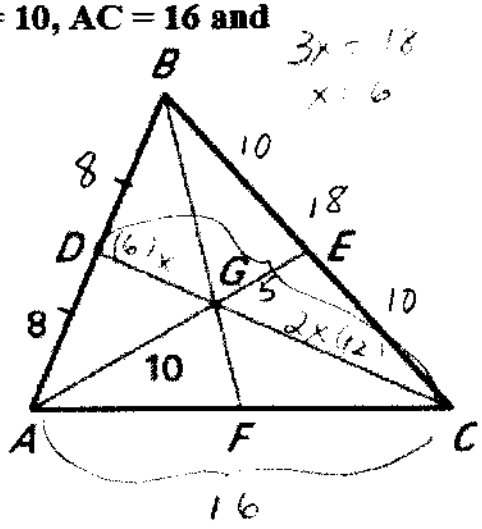
Name: (key)

Geometry CC Unit 3 Day 11 Unknown angles

Give the name the point of concurrency for each of the following.

1. Angle Bisectors of a Triangle incenter
2. Medians of a Triangle centroid
3. Altitudes of a Triangle orthocenter
4. Perpendicular Bisectors of a Triangle Circumcenter
5. The ***incenter*** of a triangle is equidistant from the sides of the triangle.
6. The ***circumcenter*** of a triangle is equidistant from the vertices of the triangle.
7. The ***centroid*** is $\frac{2}{3}$ of the distance from each vertex to the midpoint of the opposite side.

8. ***Point G is*** **the** ***centroid*** **of** ΔABC, $AD = 8$, $AG = 10$, $BE = 10$, $AC = 16$ **and** $CD = 18$. **Find the length of each segment.**



DB = 8

CG = 12

GE = 5

BC = 20

9. **Point** G **is the centroid of** ΔABC. **Use the given information to find the value of the variable.**

FG = x + 8 and GA = 6x – 4

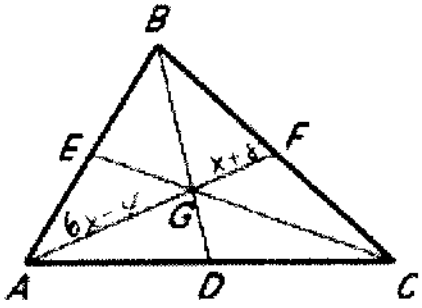
$2(x+8) = 6x - 4$

$2x + 16 = 6x - 4$

$20 = 4x$

$x = 5$

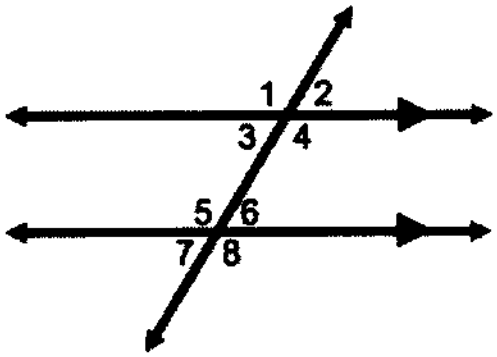
X= 5



Know Your terms!

1) Identify each type of angle pair below.

Corresponding
Alternate interior
Alternate exterior
Linear pair
Vertical
Complementary
Same side interior



Angles 2 and 3: Vertical Angles 1 and 5: Corresponding

Angles 2 and 4: Linear pair Angles 3 and 6: Alternate interior

Angles 5 and 3: Same side interior Angles 1 and 8: Alternate exterior

2) Name the 3 undefined terms in geometry:

1) point 2) line 3) plane

3) 4 Which is a "good definition" for complementary angles?

1) Angles whose sum is 180°.
2) Angles whose sum is 90°.
3) A linear pair whose sum total angle measure is 180°.
4) Adjacent angle pair whose sum total angle measure is 90°.

4) Name the <u>postulate of equality</u> for each.

Transitive 1) $FA = DZ, DZ = ME, FA = ME$

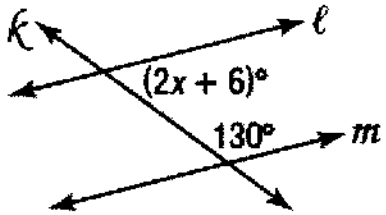
Reflexive 2) $ME = ME$

Symmetric 3) $FA = DZ, DZ = FA$

5) The sum of the measures of 3 exterior angles of a triangle is 360°.

Unknown angle pairs

1) **Find x so that $\ell \parallel m$.**



Show work:

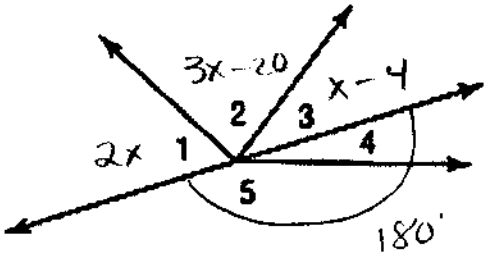
$2x + 6 + 130 = 180$

$2x = 44$

$\boxed{x = 22}$

2) **Suppose $\angle 4$ and $\angle 5$ form a linear pair.**
If $m\angle 1 = 2x$, $m\angle 2 = 3x - 20$, and $m\angle 3 = x - 4$, what is $m\angle 3$?

Show work:



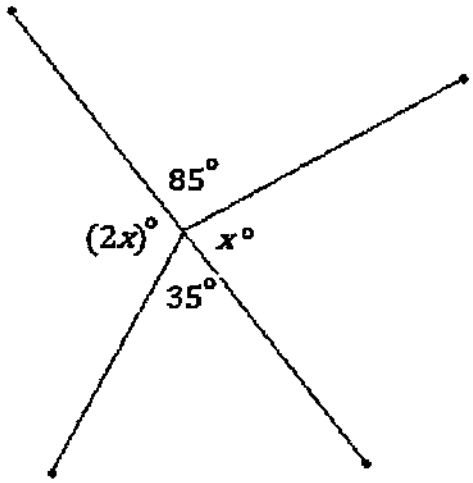
$6x - 24 = 180°$

$6x = 204$

$x = 34$

$\boxed{m\angle 3 = 34 - 4 = 30°}$

4) **There are no linear pairs of angles in this diagram. Rachel said the value of x is 80. Explain using specific geometry calculations and reasons how she arrived at this value.**



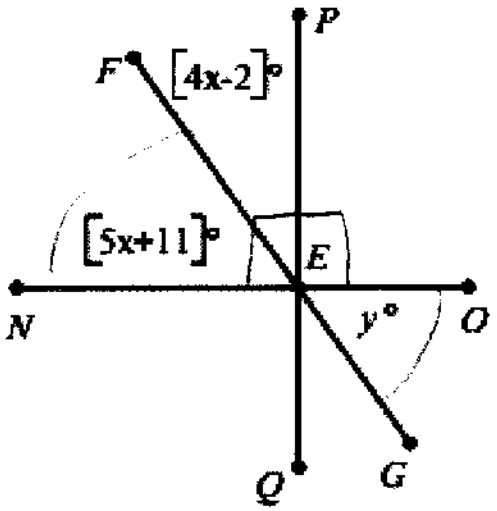
adjacent ∠'s around a point have a sum of 360°

$3x + 120 = 360$

$3x = 240$

$x = 80$

5) All segments are drawn straight. If $\overline{NO} \perp \overline{PQ}$, solve for x and y.



Show work:

$9x + 9 = 90$

$9x = 81$

$x = 9$

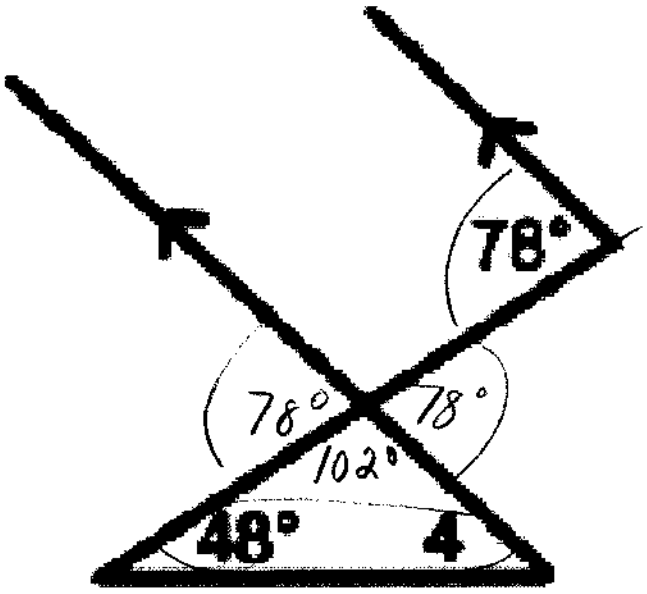
$y = 5x + 11$

$y = 5(9) + 11$

$y = 56$

6) Find the measure of angle 4.

Show work (includes diagram):



$102° + 48° = 150°$

$180 - 150 = 30°$

$m\angle 4 = 30°$

also:

$48° + m\angle 4 = 78°$

$m\angle 4 = 30°$

Triangle theorems

1) **The measures of the three angles of a triangle are represented by *x*, 3*x*, and *x* + 30. Find the value of *x* and classify the triangle.**

$5x + 30 = 180$

$5x = 150$

$x = 30$

$\{30, 90, 60\}$

x= 30

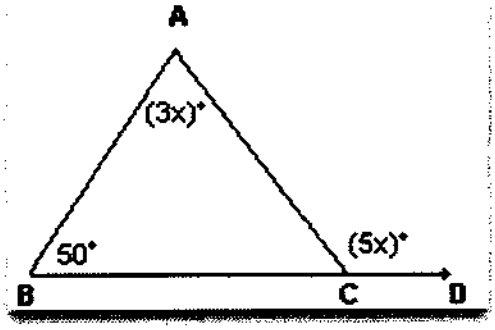
classification: Right scalene

2) **In the diagram, ∠ACD is an exterior angle of ΔABC, m∠A = 3x, m∠ACD = 5x, and m∠B = 50. What is the value of x?**

$3x + 50 = 5x$

$50 = 2x$

$25 = x$



X= 25

3) **If two sides of a triangle have lengths 4 and 9, then what is the range of values for the third side *s*?**

$5 < s < 13$

4) In ΔRQP
$QP = 15$ ft
$RP = 25$ ft
$RQ = 13$ ft

Which is the smallest angle in triangle RQP? ∠P

5) In ΔDEF
$m\angle D = 35°$
$m\angle F = 95°$

Which is the longest side of triangle DEF? $\overline{DE}$

$m\angle E = 50°$

6) **Can Jake build a triangular shaped pen for his guinea pig, Mack with 3 wall lengths of 24 inches, 36 inches and 62 inches? Explain why or why not.**

$24 + 36 = 60$

$60 < 62$ No!

Sum of any 2 sides of a Δ must be greater than the 3rd

Isosceles triangle theorems

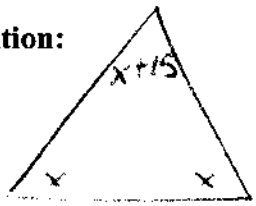
1) The vertex angle of an isosceles triangle measures 15 degrees more than one of its base angles. How many degrees are there in a base angle of the triangle?

Show how you arrived at your solution:

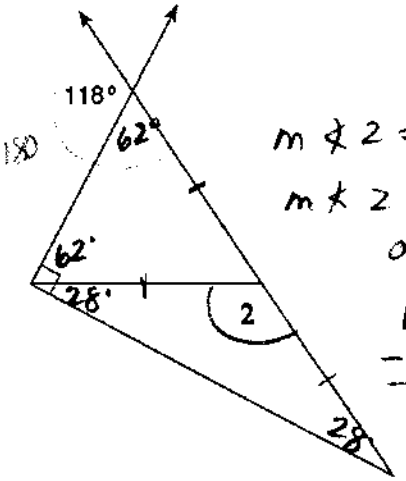
$3x + 15 = 180$

$3x = 165$

$\boxed{x = 55°}$



2) Find the value of the angle numbered 2.



$m\angle 2 = 62 + 62$

$m\angle 2 = 124°$

OR

$180 - 56 = 124°$

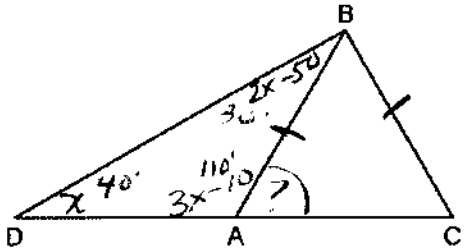
Show work:

$m\angle 2 = 62 + 62 = 124°$

OR $28° + 28° + m\angle 2 = 180°$

$\boxed{m\angle 2 = 124°}$

3) In the diagram of ΔBCD shown below, $\overline{BA}$ is drawn from vertex B to point A on $\overline{DC}$, such that $\overline{BC} \cong \overline{BA}$.



In ΔDAB, $m\angle D = x$, $m\angle DAB = 3x - 10$, and $m\angle DBA = 2x - 50$.

PART (A): Find $m\angle D$. ***[Only algebraic solutions can receive full credit.]***

$6x - 60 = 180°$

$6x = 240$

$x = 40$ $\quad m\angle D = 40°$

PART (B): Find $m\angle BAC$. $m\angle BAC = 70°$

In ΔABC, $BA = 21y - 38$ and $BC = 3y - 2$. ($\overline{BC} \cong \overline{BA}$)

PART (C): Find the length of $\overline{BC}$. ***[Only algebraic solutions can receive full credit.]***

$21y - 38 = 3y - 2$

$18y = 36$

$y = 2$

$BC = 3y - 2$

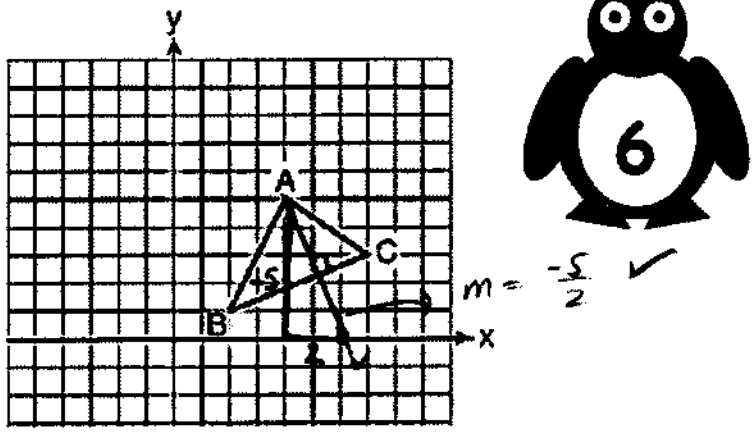
$BC = 3(2) - 2 = 4$

$\boxed{BC = 4}$

PART (D): Classify ΔDAB **by angles and sides.**

Obtuse scalene

Coordinate Geometry



1) In the diagram below, ΔABC has vertices $A(4,5)$, $B(2,1)$, and $C(7,3)$.

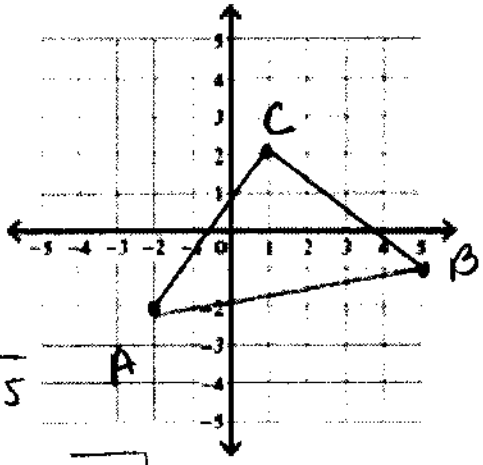
What is the slope of the altitude drawn from A to $\overline{BC}$?

B (2, 1)
C (7, 3)

Slope of $\overline{BC} = \frac{\Delta y}{\Delta x} = \frac{1-3}{2-7} = \frac{-2}{-5} = \frac{2}{5}$

→ must be ⊥ $m = \frac{-5}{2}$

2) Prove that A (-2, -2), B (5, -1), C (1, 2) is an isosceles triangle.



Formula: $d = \sqrt{(\Delta x)^2 + (\Delta y)^2}$

Calculation(s):

$AC = \sqrt{(-2-1)^2 + (-2-2)^2} = \sqrt{9+16} = \sqrt{25}$

$AC = 5$

$CB = \sqrt{(5-1)^2 + (-1-2)^2} = \sqrt{16+9} = \sqrt{25}$

$CB = 5$

$\overline{AC} \cong \overline{CB}$

Conclusion: ΔABC has at least 2 ≅ sides,

therefore it is isosceles.

Let's Review: Practice these for the review questions on Test #3!

Check answers on the website!

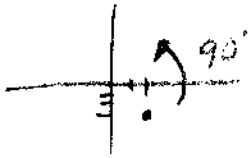
2 1. What is the slope of the line which passes through the points (2, 6) and (-3,7)?

1) $\frac{1}{5}$ 2) $-\frac{1}{5}$ 3) 5 4) -5

$m = \frac{\Delta y}{\Delta x} = \frac{6-7}{2-3} = \frac{-1}{-5}$

3 2. What is the image of the point (2,−3) after the transformation Ro,90°?

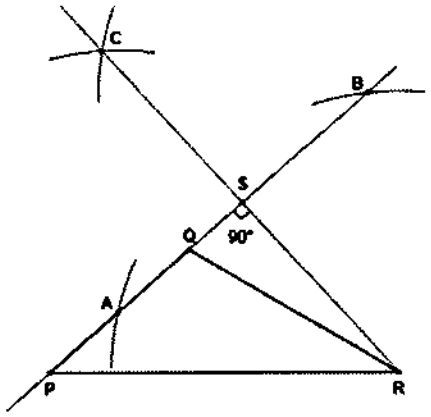
1. (2,3)
2. (−2,−3)
3. (3, 2)
4. (−3,2)



$(-y, x)$

2 3. Which construction is depicted in the diagram?

1) perpendicular bisector
2) altitude
3) angle bisector
4) median



1 4. Which of the following makes a valid claim about a composite of two reflections?

1. A composite of two reflections can never be a reflection.
2. A composite of two reflections can never be a rotation.
3. A composite of two reflections can never be a translation.
4. A composite of two reflections can never preserve orientation

4 5. Which is the correct sequence for the diagram?

1. $R_{G,180} \circ T_{\overline{KL}}(\Delta BDP)$
2. $T_{\overline{KL}} \circ R_{G,90}(\Delta BDP)$
3. $R_{G,270} \circ T_{\overline{KL}}(\Delta BDP)$
4. $T_{\overline{KL}} \circ R_{G,180}(\Delta BDP)$