

Advanced Trigonometric Equations

Factor or rewrite first, list every solution in the requested scope, and reject values where the original equation is undefined.

1. Solve $\cos(3(x - 5\pi/12))=0$ for all real x .

Assumptions: General solutions use integer n and retain all original undefined points.

2. Solve $\cos(2(x - \pi/12))=0$ on $0 \leq x < 2\pi$.

Assumptions: The interval is half-open, so include its left endpoint and exclude its right endpoint.

Math Sheet

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Advanced Trigonometric Equations

Factor or rewrite first, list every solution in the requested scope, and reject values where the original equation is undefined.

3. Solve $\cos(x - 3\pi/4)[2\cos(x - 3\pi/4) - 1] = 0$ on $0 \leq x < 2\pi$.

Assumptions: The interval is half-open, so include its left endpoint and exclude its right endpoint.

4. Solve $2\cos^2(x - 5\pi/6) + \cos(x - 5\pi/6) - 1 = 0$ on $0 \leq x < 2\pi$.

Assumptions: The interval is half-open, so include its left endpoint and exclude its right endpoint.

Advanced Trigonometric Equations

Factor or rewrite first, list every solution in the requested scope, and reject values where the original equation is undefined.

5. Solve $\sin(3(x - \pi/2))=0$ for all real x .

Assumptions: General solutions use integer n and retain all original undefined points.

6. Solve $\tan(2(x - \pi/4))=0$ for all real x .

Assumptions: General solutions use integer n and retain all original undefined points.

Advanced Trigonometric Equations

Factor or rewrite first, list every solution in the requested scope, and reject values where the original equation is undefined.

7. Solve $\tan((x - 11\pi/12))[\tan((x - 11\pi/12))-1]=0$ on $0 \leq x < 2\pi$.

Assumptions: The interval is half-open, so include its left endpoint and exclude its right endpoint.

8. Solve $\sin(2(x - 2\pi/3))=0$ on $0 \leq x < 2\pi$.

Assumptions: The interval is half-open, so include its left endpoint and exclude its right endpoint.

Math Sheet

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Advanced Trigonometric Equations

Worked Answer Key

Factor or rewrite first, list every solution in the requested scope, and reject values where the original equation is undefined.

1. Solve $\cos(3(x - 5\pi/12))=0$ for all real x .

Answer: $x = 7\pi/12 + 2n\pi$; $x = 11\pi/12 + 2n\pi$; $x = 5\pi/4 + 2n\pi$; $x = 19\pi/12 + 2n\pi$; $x = 23\pi/12 + 2n\pi$; $x = 9\pi/4 + 2n\pi$

1. Let u equal the displayed shifted argument, then rewrite or factor to isolate standard trig values.
2. Add the phase shift to every base solution and repeat each family after one full turn; n is any integer.

2. Solve $\cos(2(x - \pi/12))=0$ on $0 \leq x < 2\pi$.

Answer: $11\pi/6$, $4\pi/3$, $5\pi/6$, $\pi/3$

1. Let u equal the displayed shifted argument, then rewrite or factor to isolate standard trig values.
2. List every shifted solution in $0 \leq x < 2\pi$.

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Advanced Trigonometric Equations

Worked Answer Key

Factor or rewrite first, list every solution in the requested scope, and reject values where the original equation is undefined.

3. Solve $\cos(x - 3\pi/4)[2\cos(x - 3\pi/4) - 1] = 0$ on $0 \leq x < 2\pi$.

Answer: $13\pi/12, 5\pi/12, 5\pi/4, \pi/4$

1. Let u equal the displayed shifted argument, then rewrite or factor to isolate standard trig values.
2. List every shifted solution in $0 \leq x < 2\pi$.

4. Solve $2\cos^2(x - 5\pi/6) + \cos(x - 5\pi/6) - 1 = 0$ on $0 \leq x < 2\pi$.

Answer: $11\pi/6, 7\pi/6, \pi/2$

1. Let u equal the displayed shifted argument, then rewrite or factor to isolate standard trig values.
2. List every shifted solution in $0 \leq x < 2\pi$.

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Advanced Trigonometric Equations

Worked Answer Key

Factor or rewrite first, list every solution in the requested scope, and reject values where the original equation is undefined.

5. Solve $\sin(3(x - \pi/2))=0$ for all real x .

Answer: $x = \pi/2 + 2n\pi$; $x = 5\pi/6 + 2n\pi$; $x = 7\pi/6 + 2n\pi$; $x = 3\pi/2 + 2n\pi$; $x = 11\pi/6 + 2n\pi$; $x = 13\pi/6 + 2n\pi$

1. Let u equal the displayed shifted argument, then rewrite or factor to isolate standard trig values.
2. Add the phase shift to every base solution and repeat each family after one full turn; n is any integer.

6. Solve $\tan(2(x - \pi/4))=0$ for all real x .

Answer: $x = \pi/4 + 2n\pi$; $x = 3\pi/4 + 2n\pi$; $x = 5\pi/4 + 2n\pi$; $x = 7\pi/4 + 2n\pi$

1. Let u equal the displayed shifted argument, then rewrite or factor to isolate standard trig values.
2. Add the phase shift to every base solution and repeat each family after one full turn; n is any integer.
3. Exclude every value coterminal with the listed undefined values of the original tangent expression.

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Advanced Trigonometric Equations

Worked Answer Key

Factor or rewrite first, list every solution in the requested scope, and reject values where the original equation is undefined.

7. Solve $\tan((x - 11\pi/12))[\tan((x - 11\pi/12)) - 1] = 0$ on $0 \leq x < 2\pi$.

Answer: $11\pi/12, 23\pi/12, 7\pi/6, \pi/6$

1. Let u equal the displayed shifted argument, then rewrite or factor to isolate standard trig values.
2. List every shifted solution in $0 \leq x < 2\pi$.
3. Check the original equation and exclude $17\pi/12, 5\pi/12$ where tangent is undefined.

8. Solve $\sin(2(x - 2\pi/3)) = 0$ on $0 \leq x < 2\pi$.

Answer: $2\pi/3, 5\pi/3, 7\pi/6, \pi/6$

1. Let u equal the displayed shifted argument, then rewrite or factor to isolate standard trig values.
2. List every shifted solution in $0 \leq x < 2\pi$.