Name: _____   Date: _____

ROTATIONS AND ANGLE TERMINOLOGY
ALGEBRA 2 WITH TRIGONOMETRY

Our study of trigonometry will concentrate on the relationship between rotations (or angles) and lengths. This introductory lesson serves to introduce basic terminology and concepts concerning angles. Some of the terminology is specified below.

Standard Position: An angle is said to be drawn in standard position if its vertex is at the origin and its initial ray points along the positive *x*-axis.

Positive and Negative Rotations: A rotation is said to be positive if the initial ray is rotated counter-clockwise to the terminal ray and said to be negative if the initial ray is rotated clockwise to the terminal ray.

Coterminal Anlges: Any two angles drawn in standard position that share a terminal ray.

Reference Angles: The positive acute angle formed by the terminal ray and the *x*-axis.

***Exercise* #1:** For each of the following angles, given by the Greek letter **theta**, draw a rotation diagram and identify the quadrant is terminal ray falls in.

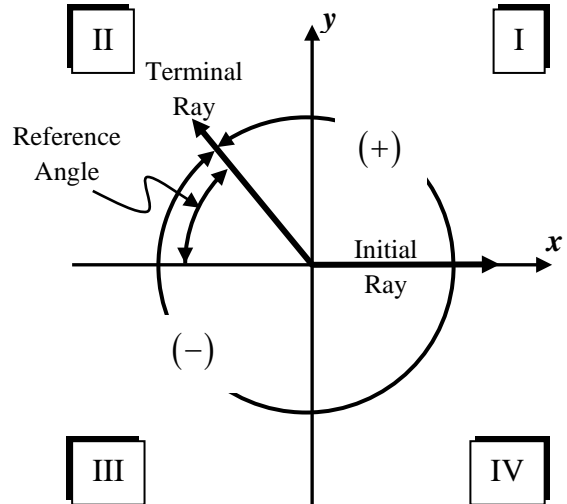(a) $\theta = 145°$ (b) $\theta = 320°$ (c) $\theta = 72°$ (d) $\theta = -210°$

(e) $\theta = 250°$ (f) $\theta = -310°$ (g) $\theta = 460°$ (h) $\theta = -400°$

Exercise #2: In which quadrant would the terminal ray of an angle drawn in standard position fall if the angle measures $860°$?

(1) I

(3) III

(2) II

(4) IV

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Exercise #3: Give a negative angle that is coterminal with each of the following positive angles, **alpha**.

(a) $\alpha = 90°$

(b) $\alpha = 330°$

(c) $\alpha = 120°$

(d) $\alpha = 210°$

Exercise #4: Coterminal angles drawn in standard position will always have measures that differ by an integer multiple of

(1) $90°$

(3) $180°$

(2) $360°$

(4) $720°$

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Exercise #5: For each of the following angles, beta, draw a rotation diagram and then state **beta's** reference angle, β_r.

(a) $\beta = 160°$

(b) $\beta = 300°$

(c) $\beta = 210°$

(d) $78°$

(e) $\beta = -110°$

(f) $\beta = -280°$

(g) $\beta = 605°$

(h) $\beta = -410°$

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SKILLS

1. For each of the following angles, draw a rotation diagram and then state the quadrant the terminal ray of the angles falls within.

   (a) $\theta = 135°$ (b) $\theta = 300°$ (c) $\theta = -110°$

   (d) $\theta = -310°$ (e) $\theta = 85°$ (f) $\theta = 560°$

2. For each of the following angles, draw a rotation diagram and determine the reference angle.

   (a) $\alpha = 245°$ (b) $\alpha = 290°$ (c) $\alpha = 130°$

   (d) $\alpha = -242°$ (e) $\alpha = 475°$ (f) $\alpha = -432°$

3. Give two angles that are coterminal with each of the following angles. Make one of the coterminal angles positive and one negative.

(a) $\theta = 105°$ (b) $\theta = 220°$ (c) $\theta = 80°$ (d) $\theta = -245°$

4. When drawn in standard position, which of the following angles is coterminal to one that measures $130°$?

(1) $430°$ (3) $850°$

(2) $-70°$ (4) $730°$ _____

5. Which of the following angles, when drawn in standard position, would *not* be coterminal with an angle that measures $270°$?

(1) $-90°$ (3) $630°$

(2) $990°$ (4) $720°$ _____

6. Which of the following angles would *not* have a reference angle equal to $30°$?

(1) $210°$ (3) $120°$

(2) $-330°$ (4) $-30°$ _____

REASONING

7. Angles are a measurement of rotation about a point. Are two coterminal angles the same rotation? Explain your answer. Diagrams are helpful.