II. \( \text{§ 6.5 LOC} \)

A. \( \text{SSS - § 6.5: p. 513: #13} \) Solve.

\[ a = 20, \quad b = 25, \quad c = 22 \]

\[ \text{Soln.:} \]

1. \( \text{Cosine Law:} \)

\[ \cos A = \frac{b^2 + c^2 - a^2}{2bc} \]

2. \[ \cos A = \frac{25^2 + 22^2 - 20^2}{2(25)(22)} \]

\[ = \frac{709}{1100} \]

3. \( \therefore \text{P1C:} \)

\[ A = \cos^{-1} \left( \frac{709}{1100} \right) \approx 49.868^\circ \]

I'll finish at home. Go to page 2.

III. \( \text{Area of Triangle from SSS} \)

Heron's Formula (Hero's Formula)

"s" stands for the semi-perimeter.

1. Calculate semi-perimeter.

\[ s = \frac{1}{2}(a+b+c) \]

2. Area

\[ \text{Area} = \sqrt{s(s-a)(s-b)(s-c)} \]
NAVIGATION.

North

N 30° E

Bearing (Compass Bearing)

N 30° E

AFTER CLASS —

Quiz #2 — Answers

1. cot(\(\frac{\pi}{3}\)) = \(\frac{1}{\sqrt{3}}\) or \(\frac{\sqrt{3}}{3}\)

Work: \(\tan(\frac{\pi}{3}) = \sqrt{3}\)

2. sec(150°) = \(-\frac{1}{\cos(30°)}\) = \(-\frac{2}{\sqrt{3}}\) or \(-\frac{2\sqrt{3}}{3}\)

Let \(\theta = 150°, \phi = 30°\)

\(\theta\) in QI: \(\cos \theta < 0\)

3. \(\sin(750°) = \frac{1}{2}\)

Work: \(A = 750°\)
\(A = 750° - 2(360°)\)
\(= 750° - 720°\)
\(= 30°\) in QI\(\quad \Rightarrow \theta \in QI\)

so \(\sin \theta = \sin \phi = \sin 30°\)

Finish [§ 6.5: p. 513: #13] ... cont.

4. Store \(A = \cos^{-1}(\frac{709}{1100})\) \(\leftarrow\) we stored this in A

5. Now, it is interesting that we could go from here using EITHER LOS or LOC.

Just for fun, let's use LOS. to find C.

\[\frac{\sin C}{C} = \frac{\sin A}{a} \quad \therefore \quad \sin C = \frac{C}{a} \sin A = \frac{22}{20} \sin A \approx 0.8410225918\]

\(C = \sin^{-1}\left(\frac{22}{20} \sin(\cos^{-1}(\frac{709}{1100}))\right) \approx 57.248\) 260 85° \(\approx 57.248°\)

6. \(B = 180° - A - C \approx 72.883\) 342 92° \(\approx 72.883°\)

7. \(a = 20\) \(A \approx 49.868°\)
\(b = 25\) \(B \approx 72.883°\)
\(c = 22\) \(C \approx 57.248°\)

Notice that the "final answer" lists all G metrics of the triangle, even though we already knew 3 of them to begin with!
Example: \([8.0.5: p. 514; \# 28]\) Find the area of the SSS-triangle, \(a=1, b=2, c=2\)

**Solution**

1. Sketch - NTS -

2. Semi-perimeter: \(S = \frac{1}{2} (a+b+c) = \frac{1}{2} (1+2+2) = \frac{5}{2}\)

3. Area: \(\sqrt{S(S-a)(S-b)(S-c)}\)

   \[= \sqrt{\frac{5}{2} \left( \frac{5}{2} - 1 \right) \left( \frac{5}{2} - 2 \right) \left( \frac{5}{2} - 2 \right)} = \sqrt{\frac{5}{2} \cdot \frac{3}{2} \cdot \frac{1}{2} \cdot \frac{1}{2}} = \sqrt{\frac{15}{8}}\]

   \[= \sqrt{\frac{15}{8}} = \sqrt{\frac{30}{16}} = \sqrt{\frac{30}{4}} \text{ units}^2\]

4. Area: \(\frac{\sqrt{30}}{4} \text{ units}^2\)