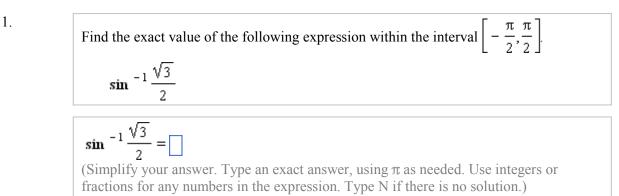
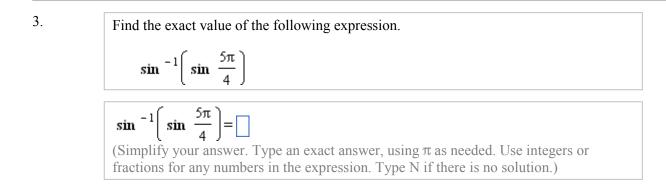
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Use a calculator to find the value of the following expression rounded to two decimal places.

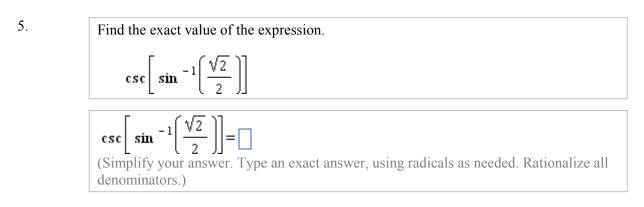
 $\cos^{-1}\frac{2}{3}$

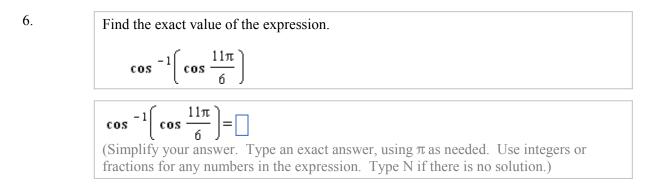


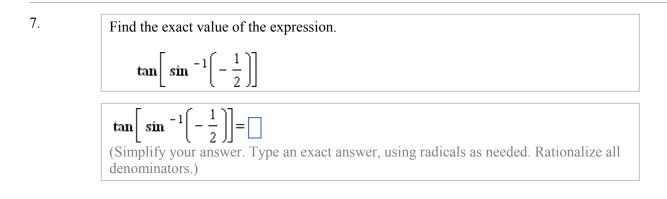


4. Find the exact value, if any, of the composite function. Do not use a calculator. $\cos\left(\cos^{-1}\frac{7}{9}\right)$ $\cos\left(\cos^{-1}\frac{7}{9}\right) = \left[\text{(Type N if there is no solution.)} \right]$

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Multiply $\frac{\sin \theta}{1 - \cos \theta}$ by $\frac{1 + \cos \theta}{1 + \cos \theta}$. Type your answer in terms of sine and/or cosine. $\frac{\sin \theta}{1 - \cos \theta} \cdot \frac{1 + \cos \theta}{1 + \cos \theta} = \square \text{ (Simplify your answer.)}$

10.

Maltinlas and simulifi	$(\sin\theta + \cos\theta)(\sin\theta + \cos\theta) - 1$	
Multiply and simplify	sin θ cos θ	
$(\sin\theta + \cos\theta)(\sin\theta)$	$\theta + \cos \theta - 1$	
· / ·		
sin 8 cos	θ = []	

11.

Establish the identity.

 $(\tan \theta + \cot \theta) \sin \theta = \sec \theta$

Which of the following shows the key steps in establishing the identity? OA. $(\tan \theta + \cot \theta) \sin \theta = \left(\frac{\sin^2 \theta + \cos^2 \theta}{\cos \theta \sin \theta}\right) \sin \theta = \cot \theta + 1 = \sec \theta$ OB. $(\tan \theta + \cot \theta) \sin \theta = \sin \theta \tan \theta + \sin \theta \left(\frac{\sec \theta}{\sin \theta}\right) = \cot \theta + 1 = \sec \theta$ OC. $(\tan \theta + \cot \theta) \sin \theta = \left(\frac{\sin^2 \theta + \cos^2 \theta}{\cos \theta \sin \theta}\right) \sin \theta = \left(\frac{1}{\cos \theta \sin \theta}\right) \sin \theta = \sec \theta$ OD. $(\tan \theta + \cot \theta) \sin \theta = \left(\frac{\sin^2 \theta \cos^2 \theta}{\cos \theta \sin \theta}\right) \sin \theta = \left(\frac{1}{\cos \theta \sin \theta}\right) \sin \theta = \sec \theta$

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12. Establish the identity.

 $(\sec \theta + \tan \theta) (\sec \theta - \tan \theta) = 1$

Which of the following statements establishes the identity?

$$OA. (\sec \theta + \tan \theta)(\sec \theta - \tan \theta) = \tan^2 \theta - \sec^2 \theta = 1$$

$$OB. (\sec \theta + \tan \theta)(\sec \theta - \tan \theta) = \left(\frac{1}{\cos \theta} + \frac{1}{\cot \theta}\right) \left(\frac{1}{\cos \theta} - \frac{1}{\cot \theta}\right)$$

$$= \left(\frac{1}{\cos \theta \cot \theta}\right) \left(\frac{1}{\cos \theta \cot \theta}\right) = 1$$

$$OC. (\sec \theta + \tan \theta)(\sec \theta - \tan \theta) = \sec^2 \theta - 2 \sec \theta \tan \theta - \tan^2 \theta = 1$$

$$OD. (\sec \theta + \tan \theta)(\sec \theta - \tan \theta) = \sec^2 \theta - \tan^2 \theta = 1$$

13.

Establish the identity. $\frac{2 \csc \theta}{\sec \theta} + \frac{3 \cos \theta}{\sin \theta} = 5 \cot \theta$

Which of the following statements establishes the identity?

<u>О</u> А.	$\frac{2\csc\theta}{\sec\theta} + \frac{1}{2}$	=	$\frac{2/\cos\theta}{1/\sin\theta} +$	$\frac{3\cos\theta}{\sin\theta} =$	$\frac{2\sin\theta}{\cos\theta} + \frac{3\theta}{s}$	cos θ in θ = 2 cot θ + 3 cot θ = 5 cot θ
ОВ.	$\frac{2\csc\theta}{\sec\theta} + \frac{1}{2}$		$\frac{2/\sin\theta}{1/\cos\theta} +$	$\frac{3\cos\theta}{\sin\theta} =$	$\frac{2\sin\theta}{\cos\theta} + \frac{3\theta}{s}$	cos θ in θ = 2 cot θ + 3 cot θ = 5 cot θ
<mark>0</mark> C.	$\frac{2\csc\theta}{\sec\theta} + \frac{1}{2}$		$\frac{2/\sin\theta}{1/\cos\theta} +$		$\frac{2\cos\theta}{\sin\theta} + \frac{3\theta}{\sin\theta}$	cos θ in θ = 2 cot θ + 3 cot θ = 5 cot θ
OD.	$\frac{2\csc\theta}{\sec\theta} + \frac{1}{2}$	$\frac{3\cos\theta}{\sin\theta} =$	$\frac{2/\cos\theta}{1/\sin\theta} +$	$\frac{3\cos\theta}{\sin\theta} =$		cos θ in θ = 2 cot θ + 3 cot θ = 5 cot θ

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Establish the identity.

$$\frac{\csc \theta - \sin \theta}{\csc \theta + \sin \theta} = \frac{\cos^2 \theta}{1 + \sin^2 \theta}$$

Which of the following statements establishes the identity? (A, B, C, or D)

<u></u> ∧.	$\frac{\csc\theta - \sin\theta}{\csc\theta + \sin\theta} =$	$\frac{\frac{1}{\sin\theta} - \sin\theta}{\frac{1}{\sin\theta} + \sin\theta} =$	$\frac{\frac{1-\cos^2\theta}{\cos\theta}}{\frac{1+\cos^2\theta}{\cos\theta}} = \frac{1-\sin^2\theta}{1+\sin^2\theta} = \frac{\cos^2\theta}{1+\sin^2\theta}$
ОВ.	$\frac{\csc\theta - \sin\theta}{\csc\theta + \sin\theta} =$	$\frac{\frac{1}{\cos\theta} - \cos\theta}{\frac{1}{\cos\theta} + \cos\theta} =$	$\frac{\frac{1-\sin^2\theta}{\sin\theta}}{\frac{1+\sin^2\theta}{\sin\theta}} = \frac{1-\sin^2\theta}{1+\sin^2\theta} = \frac{\cos^2\theta}{1+\sin^2\theta}$
○ C.	$\frac{\csc\theta - \sin\theta}{\csc\theta + \sin\theta} =$	$\frac{\frac{1}{\cos\theta} - \cos\theta}{\frac{1}{\cos\theta} + \cos\theta} =$	$\frac{\frac{1-\cos^2\theta}{\cos\theta}}{\frac{1+\cos^2\theta}{\cos\theta}} = \frac{1-\sin^2\theta}{1+\sin^2\theta} = \frac{\cos^2\theta}{1+\sin^2\theta}$
OD.	$\frac{\csc\theta - \sin\theta}{\csc\theta + \sin\theta} =$	$\frac{\frac{1}{\sin\theta} - \sin\theta}{\frac{1}{\sin\theta} + \sin\theta} =$	$\frac{\frac{1-\sin^2\theta}{\sin\theta}}{\frac{1+\sin^2\theta}{\sin\theta}} = \frac{1-\sin^2\theta}{1+\sin^2\theta} = \frac{\cos^2\theta}{1+\sin^2\theta}$

15.

Use a sum or difference formula to find the exact value of the trigonometric function.

sin 75°

16.

Find the exact value of the expression.

sin 40° cos 5°+ cos 40° sin 5°

 $\sin 40^\circ \cos 5^\circ + \cos 40^\circ \sin 5^\circ =$

(Type an exact answer, using radicals as needed.)

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 (a) sin (α+β) (b) cos (α+β) (c) sin (α-β) (d) tan (a) sin (α+β) = [] (Type an exact answer using radicals as needed. Use integers or fraction numbers in the expression. Simplify your answer.) (b) cos (α+β) = []	
(Type an exact answer using radicals as needed. Use integers or fraction numbers in the expression. Simplify your answer.)	
(Type an exact answer using radicals as needed. Use integers or fraction numbers in the expression. Simplify your answer.)	
(c) $\sin(\alpha - \beta) = $ (Type an exact answer using radicals as needed. Use integers or fraction numbers in the expression. Simplify your answer.)	ons for ar

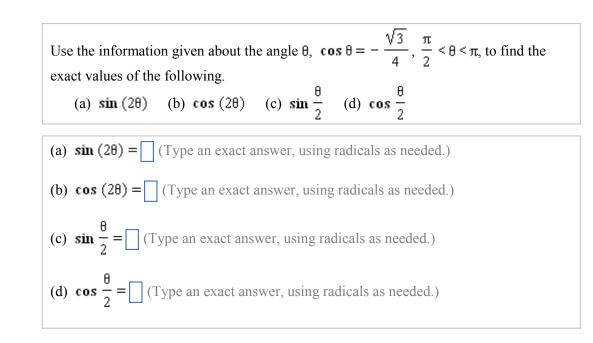
Establish the identity.

$$\cos\left(\frac{3\pi}{2}+\theta\right) = \sin\theta$$

Choose the sequence of steps below that verifies the identity.

$$\begin{array}{l} \bigcirc A. \\ \cos\left(\frac{3\pi}{2} + \theta\right) = \cos\frac{\pi}{2}\cos\theta + \sin\frac{\pi}{2}\sin\theta = (0)\cos\theta + (1)\sin\theta = \sin\theta \\ \bigcirc B. \\ \cos\left(\frac{3\pi}{2} + \theta\right) = \cos\frac{\pi}{2}\cos\theta - \sin\frac{\pi}{2}\sin\theta = (0)\cos\theta - (1)\sin\theta = \sin\theta \\ \bigcirc C. \\ \cos\left(\frac{3\pi}{2} + \theta\right) = \cos\frac{3\pi}{2}\cos\theta + \sin\frac{3\pi}{2}\sin\theta = (0)\cos\theta + (-1)\sin\theta = \sin\theta \\ \bigcirc D. \\ \cos\left(\frac{3\pi}{2} + \theta\right) = \cos\frac{3\pi}{2}\cos\theta - \sin\frac{3\pi}{2}\sin\theta = (0)\cos\theta - (-1)\sin\theta = \sin\theta \end{array}$$

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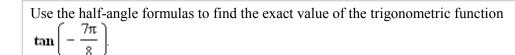
Use the half-angle formulas to find the exact value of the trigonometric function **sin** 112.5°.



(Simplify your answer, including any radicals. Use integers or fractions for any numbers in the expression.)

21.

20.



$$\tan\left(-\frac{7\pi}{8}\right) = \square$$

(Simplify your answer, including any radicals. Use integers or fractions for any numbers in the expression.)

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Establish the identity.

 $2\sin^{3}\theta\cos\theta + 2\sin\theta\cos^{3}\theta = \sin(2\theta)$

Choose the sequence of steps below that verifies the identity.

```
\bigcirc A. 2\sin^{3}\theta\cos\theta + 2\sin\theta\cos^{3}\theta = (2\cos^{2}\theta + \sin^{2}\theta)(\sin\theta\cos\theta) = 1 \cdot \sin(2\theta) = \sin(2\theta)

\bigcirc B. 2\sin^{3}\theta\cos\theta + 2\sin\theta\cos^{3}\theta = (\cos^{2}\theta + \sin^{2}\theta)(2\sin\theta\cos\theta) = 1 \cdot \sin(2\theta) = \sin(2\theta)

\bigcirc C. 2\sin^{3}\theta\cos\theta + 2\sin\theta\cos^{3}\theta = (\cos^{2}\theta + \sin^{2}\theta)(2\sin^{2}\theta + 1) = 1 \cdot \sin(2\theta) = \sin(2\theta)

\bigcirc D. 2\sin^{3}\theta\cos\theta + 2\sin\theta\cos^{3}\theta = (\cos^{2}\theta - \sin^{2}\theta)(2\sin\theta\cos\theta) = 1 \cdot \sin(2\theta) = \sin(2\theta)
```

23.

Express the given product as a sum containing only sines or cosines.

cos (78) **cos** (98)

cos (78) cos (98) =

(Simplify your answer, including any radicals. Use integers or fractions for any numbers in the expression.)

24.

Express the given sum or difference as a product of sines and/or cosines.

 $\cos\frac{\theta}{2} - \cos\frac{7\theta}{2}$

$$\cos\frac{\theta}{2} - \cos\frac{7\theta}{2} =$$

(Simplify your answer, including any radicals. Use integers or fractions for any numbers in the expression.)

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Establish the identity.

 $\frac{\cos \theta + \cos (3\theta)}{2 \cos (2\theta)} = \cos \theta$

Choose the correct sequence of steps to establish the identity.

OA.	$\frac{\cos \theta + \cos (3\theta)}{2}$	$=\frac{2\sin\left(2\theta\right)\sin\theta}{\cos\theta}=\cos\theta$
	2 cos (28)	$\frac{1}{2\cos(2\theta)} = \cos\theta$
ОВ.	$\cos\theta + \cos(3\theta)$	$=\frac{2\sin\left(2\theta\right)\cos\theta}{2\cos\theta}=\cos\theta$
	2 cos (28)	2 cos (28)
OC.	$\cos\theta + \cos(3\theta)$	$=\frac{2\cos\left(2\theta\right)\cos\theta}{\cos\theta}=\cos\theta$
	2 cos (28)	2 cos (28)
OD.	<u>cos θ + cos (3θ)</u>	$= \frac{-2\sin\theta\cos\left(2\theta\right)}{\cos\theta} = \cos\theta$
	2 cos (28)	2 cos (28)

26.

Establish the identity
$$\frac{\sin(\vartheta\theta) + \sin(\vartheta\theta)}{\cos(\vartheta\theta) + \cos(\vartheta\theta)} = \tan(\theta\theta).$$

Which of the following statements establishes the identity?

$$\begin{array}{l} \bigcirc A. \\ \frac{\sin(8\theta) + \sin(4\theta)}{\cos(8\theta) + \cos(4\theta)} = \frac{2 \sin \frac{8\theta + 4\theta}{2} \cos \frac{8\theta - 4\theta}{2}}{2 \cos \frac{8\theta - 4\theta}{2} \cos \frac{8\theta - 4\theta}{2}} = \frac{\sin \frac{8\theta + 4\theta}{2}}{\cos \frac{8\theta + 4\theta}{2}} = \tan(6\theta) \\ \hline B. \\ \frac{\sin(8\theta) + \sin(4\theta)}{\cos(8\theta) + \cos(4\theta)} = \frac{2 \sin \frac{8\theta - 4\theta}{2} \cos \frac{8\theta + 4\theta}{2}}{2 \cos \frac{8\theta - 4\theta}{2} \cos \frac{8\theta + 4\theta}{2}} = \frac{\sin \frac{8\theta - 4\theta}{2}}{\cos \frac{8\theta - 4\theta}{2}} = \tan(6\theta) \\ \hline C. \\ \frac{\sin(8\theta) + \sin(4\theta)}{\cos(8\theta) + \cos(4\theta)} = \frac{2 \sin \frac{8\theta - 4\theta}{2} \cos \frac{8\theta + 4\theta}{2} \cos \frac{8\theta + 4\theta}{2}}{2 \cos \frac{8\theta - 4\theta}{2} \cos \frac{8\theta + 4\theta}{2}} = \frac{\sin \frac{8\theta - 4\theta}{2}}{\cos \frac{8\theta - 4\theta}{2}} = \tan(6\theta) \\ \hline \end{array}$$

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1.	$\frac{\pi}{3}$		
2.	0.84		
3.	$-\frac{\pi}{4}$		
4.	7 9		
5.	$\sqrt{2}$		
6.	<u>π</u> 6		
7.	$-\frac{\sqrt{3}}{3}$		
8.	$\frac{\sqrt{155}}{31}$		
9.	$\frac{1+\cos\theta}{\sin\theta}$		
10.	2		
11.	С		
12.	D		
13.	С		
14.	D		
15.	$\frac{1}{4}(\sqrt{6}+\sqrt{2})$		

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16.	$\frac{\sqrt{2}}{2}$		
17.	$ \frac{12 - 3\sqrt{7}}{20} \\ -9 - 4\sqrt{7} \\ \frac{20}{12 + 3\sqrt{7}} \\ \frac{20}{12 + 3\sqrt{7}} \\ -\frac{12 + 3\sqrt{7}}{9 - 4\sqrt{7}} $		
18.	D		
19.	$-\frac{\sqrt{39}}{8} \\ -\frac{5}{8} \\ \frac{1}{2}\sqrt{\frac{4+\sqrt{3}}{2}} \\ \frac{1}{2}\sqrt{\frac{4-\sqrt{3}}{2}} \\ \frac{1}{2}\sqrt{\frac{4-\sqrt{3}}{2}} $		
20.	$\frac{\sqrt{2+\sqrt{2}}}{2}$		
21.	$\sqrt{2} - 1$		
22.	В		
23.	$\frac{1}{2} \left[\cos \left(2\theta \right) + \cos \left(16\theta \right) \right]$		
24.	$2 \sin (2\theta) \sin \frac{3\theta}{2}$		
25.	С		
26.	А		