Honors Geometry Name Key

Triangle Review 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

$9+12>15$ ✓
$12+15>9$ ✓
$9+15>12$ ✓

Triangle? Yes

Classify by:

Sides Scalene

Angles Right

2. 6, 13, 20

$6+13 \not> 20$

Triangle? No

Classify by:

Sides ______

Angles ______

3. 7, 22, 21

$7+22>21$ ✓
$7+21>22$ ✓
$22+21>7$ ✓

Triangle? Yes

Classify by:

Sides Scalene

Angles acute

4. 2, 5, 6

$2+5>6$ ✓
$5+6>2$ ✓
$2+6>5$ ✓

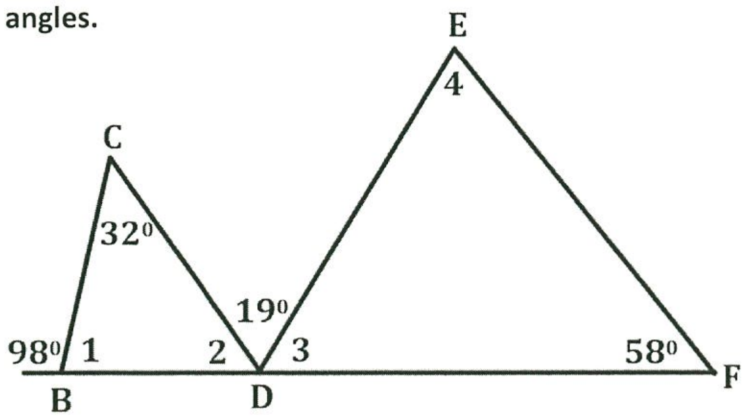
Triangle? yes

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.



$m\angle 1$ 82

$m\angle 2$ 66°

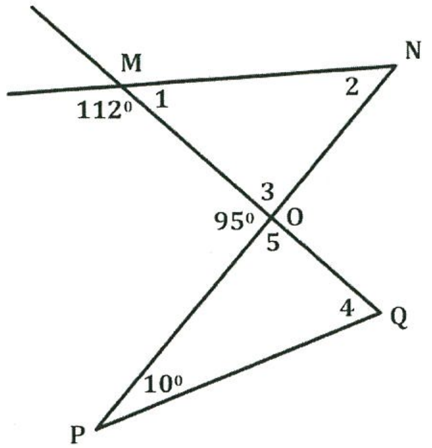
$m\angle 3$ 95°

$m\angle 4$ 47°

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 <u>and</u> angles.



$m\angle 1$ 68°

$m\angle 2$ 27°

$m\angle 3$ 85°

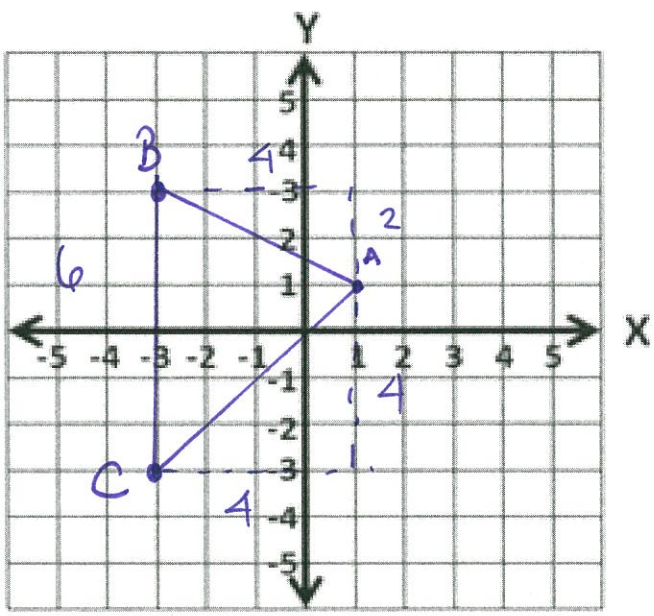
$m\angle 4$ 85°

$m\angle 5$ 85°

Classify Δ*MNO* by <u>Sides</u>: Scalene by <u>Angles</u>: acute

Classify Δ*PQO* by <u>Sides</u>: Isosceles by <u>Angles</u>: 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.



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

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

Side Lengths: *AB* = $\sqrt{20}$

BC = $\sqrt{36} = 6$

AC = $\sqrt{32}$

Is Δ*ABC* a Right Triangle? NO

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

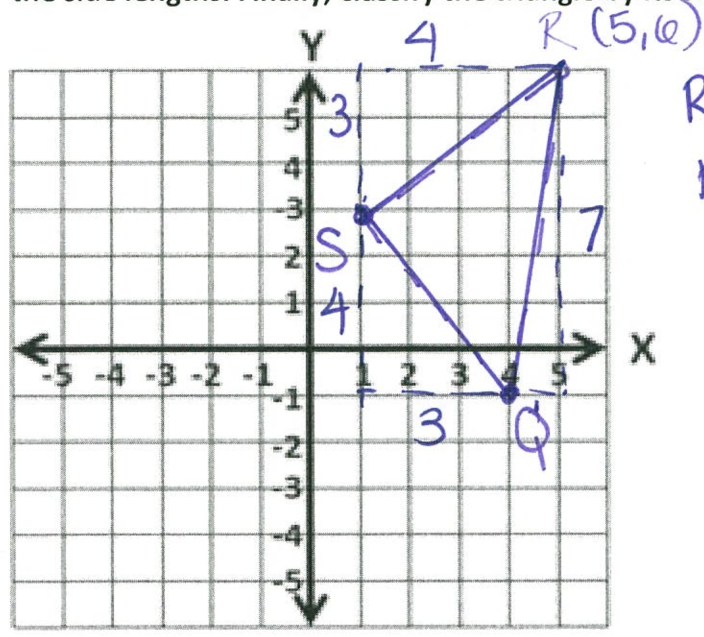
Explain why you classified it as Acute or Obtuse.

$a^2 + b^2 > c^2$

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

Scalene

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.



$RS = SQ = \sqrt{4^2 + 3^2} = \sqrt{16+9} = \sqrt{25}$

$RS = SQ = 5$

$RQ = \sqrt{1^2 + 7^2} = \sqrt{1+49} = \sqrt{50}$

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? right

$a^2 + b^2 \stackrel{?}{=} c^2 \quad (\sqrt{25})^2 + (\sqrt{25})^2 \stackrel{?}{=} (\sqrt{50})^2 \quad 25+25 = 50$ ✓

Explain why you classified it as Acute or Obtuse.

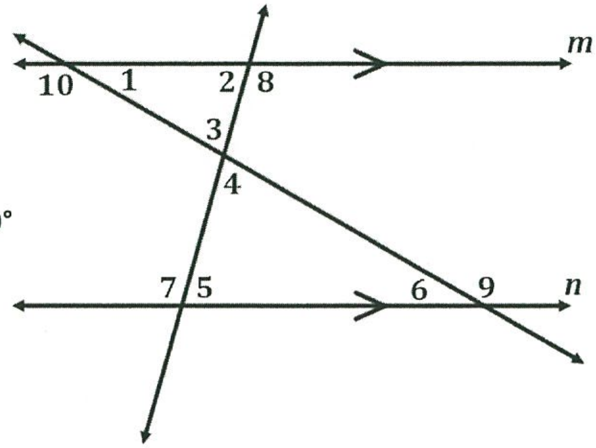
Classify ΔQRS by its sides (Scalene, Isosceles or Equilateral), and explain how you came to that classification.

Isosceles

9. Given the diagram below, explain—<u>without using the Triangle Sum Theorem</u>—why $m\angle 1 + m\angle 2 + m\angle 3 = m\angle 4 + m\angle 5 + m\angle 5 = 180^\circ$. 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: $m || n$

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



Statements	Reasons
1. m // m	1. Given
2. $\angle 1 \cong \angle 6$, $\angle 9 \cong \angle 10$, $\angle 2 \cong \angle 5$, $\angle 7 \cong \angle 8$	2. Alt. int ∡ Post
3. $\angle 3 \cong \angle 4$	3. Vert. ∡ are ≅
4. $\angle 2 + \angle 3 = \angle 10$, $\angle 4 + \angle 5 = \angle 9$	4 Ext. Angle Thm
5. $\angle 1 + \angle 10 = 180$, $\angle 6 + \angle 9 = 180$	5 Def. of a Linear Pair
6. $\angle 10 = 180 - \angle 1$, $\angle 9 = 180^\circ - \angle 6$	6. Subtraction
7. $\angle 2 + \angle 3 = 180 - \angle 1$, $\angle 4 + \angle 5 = 180 - \angle 6$	7. substitution
8. $\angle 1 + \angle 2 + \angle 3 = 180$, $\angle 4 + \angle 5 + \angle 6 = 180$	8. Add.
9. $\angle 1 + \angle 2 + \angle 3 = \angle 4 + \angle 5 + \angle 6$	9. Substution