Exercises 7.5

2. $x^2 = 10^2 + 16^2 - 2 \cdot 10 \cdot 16 \cdot \cos 98° = 100 + 256 - 320 \cos 98° \approx 400.535$ and so $x \approx \sqrt{400.535} \approx 20$.

4. $154.6^2 = 60.1^2 + 122.5^2 - 2 \cdot 60.1 \cdot 122.5 \cdot \cos\theta$. Then $\cos\theta = \dfrac{154.6^2 - 60.1^2 - 122.5^2}{-2 \cdot 60.1 \cdot 122.5}$ $\approx -0.359 \quad \Leftrightarrow \quad \theta \approx \cos^{-1}(-0.359) \approx 111°$.

6. $20^2 = 10^2 + 12^2 - 2 \cdot 10 \cdot 12 \cdot \cos\theta$. Then $\cos\theta = \dfrac{20^2 - 10^2 - 12^2}{-2 \cdot 10 \cdot 12} = \dfrac{156}{-240} = -0.65 \quad \Leftrightarrow$ $\theta \approx \cos^{-1}(-0.65) \approx 130.54°$.

8. $12^2 = 40^2 + 44^2 - 2 \cdot 40 \cdot 44 \cdot \cos B \quad \Leftrightarrow \quad \cos B = \dfrac{12^2 - 40^2 - 44^2}{-2 \cdot 40 \cdot 44} \approx 0.964 \quad \Leftrightarrow$ $\angle B \approx \cos^{-1} 0.964 \approx 15°$. Then $\sin A = \dfrac{40 \cdot \sin 15.5°}{12} \approx 0.891 \quad \Leftrightarrow \quad \angle A \approx \sin^{-1} 0.891 \approx 63°$, and so $\angle C \approx 180° - 15° - 63° = 102°$.