1. \( ABC \) is a right triangle with the right angle at \( A \). Given that \( B = 24^\circ \) and \( b = 12 \text{ cm} \), find \( a \). (two decimal places).

2. In the triangle \( ABC \), \( b = 4.8 \text{ cm} \), \( c = 4.6 \text{ cm} \), and \( A = 54^\circ \). Find \( B \) (two decimal places).

3. Find the exact values of the first three trigonometric functions of an angle of \(-870^\circ\).

4. \( ABC \) is a right triangle with the right angle at \( A \). Given that \( a = 4 \text{ in} \) and \( b = 3 \text{ in} \), find the exact values of \( \tan C \) and \( \cot A \).

5. Find any solution of the equation \( \sec \theta = 1.6843 \) (two decimal places). Show all work.
6. From the top of a lighthouse 110 ft tall, the angle of depression of a small boat on the ocean surface is 35°. Find how far is the boat from the base of the lighthouse (two decimal places).

7. (a) Convert 1350° to radians (exact answer)  
(b) Convert 5 radians to degrees (2 decimals)

8. Two sides of a parallelogram are 12 in and 7 in, and they include an angle of 20°. Find the area of the parallelogram (four decimal places).

9. A hillside makes an angle of 15° with the horizontal, and there is a 100 ft-tall vertical building standing on the top of the hill. From a point 120 ft downhill from the base of the building, along the hill, find the angle of elevation to the top of the building. (two decimal places).

10. In the triangle \( \triangle ABC, A = 20^{\circ}, B = 55^{\circ}, \) and the area of the triangle is equal to 60 sq in. Find \( a \) (four decimal places). Please USE OTHER SIDE.
1. ABC is a right triangle with the right angle at A. Given that $B = 24^\circ$ and $b = 12\, cm$, find $a$.

\[
\sin 24^\circ = \frac{12}{a} \\
\therefore a = \frac{12}{\sin 24^\circ} \\
a \approx 29.50\, cm
\]

2. In the triangle ABC, $b = 4.8\, cm$, $c = 4.6\, cm$, and $A = 54^\circ$. Find $B$ (two decimal places).

\[
\text{Find } a \text{ first}:
\begin{align*}
a^2 &= b^2 + c^2 - 2bc \cos A \\
a^2 &= 4.8^2 + 4.6^2 - 2 \times 4.8 \times 4.6 \times \cos 54^\circ \\
a &= \pm \sqrt{4.8^2 + 4.6^2 - 2 \times 4.8 \times 4.6 \times \cos 54^\circ} \\
a &\approx 4.27\, cm
\end{align*}
\]

\[
\text{Find } B:
\begin{align*}
b^2 &= a^2 + c^2 - 2ac \cos B \\
\cos B &= \frac{a^2 + c^2 - b^2}{2ac} \\
\cos B &= \frac{(4.27\, cm)^2 + 4.6^2 - 4.8^2}{2 \times 4.27\, cm \times 4.6} \\
B &\approx \cos^{-1}(0.41\,...) \approx 65.39^\circ
\end{align*}
\]

3. Find the exact values of the first three trigonometric functions of an angle of $-870^\circ$.

\[
\begin{align*}
\sin(-870^\circ) &= \sin 30^\circ = \frac{1}{2} \\
\cos(-870^\circ) &= \cos 30^\circ = \frac{\sqrt{3}}{2} \\
\tan(-870^\circ) &= \tan 30^\circ = \frac{1}{\sqrt{3}}
\end{align*}
\]

4. ABC is a right triangle with the right angle at A. Given that $a = 4\, in$ and $b = 3\, in$, find the exact values of $\tan C$ and $\cot A$.

\[
\begin{align*}
\text{Find } c \text{ first}:
\begin{align*}
hy^2 &= leg^2 + leg^2 \\
16 &= 9 + c^2 \\
c^2 &= 7 \\
c &= \sqrt{7}
\end{align*}
\end{align*}
\]

\[
\begin{align*}
\therefore \tan C &= \frac{opp}{adj} = \frac{\sqrt{7}}{3} \\
\cot A &= \cot 90^\circ = 0
\end{align*}
\]

5. Find any solution of the equation $\sec \theta = 1.6843$ (two decimal places). Show all work.

\[
\cos \theta = \frac{1}{\sec \theta} = \frac{1}{1.6843} \\
\therefore \theta = \cos^{-1}\left(\frac{1}{1.6843}\right) \\
\theta \approx 53.58^\circ
\]
6. From the top of a lighthouse 110 ft tall, the angle of depression of a small boat on the ocean surface is 35°. Find how far is the boat from the base of the lighthouse (two decimal places).

\[
\tan 35° = \frac{110}{x} \\
x = \frac{110}{\tan 35°} \approx 157.10 \text{ ft}
\]

The boat is about 157.10 ft from the base of the lighthouse.

7. (a) Convert 1350° to radians (exact answer) 

\[
1350° = \frac{15}{180°} \times \frac{\pi}{2} \text{ rad} = 15\pi \text{ rad}
\]

(b) Convert 5 radians to degrees (2 decimals)

\[
5 \text{ rad} = 5 \times 180° = \frac{900°}{\pi} \approx 286.45°
\]

8. Two sides of a parallelogram are 12 in and 7 in, and they include an angle of 20°. Find the area of the parallelogram (four decimal places).

\[
\text{Area of parallelogram} = 2 \left( \text{Area of } \triangle \text{ ABD} \right) \\
= 8 \times \frac{1}{2} \times 12 \times 7 \times \sin 20° \\
= 84 \times \sin 20° \\
\approx 28.7297 \text{ in}^2
\]

9. A hillside makes an angle of 15° with the horizontal, and there is a 100 ft-tall vertical building standing on the top of the hill. From a point 120 ft downhill from the base of the building, along the hill, find the angle of elevation to the top of the building. (two decimal places)

\[
\sin 15° = \frac{BC}{120} \\
BC = 120 \sin 15° \\
BC \approx 31.05828...
\]

\[
\cos 15° = \frac{AB}{120} \\
AB = 120 \cos 15° \\
AB \approx 115.9110932
\]

\[
\tan \theta = \frac{BD}{AB} \\
\theta \approx \frac{131.05828...}{115.9110932} \\
\theta \approx 48.51°
\]

The required angle of elevation is about 48.51°.

10. In the triangle \(ABC\), \(A = 20°, B = 55°\), and the area of the triangle is equal to 60 sq in. Find \(a\) (four decimal places). Please USE OTHER SIDE.
\[ C = 180^\circ - (20^\circ + 55^\circ) = 105^\circ \]

Area \[ \frac{1}{2} ac \sin 55^\circ = 60 \]

\[ \therefore ac = \frac{120}{\sin 55^\circ} \quad (1) \]

\[ \frac{a}{\sin 20^\circ} = \frac{c}{\sin 105^\circ} \]

\[ \therefore c = \frac{a \sin 105^\circ}{\sin 20^\circ} \quad (2) \]

(1) & (2):

\[ \frac{a^2 \sin 105^\circ}{\sin 20^\circ} = \frac{120}{\sin 55^\circ} \]

\[ \therefore a = \pm \sqrt{\frac{120 \sin 20^\circ}{\sin 55^\circ \sin 105^\circ}} \approx 7.2022 \text{ in} \]