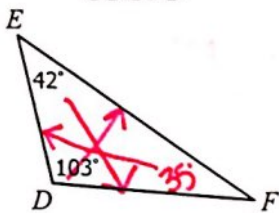| **Ordering Angles**	The **angles of a triangle** can be put in order by **comparing the sides.**

*The **smallest angle** is always **opposite** the _smallest_ _side_.

*The **largest angle** is always **opposite** the _largest_ _side_.

⟵ Order the angles from least to greatest:

∠A , ∠C , ∠B

Ordering Sides	The **sides of a triangle** can be put in order by **comparing the angles.**

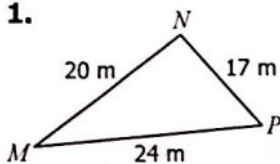*The **shortest side** is always **opposite** the _smallest_ _angle_.

*The **longest side** is always **opposite** the _largest_ _angle_.

⟵ Order the sides from least to greatest:
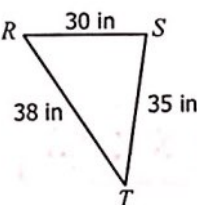
$\overline{ED}$, $\overline{FD}$, $\overline{EF}$

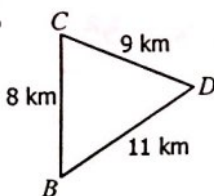**Set 1:** Order the angles from least to greatest:

1.

∠M, ∠P, ∠N

2. R — 30 in — S, 38 in, 35 in, T

∠T, ∠R, ∠S

Set 2: Order the angles from greatest to least:

3. C, 9 km, 8 km, D, 11 km, B

∠C, ∠B, ∠D

4. 29 ft, X, W, 26 ft, 43 ft, Y
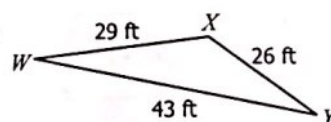
∠X, ∠Y, ∠W

Set 3: Order the sides from least to greatest:

5. K, J 31°, 57° L

$\overline{KL}$, $\overline{JK}$, $\overline{JL}$

6. T, S 68°, 53° V
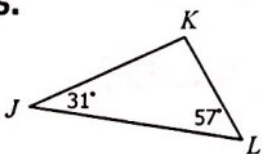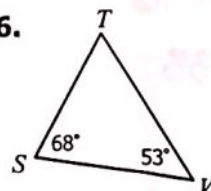
$\overline{ST}$, $\overline{SV}$, $\overline{TV}$

Set 4: Order the sides from greatest to least:

7. Y 82°, Z, 54°, X
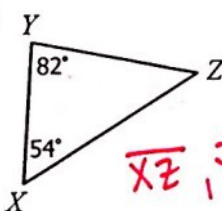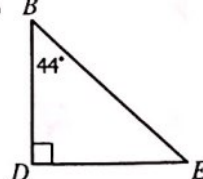
$\overline{XZ}$, $\overline{YZ}$, $\overline{XY}$

8. B 44°, D, E

$\overline{BE}$, $\overline{BD}$, $\overline{DE}$

Name: _____

Date: _____ Bell: _____

** This is a 2-page document! **

Directions: Determine if the side lengths could form a triangle. Use an inequality to prove your answer.

1. 16 m, 21 m, 39 m

$16 + 21 > 39$
$37 > 39$?
NO!

2. 18 in, 6 in, 13 in

$6 + 13 > 18$
$19 > 18$? YES!

3. 34 km, 27 km, 58 km

$34 + 27 > 58$
$61 > 58$? YES!

4. 29 ft, 38 ft, 9 ft

$29 + 9 > 38$
$38 > 38$? NO!

5. 12 cm, 12 cm, 25 cm

$12 + 12 > 25$
$24 > 25$? NO!

6. 31 yd, 14 yd, 19 yd

$14 + 19 > 31$
$33 > 31$? YES!

Directions: Given two sides of a triangle, find a range of possible lengths for the third side.

7. 4 cm, 17 cm , X

$4 + 17 = 21$
$17 - 4 = 13$

$\boxed{13 < X < 21}$

8. 24 ft, 52 ft

$24 + 52 = 76$
$52 - 24 = 28$

$\boxed{28 < X < 76}$

9. 9 yd, 32 yd

$9 + 32 = 41$
$32 - 9 = 23$

$\boxed{23 < X < 41}$

10. 16 km, 17 km

$16 + 17 = 33$
$17 - 16 = 1$

$\boxed{1 < X < 33}$

11. If a triangle has lengths of 27 m and 11 m, check all the possible lengths for the third side.

$27 + 11 = 38$
$27 - 11 = 16$

$16 < X < 38$

- ☐ 39 ft
- ☑ 17 ft
- ☑ 35 ft
- ☑ 22 ft
- ☐ 16 ft

12. If a triangle has lengths of 3 ft and 54 ft, check all the possible lengths for the third side.

$3 + 54 = 57$
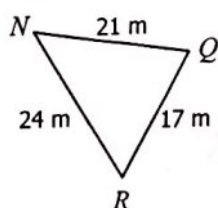$54 - 3 = 51$

$51 < X < 57$

- ☐ 51 ft
- ☑ 53 ft
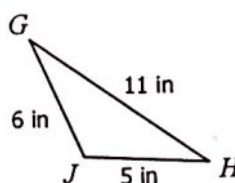- ☑ 55 ft
- ☐ 57 ft
- ☐ 58 ft

Directions: Order the angles from least to greatest for 13-14, then greatest to least for 15-16.

13.

$\angle N, \angle R, \angle Q$

14.

$\angle G, \angle H, \angle J$

Triangle Inequalities & ALGEBRA

Review! Solve the following inequalities. Watch out for the flippers!

1. $5x - 18 > 2x + 3$ $\quad -2x \qquad -2x$ $\quad 3x - 18 > 3$ $\qquad +18 \quad +18$ $\qquad \dfrac{3x}{3} > \dfrac{21}{3}$ $\boxed{x > 7}$	**2.** $8x + 7 > 10x - 15$ $\quad -8x + 15 \quad -8x + 15$ $\qquad \dfrac{22}{2} > \dfrac{2x}{2}$ $\qquad \boxed{11 > x}$
3. $9x - 26 > 14x - 40$ $\quad -9x + 40 \quad -9x + 40$ $\qquad \dfrac{14}{5} > \dfrac{5x}{5}$ $\qquad \boxed{14/5 > x}$	**4.** $9 - 2x > 57 - 10x$ $\quad -9 + 10x \quad -9 + 10x$ $\qquad \dfrac{8x}{8} > \dfrac{48}{8}$ $\qquad \boxed{x > 6}$

Directions: If the sides of a triangle have the following lengths, find all possible values for x.
Since you do not know which two sides are the shortest, you must account for all possiblilities.

5. $AB = 4x + 25$, $BC = 3x - 2$, $AC = 9x - 5$

$AB + BC > AC$ $4x + 25 + 3x - 2 > 9x - 5$ $7x + 23 > 9x - 5$ $-7x + 5 \quad -7x + 5$ $\quad 28 > 2x$ $\quad 14 > x$	$AB + AC > BC$ $4x + 25 + 9x - 5 > 3x - 2$ $13x + 20 > 3x - 2$ $-3x - 20 \quad -3x - 20$ $\quad 10x > -22$ $\quad x > -\dfrac{22}{10}$ $\quad x > -\dfrac{11}{5}$	$BC + AC > AB$ $3x - 2 + 9x - 5 > 4x + 25$ $12x - 7 > 4x + 25$ $-4x + 7 \quad -4x + 7$ $\quad 8x > 32$ $\quad x > 4$

Range of values: $4 < x < 14$

6. $MN = x - 1$, $NP = 9x - 68$, $MP = 5x - 4$

Range of values: _____