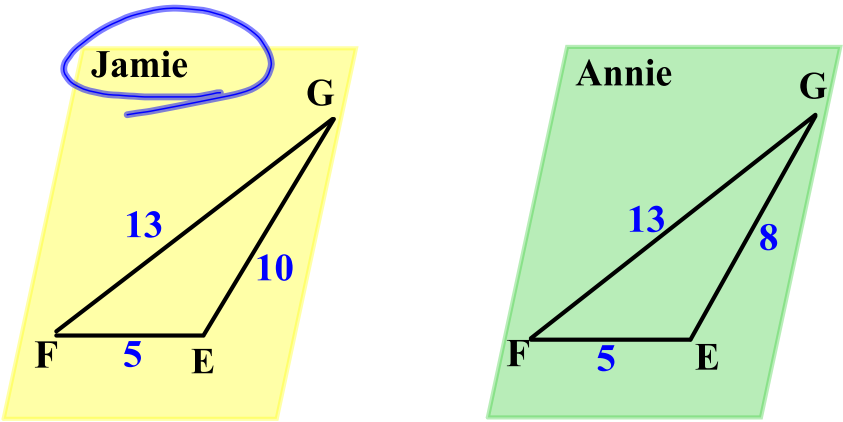
$\overline{PQ}$ is the shortest segment from P to $\overleftrightarrow{AB}$.

Corollary 5.1 -- The perpendicular segment from a point to a plane is the shortest segment from the point to the plane.



Guided Practice:

1. Find the Error. Jamie and Annie drew $\triangle EFG$ with FG = 13 and EF = 5. They each chose a possible measure for GE. Who is correct? Why?



Determine whether the given measures can be the lengths of the sides of a triangle. Write *yes* or *no*. Explain.

2. 5, 4, 3

yes

3. 5, 15, 10

no

4. 30.1, 0.8, 31

no

5. 5.6, 10.1, 5.2

yes

Find the range for the measure of the third side of a triangle given the measures of two sides.

6. 7 and 12

$\underline{5} < x < \underline{19}$

7. 14 and 23

$\underline{9} < x < \underline{37}$

8. 22 and 34

$\underline{12} < x < \underline{56}$

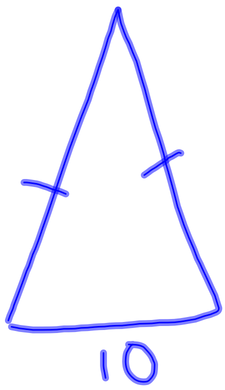
9. 15 and 18

$\underline{3} < x < \underline{33}$

10. An isosceles triangle has a base 10 units long. If the congruent side lengths have whole number measures, what is the shortest possible length of the sides.

A. 5 **B. 6**

C. 17 **D. 21**



Do you have any Vocab questions?

OBJECTIVES:

HOMEWORK: p. 258 # 13 - 18

&

p. 264 - 265 # 14 - 37, 38, 41 - 44
(#38 is 5 steps)

*****Quiz next time over 5-1 and 5-2*****