Name_____ Date _____

1.6 Enrichment and Extension

Radian Measures of Complementary and Supplementary Angles

A *radian* is a standard unit of measure used to measure angles. The conversion from degrees to radians is $180° = \pi$ radians.

Example 1: Convert the sum of complementary and supplementary angles into radians.

Solution: $90° \bullet \dfrac{\pi \text{ radians}}{180°} = \dfrac{\pi}{2}$ radians   Complementary angles sum to $\dfrac{\pi}{2}$ radians.

$180° \bullet \dfrac{\pi \text{ radians}}{180°} = \pi$ radians   Supplementary angles sum to π radians.

Example 2: Determine whether $\dfrac{3\pi}{8}$ and $\dfrac{\pi}{4}$ are *complementary*, *supplementary*, or *neither*.

Solution: $\dfrac{\pi}{4} \bullet \left(\dfrac{2}{2}\right) = \dfrac{2\pi}{8}$ Multiply by an identity to get the LCD.

$\dfrac{2\pi}{8} + \dfrac{3\pi}{8} = \dfrac{5\pi}{8}$ Add the two measurements.

The sum of $\dfrac{5\pi}{8}$ does not equal $\dfrac{\pi}{2}$ or π, so the final answer is *neither*.

In Exercises 1–6, determine whether the two angles are *complementary*, *supplementary*, or *neither*.

1. $\dfrac{3\pi}{7}, \dfrac{4\pi}{7}$ 2. $\dfrac{\pi}{4}, \dfrac{\pi}{4}$ 3. $\dfrac{5\pi}{18}, \dfrac{5\pi}{9}$

4. $\dfrac{\pi}{8}, \dfrac{7\pi}{8}$ 5. $\dfrac{\pi}{3}, \dfrac{\pi}{4}$ 6. $\dfrac{6\pi}{15}, \dfrac{\pi}{10}$

In Exercises 7–12, find the angle complementary and supplementary to the given angle, if possible.

7. $\dfrac{12\pi}{15}$ 8. $\dfrac{23\pi}{42}$ 9. $\dfrac{3\pi}{17}$

10. $\dfrac{2\pi}{5}$ 11. $\dfrac{17\pi}{42}$ 12. $\dfrac{7\pi}{8}$