Use a sum or difference identity to find the exact value of the trigonometric expression without the use of a calculator.

tan (75°)

tan (75°) = ☐
(Simplify your answer, including any radicals. Use integers or fractions for any numbers in the expression. Do not factor.)

1.

Write the product as the sum or difference containing only sines or cosines.

sin (7θ) **cos** (2θ)

sin (7θ) **cos** (2θ) = ☐
(Simplify your answer. Use integers or fractions for any numbers in the expression.)

2.

Find the exact value of the trigonometric expression without the use of a calculator.

cos (150° + 225°)

cos (150° + 225°) = ☐
(Simplify your answer, including any radicals. Use integers or fractions for any numbers in the expression. Do not factor.)

3.

Find the exact value of the trigonometric expression without the use of a calculator.

$$\sin\left(\tan^{-1}(-1)+\cos^{-1}\left(\frac{\sqrt{3}}{2}\right)\right)$$

$\sin\left(\tan^{-1}(-1)+\cos^{-1}\left(\frac{\sqrt{3}}{2}\right)\right)=$ ☐

(Simplify your answer, including any radicals. Use integers or fractions for any numbers in the expression. Do not factor.)

4.

Rewrite the expression as the sine, cosine, or tangent of a double-angle. Then find the exact value of the trigonometric expression without the use of a calculator.

$$1-2\sin^2\left(\frac{-11\pi}{12}\right)$$

Use the appropriate double-angle formula to rewrite the given expression as the sine, cosine, or tangent of the corresponding double-angle.

$1-2\sin^2\left(\frac{-11\pi}{12}\right)=$ ☐

(Do not evaluate. Use integers or fractions for any numbers in the expression. Type your answer in radians.)

Find the exact value of the trigonometric expression without the use of a calculator.

$1-2\sin^2\left(\frac{-11\pi}{12}\right)=$ ☐

(Use integers or fractions for any numbers in the expression. Type an exact answer, using radicals as needed.)

5.

Use the given information to determine the values of $\sin 2\theta$, $\cos 2\theta$, and $\tan 2\theta$.

$\sin\theta=\frac{3}{4}$; The terminal side of θ lies in quadrant II.

$\sin 2\theta =$ ☐

(Simplify your answer. Type an exact answer, using radicals as needed. Use integers or fractions for any numbers in the expression.)

$\cos 2\theta =$ ☐

(Simplify your answer. Type an exact answer, using radicals as needed. Use integers or fractions for any numbers in the expression.)

$\tan 2\theta =$ ☐

(Simplify your answer. Type an exact answer, using radicals as needed. Use integers or fractions for any numbers in the expression.)

6.

Use a half-angle formula to evaluate the expression without using a calculator.

$$\sec\left(-\frac{17\pi}{12}\right)$$

a. What is the measure of the half-angle $\frac{\alpha}{2}$?

$\frac{\alpha}{2} = \square$

(Type an exact answer in terms of π. Use integers or fractions for any numbers in the expression.)

b. What is the measure of angle α?

$\alpha = \square$

(Type an exact answer in terms of π. Use integers or fractions for any numbers in the expression.)

c. The terminal side of the half-angle $\frac{\alpha}{2}$ lies in Quadrant [ ]

d. Is the secant function (and cosine function) positive or negative in this quadrant?

The secant function (and cosine function) are [ ] in this quadrant.

e. Which half-angle formula should be used to evaluate the expression $\sec\left(-\frac{17\pi}{12}\right)$?

The half-angle formula [ ] should be used to evaluate the expression $\sec\left(-\frac{17\pi}{12}\right)$.

f. Choose the correct formula below used to evaluate the expression $\sec\left(-\frac{17\pi}{12}\right)$ and complete the expression in the numerator of the expression under the radical.

(Type an exact answer, using radicals as needed. Use integers or fractions for any numbers in the expression.)

○ A. $\sec\left(-\frac{17\pi}{12}\right) = \frac{1}{\sqrt{\frac{\square}{2}}}$

○ B. $\sec\left(-\frac{17\pi}{12}\right) = -\frac{1}{\sqrt{\frac{\square}{2}}}$

g. Completely simplify the expression from part **f**.

$\sec\left(-\frac{17\pi}{12}\right) = \square$

(Type an exact answer, using radicals as needed. Use integers or fractions for any numbers in the expression.)

7.

Verify the identity.

$$\frac{\sec t - 1}{\tan t} = \frac{\tan t}{\sec t + 1}$$

Choose the sequence of steps below that verifies the identity.

○ A. $\frac{\sec t - 1}{\tan t} = \frac{\sec t - 1}{\tan t} \cdot \frac{\sec t - 1}{\sec t - 1} = \frac{\sec^2 t - 1}{\tan t(\sec t + 1)} = \frac{\tan^2 t}{\tan t(\sec t + 1)} = \frac{\tan t}{\sec t + 1}$

○ B. $\frac{\sec t - 1}{\tan t} = \frac{\sec t - 1}{\tan t} \cdot \frac{\sec t + 1}{\sec t + 1} = \frac{\sec^2 t - 1}{\tan t(\sec t + 1)} = \frac{\tan^2 t}{\tan t(\sec t + 1)} = \frac{\tan t}{\sec t + 1}$

○ C. $\frac{\sec t - 1}{\tan t} = \frac{\sec t - 1}{\tan t} \cdot \frac{\sec t - 1}{\sec t + 1} = \frac{\sec^2 t + 1}{\tan t(\sec t + 1)} = \frac{\tan^2 t}{\tan t(\sec t + 1)} = \frac{\tan t}{\sec t + 1}$

○ D. $\frac{\sec t - 1}{\tan t} = \frac{\sec t - 1}{\tan t} \cdot \frac{\sec t + 1}{\sec t + 1} = \frac{\sec^2 t + 1}{\tan t(\sec t + 1)} = \frac{\tan^2 t}{\tan t(\sec t + 1)} = \frac{\tan t}{\sec t + 1}$

8.