

Math Sheet

Name _____ Score _____ Teacher _____ Date _____

Trigonometric Equations on Bounded Intervals

Find every distinct exact solution in the stated half-open interval. Check endpoints and exclude values where the original expression is undefined.

1. Solve $\sin(x) = -1/2$ for all x in $[0, 2\pi)$.

2. Solve $2 \tan(2x - \pi/6) = 0$ for all x in $[0, 2\pi)$.

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Trigonometric Equations on Bounded Intervals

Find every distinct exact solution in the stated half-open interval. Check endpoints and exclude values where the original expression is undefined.

3. Solve $-\sin(3x + \pi/4) = -\sqrt{3}/2$ for all x in $[0, 2\pi)$.

4. Solve $\sin(x - \pi/3) = \sqrt{2}/2$ for all x in $[0, 2\pi)$.

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Trigonometric Equations on Bounded Intervals

Find every distinct exact solution in the stated half-open interval. Check endpoints and exclude values where the original expression is undefined.

5. Solve $\cos(2x) = -1/2$ for all x in $[0, 2\pi)$.

6. Solve $2 \tan(3x - \pi/6) = -2\sqrt{3}/3$ for all x in $[0, 2\pi)$.

Trigonometric Equations on Bounded Intervals

Find every distinct exact solution in the stated half-open interval. Check endpoints and exclude values where the original expression is undefined.

7. Solve $\tan(x + \pi/4) = 1$ for all x in $[0, 2\pi)$.

8. Solve $2 \cos(2x - \pi/3) = \sqrt{2}$ for all x in $[0, 2\pi)$.

Trigonometric Equations on Bounded Intervals

Worked Answer Key

Find every distinct exact solution in the stated half-open interval. Check endpoints and exclude values where the original expression is undefined.

1. Solve $\sin(x) = -1/2$ for all x in $[0, 2\pi)$.

Answer: $7\pi/6, 11\pi/6$

1. Use the standard-angle families: $x = 7\pi/6 + k(2\pi)$ or $x = 11\pi/6 + k(2\pi)$.
2. Solve each linear angle equation, then retain only roots in $[0, 2\pi)$.
3. Check each retained root in the original equation.

2. Solve $2 \tan(2x - \pi/6) = 0$ for all x in $[0, 2\pi)$.

Answer: $\pi/12, 7\pi/12, 13\pi/12, 19\pi/12$

1. Divide both sides by 2: $\tan(2x - \pi/6) = 0$.
2. Use the standard-angle families: $2x - \pi/6 = 0 + k(\pi)$.
3. Solve each linear angle equation, then retain only roots in $[0, 2\pi)$.
4. Exclude undefined inputs: $\pi/3, 5\pi/6, 4\pi/3, 11\pi/6$.

Trigonometric Equations on Bounded Intervals

Worked Answer Key

Find every distinct exact solution in the stated half-open interval. Check endpoints and exclude values where the original expression is undefined.

3. Solve $-\sin(3x + \pi/4) = -\sqrt{3}/2$ for all x in $[0, 2\pi)$.

Answer: $\pi/36, 5\pi/36, 25\pi/36, 29\pi/36, 49\pi/36, 53\pi/36$

1. Multiply both sides by -1 : $\sin(3x + \pi/4) = \sqrt{3}/2$.
2. Use the standard-angle families: $3x + \pi/4 = \pi/3 + k(2\pi)$ or $3x + \pi/4 = 2\pi/3 + k(2\pi)$.
3. Solve each linear angle equation, then retain only roots in $[0, 2\pi)$.
4. Check each retained root in the original equation.

4. Solve $\sin(x - \pi/3) = \sqrt{2}/2$ for all x in $[0, 2\pi)$.

Answer: $7\pi/12, 13\pi/12$

1. Use the standard-angle families: $x - \pi/3 = \pi/4 + k(2\pi)$ or $x - \pi/3 = 3\pi/4 + k(2\pi)$.
2. Solve each linear angle equation, then retain only roots in $[0, 2\pi)$.
3. Check each retained root in the original equation.

Trigonometric Equations on Bounded Intervals

Worked Answer Key

Find every distinct exact solution in the stated half-open interval. Check endpoints and exclude values where the original expression is undefined.

5. Solve $\cos(2x) = -1/2$ for all x in $[0, 2\pi)$.

Answer: $\pi/3, 2\pi/3, 4\pi/3, 5\pi/3$

1. Use the standard-angle families: $2x = 2\pi/3 + k(2\pi)$ or $2x = 4\pi/3 + k(2\pi)$.
2. Solve each linear angle equation, then retain only roots in $[0, 2\pi)$.
3. Check each retained root in the original equation.

6. Solve $2 \tan(3x - \pi/6) = -2\sqrt{3}/3$ for all x in $[0, 2\pi)$.

Answer: $0, \pi/3, 2\pi/3, \pi, 4\pi/3, 5\pi/3$

1. Divide both sides by 2: $\tan(3x - \pi/6) = -\sqrt{3}/3$.
2. Use the standard-angle families: $3x - \pi/6 = -\pi/6 + k(\pi)$.
3. Solve each linear angle equation, then retain only roots in $[0, 2\pi)$.
4. Exclude undefined inputs: $2\pi/9, 5\pi/9, 8\pi/9, 11\pi/9, 14\pi/9, 17\pi/9$.

Trigonometric Equations on Bounded Intervals

Worked Answer Key

Find every distinct exact solution in the stated half-open interval. Check endpoints and exclude values where the original expression is undefined.

7. Solve $\tan(x + \pi/4) = 1$ for all x in $[0, 2\pi)$.

Answer: 0, π

1. Use the standard-angle families: $x + \pi/4 = \pi/4 + k(\pi)$.
2. Solve each linear angle equation, then retain only roots in $[0, 2\pi)$.
3. Exclude undefined inputs: $\pi/4, 5\pi/4$.

8. Solve $2 \cos(2x - \pi/3) = \sqrt{2}$ for all x in $[0, 2\pi)$.

Answer: $\pi/24, 7\pi/24, 25\pi/24, 31\pi/24$

1. Divide both sides by 2: $\cos(2x - \pi/3) = \sqrt{2}/2$.
2. Use the standard-angle families: $2x - \pi/3 = \pi/4 + k(2\pi)$ or $2x - \pi/3 = 7\pi/4 + k(2\pi)$.
3. Solve each linear angle equation, then retain only roots in $[0, 2\pi)$.
4. Check each retained root in the original equation.