Geometry 1-2
Triangle Review

Name KEY
Date _____ Period _____

For problems 1 – 4 use the Triangle Inequality Theorem to determine whether the given side lengths will create a triangle. If a triangle exists, classify it by both sides (Equilateral, Isosceles or Scalene) and angles (Acute, Right, Obtuse or Equiangular).

1. 9, 12, 15

$9+12>15$?
$21>15$ ✓

$9^2+12^2 \stackrel{?}{=} 15^2$
$81+141=225$
$225=225$ ✓

Triangle? YES

Classify by:

Sides SCALENE

Angles RIGHT Δ

2. 6, 13, 20

$6+13>20$?
$19>2$ (NO)

Triangle? NO

Classify by:

Sides Ş NOT POSSIBLE

Angles _____

3. 7, 22, 21

$7+21>22$?
$28>22$ ✓

$7^2+21^2 \stackrel{?}{=} 22^2$
$49+441=484$
$490>484$

Triangle? YES

Classify by:

Sides SCALENE

Angles ACUTE

4. 2, 5, 6

$2+5>6$
$7>6$ ✓

$2^2+5^2 \stackrel{?}{=} 6^2$
$4+25=36$
$29<36$

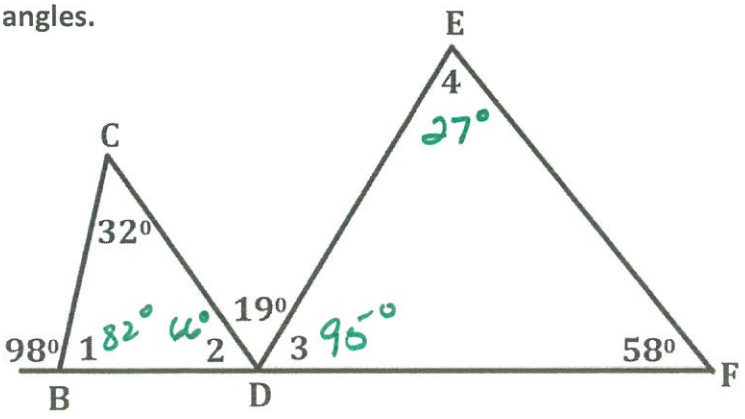
Triangle? YES

Classify by:

Sides SCALENE

Angles OBTUSE

5. Find the measures of the missing angles, then classify each triangle in the diagram by its sides and angles.



m <1 $180-98=82°$

m <2 $180-82-32=66°$

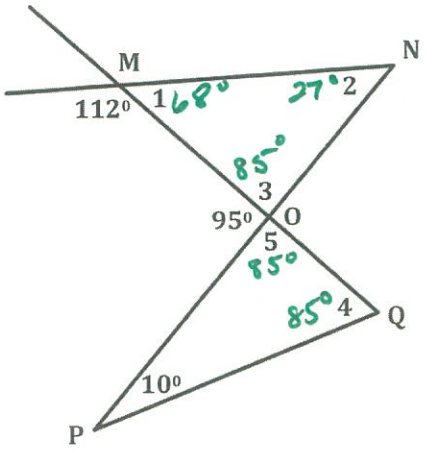
m <3 $180-66-19=95°$

m <4 $180-58-95=27°$

Classify ΔBCD by Sides: SCALENE by Angles: ACUTE

Classify ΔDEF by Sides: SCALENE by Angles: OBTUSE

6. Find the measures of the missing angles, then classify each triangle in the diagram by its sides and angles.



m <1 $180-112=68^\circ$

m <2 $180-68-85=27^\circ$

m <3 $180-95=85^\circ$

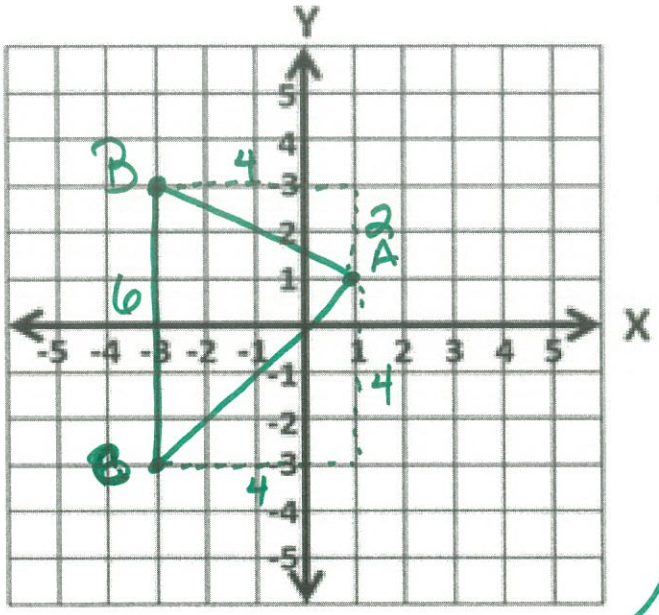
m <4 $95^\circ-10^\circ=85^\circ$

m <5 85°

Classify Δ*MNO* by Sides: SCALENE by Angles: ACUTE

Classify Δ*PQO* by Sides: ISOSCELES by Angles: ACUTE

7. Graph Δ*ABC* with vertices *A*(1,1), *B*(-3,3), and *C*(-3,-3). Then use the Pythagorean Theorem to find the side lengths.



$AB=\sqrt{2^2+4^2}=\sqrt{4+16}=\sqrt{20}$

$AC=\sqrt{4^2+4^2}=\sqrt{16+16}=\sqrt{32}$

CHECK FOR RIGHT Δ: "c" = 6

$(\sqrt{20})^2+(\sqrt{32})^2 \stackrel{?}{=} 6^2$

$20+32 \stackrel{?}{=} 36$

$52 \neq 36$ NO

Side Lengths: *AB* = $\sqrt{20}$ "a" or "b"

BC = 6 "c"

AC = $\sqrt{32}$ "b" or "a"

Is Δ*ABC* a Right Triangle? NO

If not, is it an Obtuse Triangle, or an Acute Triangle? ACUTE

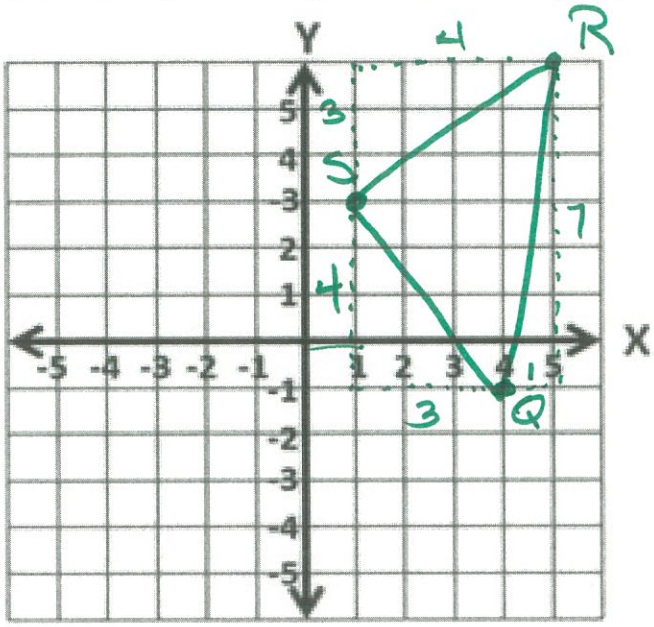
Explain why you classified it as Acute or Obtuse. $a^2+b^2>c^2$

$52>36$

Classify Δ*ABC* by its sides (Scalene, Isosceles or Equilateral), and explain how you came to that classification.

SCALENE: ALL 3 SIDES DIFFERENT LENGTHS

8. Graph ΔQRS with vertices $Q(4,-1)$, $R(5,6)$, and $S(1,3)$. Then use the Pythagorean Theorem to find the side lengths. Finally, classify the triangle by its sides and determine if it is a right triangle.



$QR = \sqrt{1^2+7^2} = \sqrt{50}$

$RS = \sqrt{3^2+4^2} = \sqrt{25} = 5$

$QS = \sqrt{3^2+4^2} = \sqrt{25} = 5$

RT Δ? $5^2+5^2 \stackrel{?}{=} (\sqrt{50})^2$

$25+25 = 50$

$50 = 50$ ✓

C

Side Lengths: $QR =$ $\sqrt{50}$

$RS =$ 5

$QS =$ 5

Is ΔQRS a Right Triangle? YES

If not, is it an Obtuse Triangle, or an Acute Triangle? _____

Explain why you classified it as Acute or Obtuse. _____

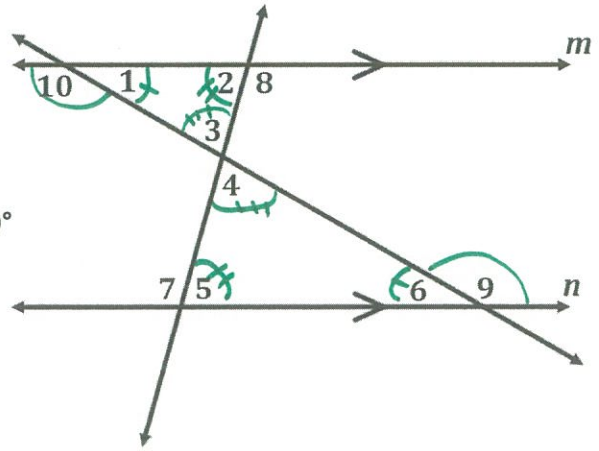
Classify ΔQRS by its sides (Scalene, Isosceles or Equilateral), and explain how you came to that classification.

ISOSCELES: $RS = QS$

9. Given the diagram below, explain—<u>without using the Triangle Sum Theorem</u>—why $m\angle 1 + m\angle 2 + m\angle 3 = m\angle 4 + m\angle 5 + m\angle 5 = 180°$. You can use any other theorems or postulates that we have introduced, both for triangles and parallel lines. You may use either a paragraph proof or the two-column format. If you choose to do a paragraph proof, you <u>must</u> support your statements with theorems or postulates.

Given: $m \parallel n$

Prove:
$m\angle 1 + m\angle 2 + m\angle 3 = m\angle 4 + m\angle 5 + m\angle 6 = 180°$



Statements	Reasons
(1) $m \parallel n$	(1) GIVEN
(2) $\angle 1 \cong \angle 6$; $\angle 2 \cong \angle 5$	(2) ALTERNATE INTERIOR $\angle$ POSTULATE
(3) $\angle 3 \cong \angle 4$	(3) VERTICAL $\angle$S $\cong$
(4) $\angle 9 \cong \angle 10$	(4) ALTERNATE INT. $\angle$ POST.
(5) $\angle 10 + \angle 1 = 180$ $\angle 6 + \angle 9 = 180$	(5) LINEAR PAIR POST.
(6) $\angle 10 = \angle 2 + \angle 3$ $\angle 9 = \angle 4 + \angle 5$	(6) EXTERIOR $\angle$ THEOREM
(7) $\angle 2 + \angle 3 + \angle 1 = 180$ $\angle 6 + \angle 4 + \angle 5 = 180$	(7) SUBSTITUTION
(8) $\angle 1 + \angle 2 + \angle 3 = \angle 4 + \angle 5 + \angle 6 = 180$	(8) SUBSTITUTION