

Lesson 9 answers

all solutions

1. $x = \frac{\pi}{6} \pm \pi n$ or $x = \frac{\pi}{3} \pm \pi n$

2. $x = \frac{\pi}{12} \pm \frac{2\pi}{3} n$ or $x = \frac{7\pi}{12} \pm \frac{2\pi}{3} n$

3. $x = \frac{3\pi}{2} \pm 2\pi n$

4. $x = \pm \frac{\pi}{6} \pm 2\pi n$ or $\frac{\pi}{2} \pm \pi n$

5. $x = \pm \pi n$ or $x = \pm \frac{\pi}{6} \pm 2\pi n$
or $x = \pm \frac{5\pi}{6} \pm 2\pi n$

6. $x = \frac{\pi}{12} \pm \pi n$ or $x = \frac{5\pi}{12} \pm \pi n$

7. $x = \pm \pi n$ or $x = \frac{\pi}{4} \pm \frac{\pi}{2} n$

8. $x = \frac{\pi}{2} \pm \pi n$

9. $x = \frac{5\pi}{4} \pm 2\pi n$ or $x = \frac{7\pi}{4} \pm 2\pi n$

10. $x = \frac{\pi}{3} \pm \pi n$

11. $x = \frac{\pi}{3} n$

12. $x = \frac{\pi}{2} \pm \pi n$ or $x = \pm 2\pi n$

13. $\frac{7\pi}{6} \pm 2\pi n$ or $\frac{11\pi}{6} \pm 2\pi n$ or $\frac{3\pi}{2} \pm 2\pi n$

solutions on $[0, 2\pi)$

$$\frac{\pi}{6}, \frac{\pi}{3}, \frac{7\pi}{6}, \frac{4\pi}{3}$$

$$\frac{\pi}{12}, \frac{7\pi}{12}, \frac{3\pi}{4}, \frac{5\pi}{4}, \frac{17\pi}{12}, \frac{23\pi}{12}$$

$$\frac{3\pi}{2}$$

$$\frac{\pi}{6}, \frac{\pi}{2}, \frac{3\pi}{2}, \frac{11\pi}{6}$$

$$0, \frac{\pi}{6}, \frac{5\pi}{6}, \pi, \frac{7\pi}{6}, \frac{11\pi}{6}$$

$$\frac{\pi}{12}, \frac{5\pi}{12}, \frac{13\pi}{12}, \frac{17\pi}{12}$$

$$0, \frac{\pi}{4}, \frac{3\pi}{4}, \pi, \frac{5\pi}{4}, \frac{7\pi}{4}$$

$$\frac{\pi}{2}, \frac{3\pi}{2}$$

$$\frac{5\pi}{4}, \frac{7\pi}{4}$$

$$\frac{\pi}{3}, \frac{4\pi}{3}$$

$$0, \frac{\pi}{3}, \frac{2\pi}{3}, \pi, \frac{4\pi}{3}, \frac{5\pi}{3}$$

$$0, \frac{\pi}{2}, \frac{3\pi}{2}$$

$$\frac{7\pi}{6}, \frac{11\pi}{6}, \frac{3\pi}{2}$$

$$14. \quad x = \frac{\pi}{8} \pm \frac{\pi}{4}n$$

$$\frac{\pi}{8}, \frac{3\pi}{8}, \frac{5\pi}{8}, \frac{7\pi}{8}, \frac{9\pi}{8}, \frac{11\pi}{8}, \frac{13\pi}{8}, \frac{15\pi}{8}$$

$$15. \quad x = \frac{2\pi}{3} \pm 2\pi n \text{ or } \frac{4\pi}{3} \pm 2\pi n$$

$$\text{or } \pm 2\pi n$$

$$0, \frac{2\pi}{3}, \frac{4\pi}{3}$$

$$16. \quad x = \frac{\pi}{3} \pm 2\pi n \text{ or } x = \frac{5\pi}{3} \pm 2\pi n$$

$$\frac{\pi}{3}, \frac{5\pi}{3}$$

$$17. \quad -1 \pm 4n$$

$$19. \quad (-\pi, 1), \left(\frac{\pi}{5}, 2\frac{1}{4}\right), \left(\frac{7\pi}{10}, 2\frac{3}{4}\right)$$