

# Chapter 1

# Trigonometric Functions I



Fig. 1-1: Naming the three sides of a right-angled triangle relative to: (a) angle  $\theta$  , and (b) angle  $\varphi$ .

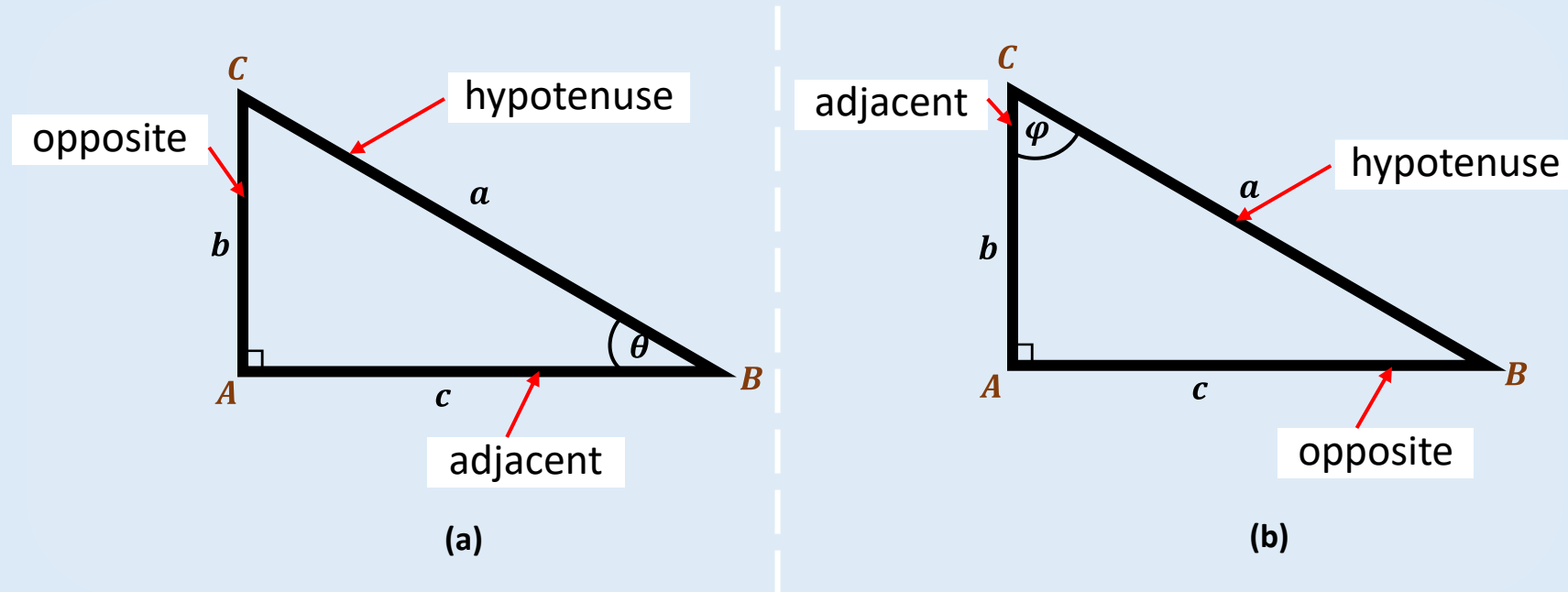


Fig. 1-2: Example 1.

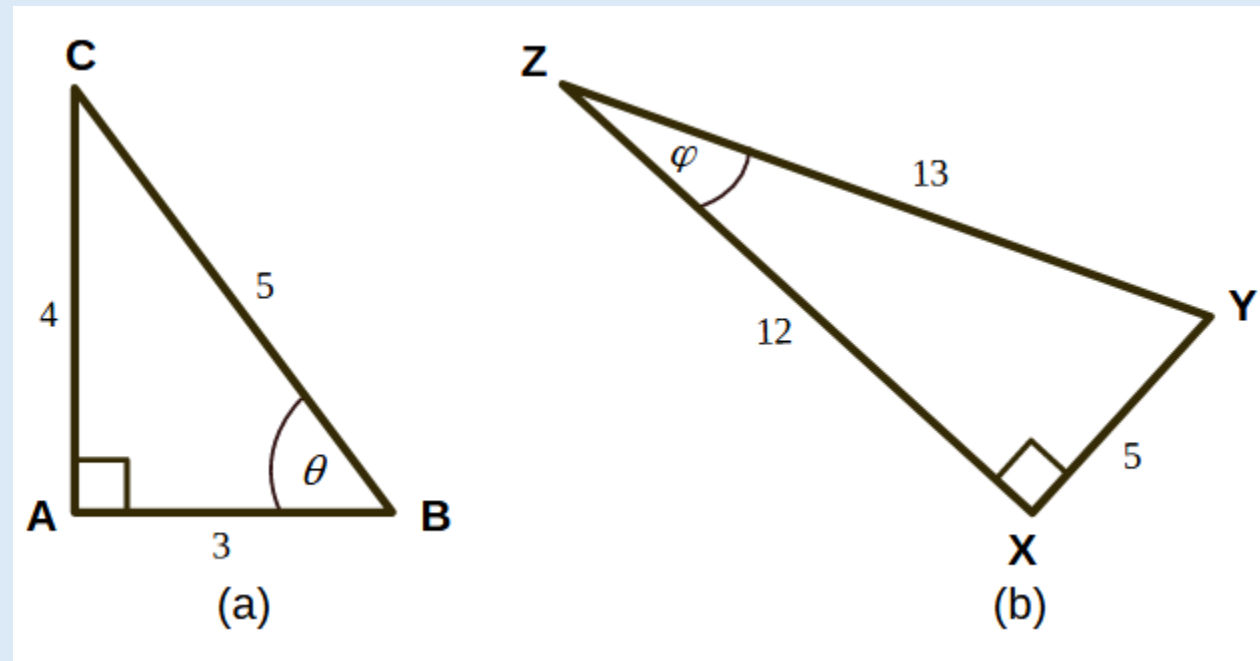


Fig. 1-3: Example 2.

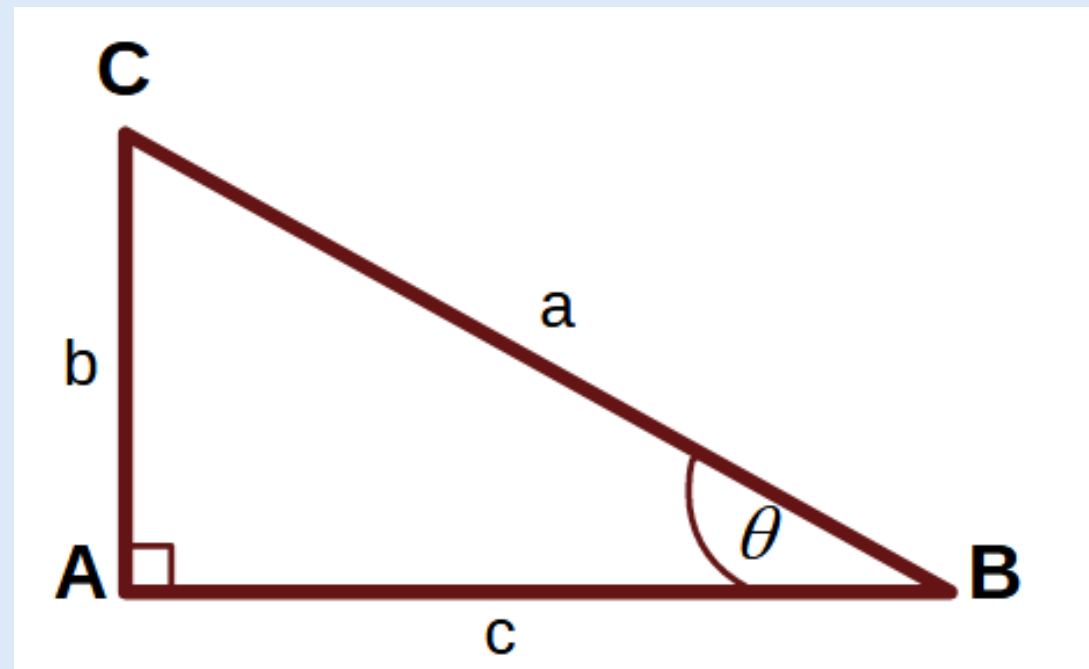


Fig. 1-4: Solution to Example 3.

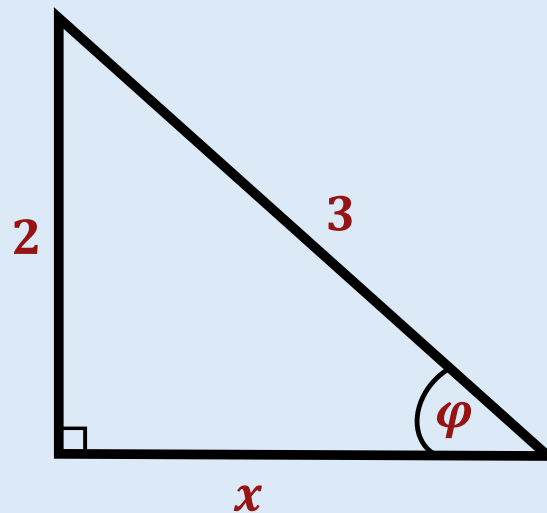
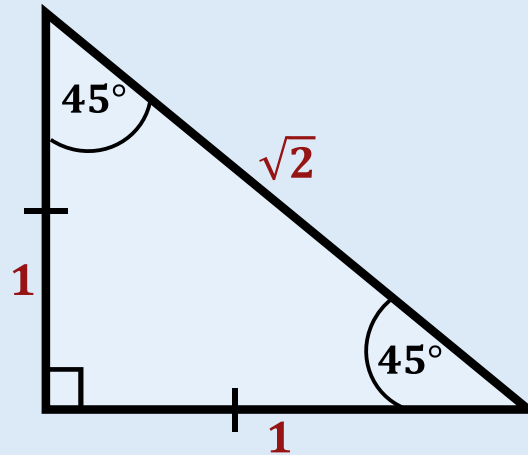


Fig. 1-5: Determining angle  $45^\circ$ .



**Fig. 1-6: Determining angles  $30^\circ$  and  $60^\circ$ .**

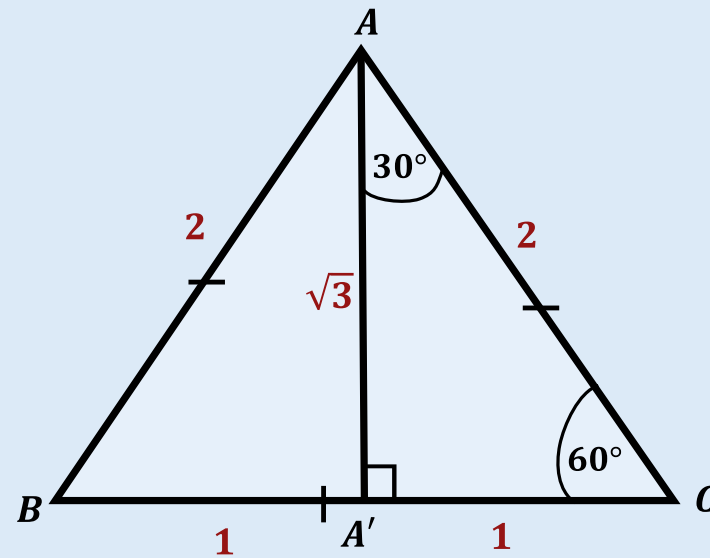


Fig. 1-7: Determining angles  $0^\circ$  and  $90^\circ$ .

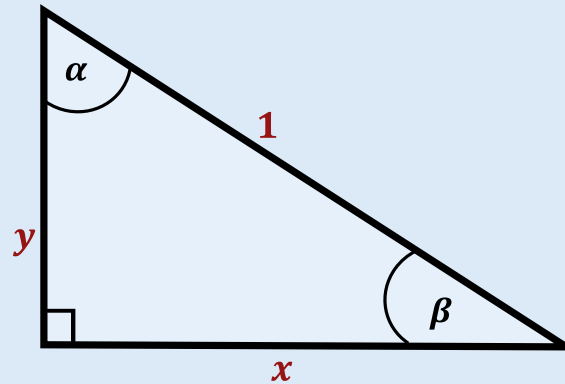




Fig. 1-8: Solution to Example 4(a).

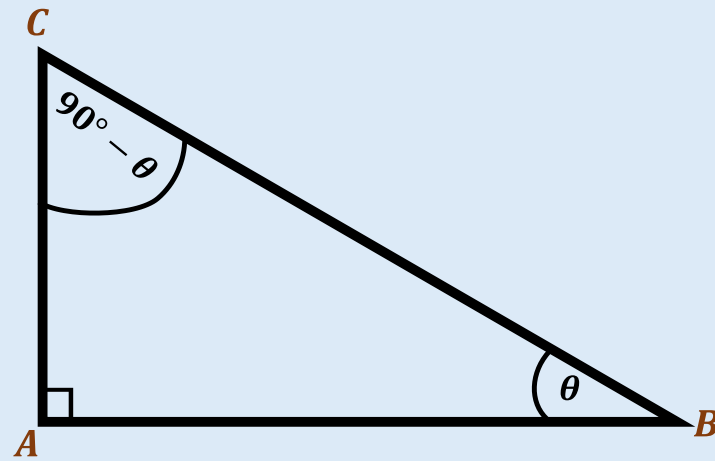


Fig. 1-9: Solution to Example 4(b).

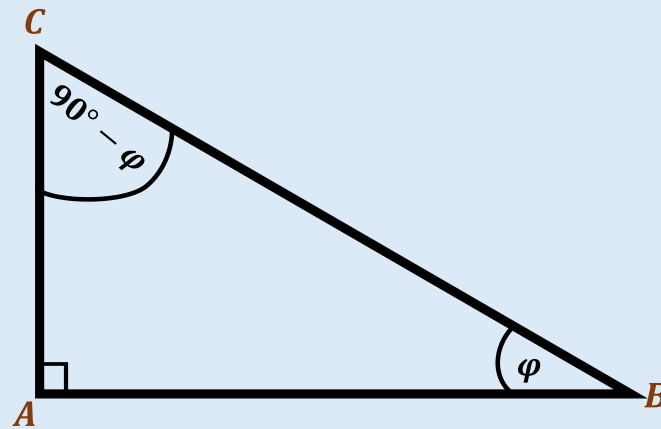
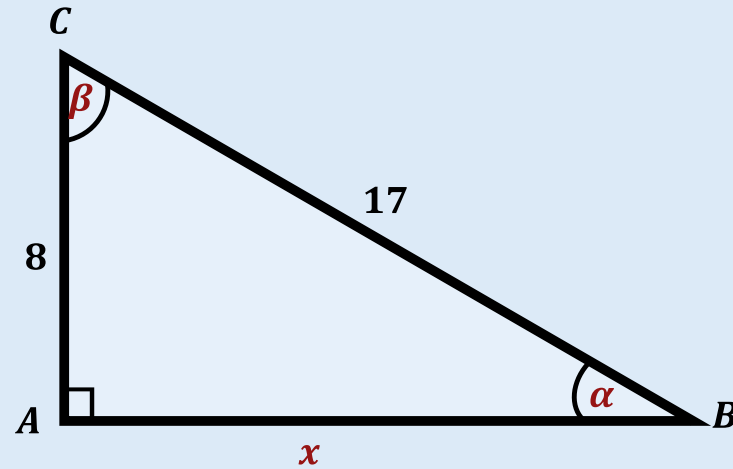
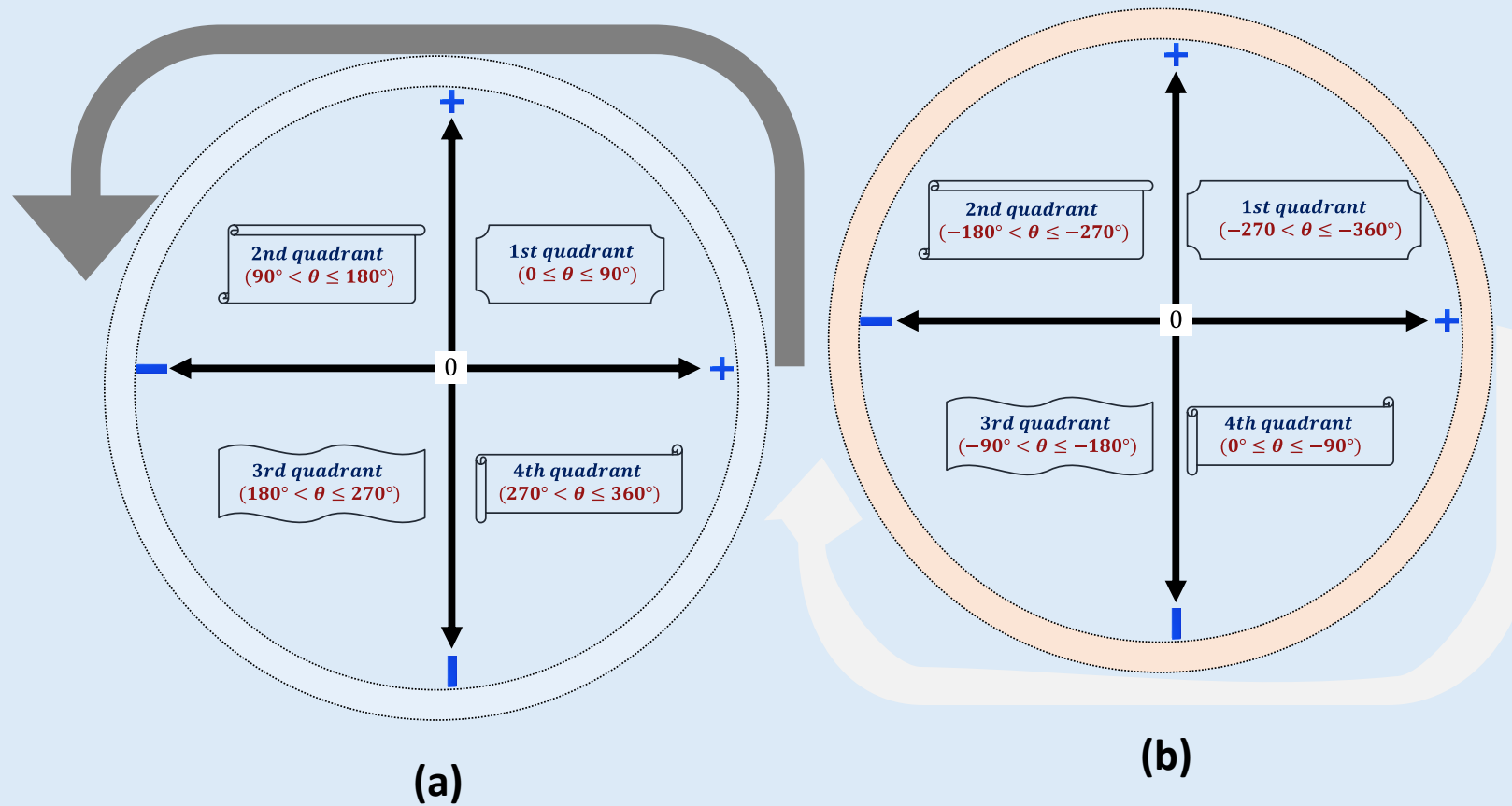


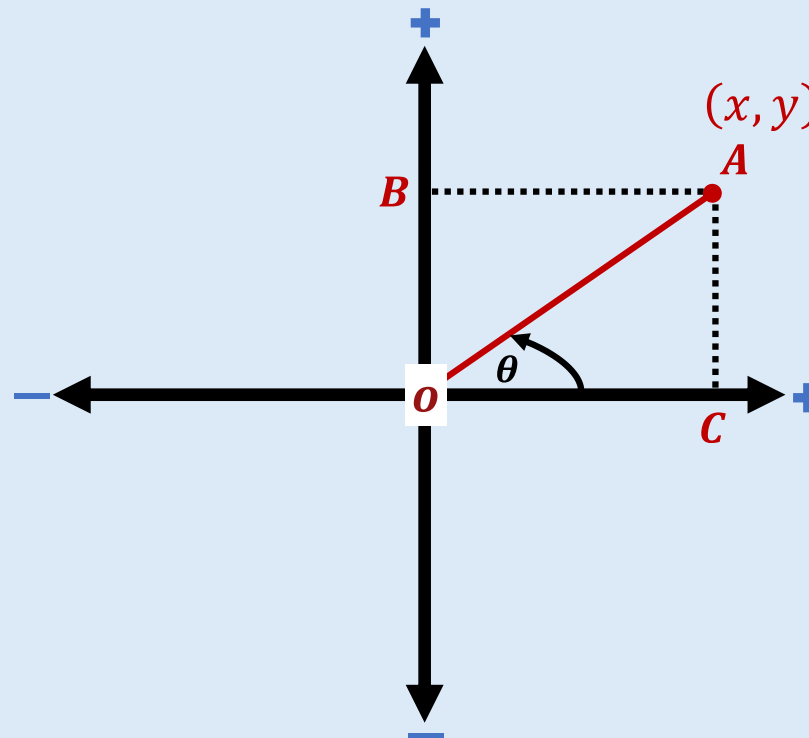
Fig. 1-10: Example 7.



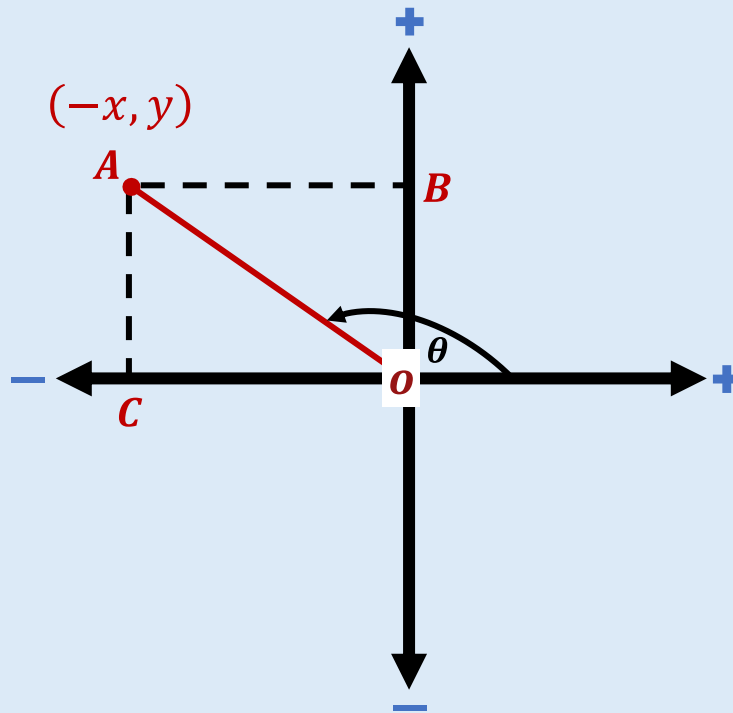
**Fig. 1-11: Four quadrants and their respective angle intervals illustrated (when the angle is measured from the positive x-axis: (a) in an anti-clockwise direction and (b) in a clockwise direction).**



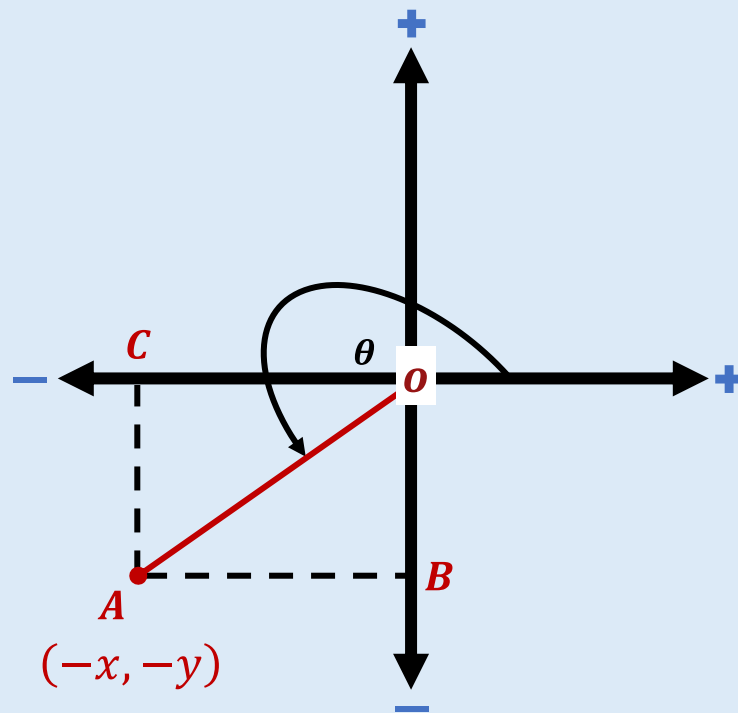
**Fig. 1-12: Determining trigonometric ratios using phasor diagram (first quadrant).**



**Fig. 1-13: Determining trigonometric ratios using phasor diagram (second quadrant).**



**Fig. 1-14: Determining trigonometric ratios using phasor diagram (third quadrant).**



**Fig. 1-15: Determining trigonometric ratios using phasor diagram (fourth quadrant).**

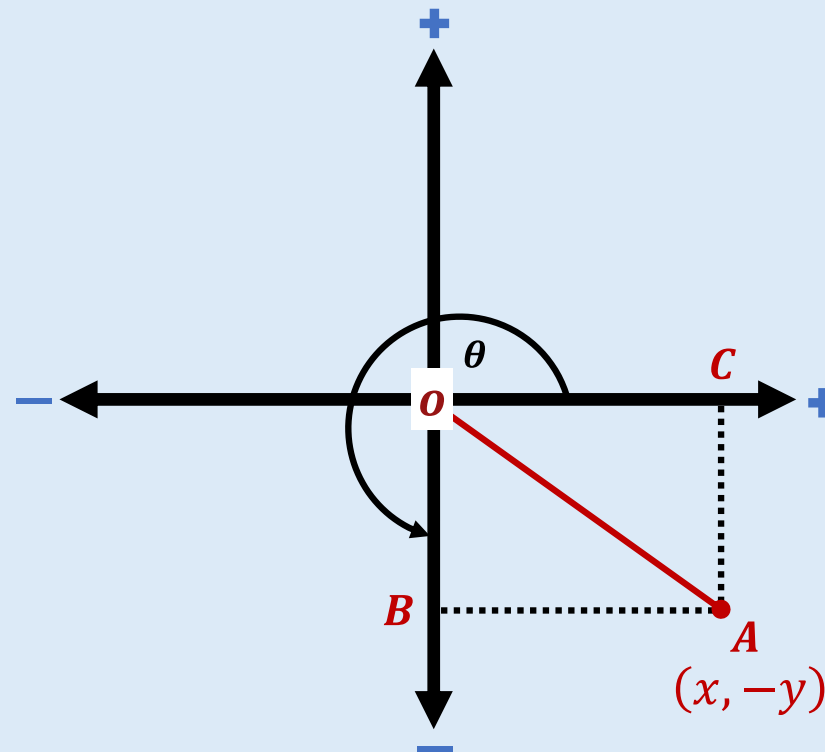
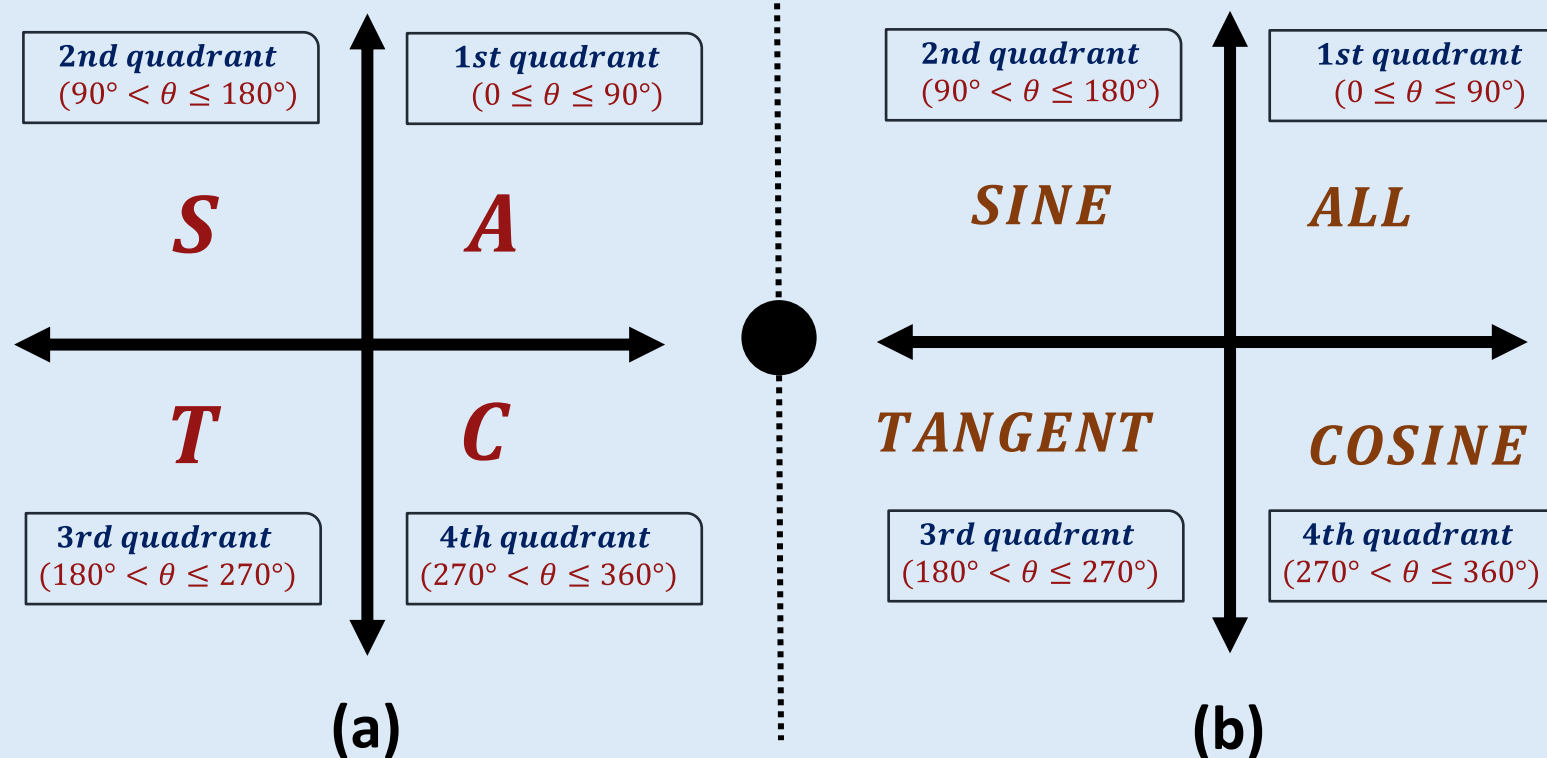




Fig. 1-16: Signs (positive and negative) of the three trigonometric ratios in the four quadrants illustrated.



**Fig. 1-17: Determining trigonometric ratios using phasor diagram (for angles  $0^\circ$ ,  $90^\circ$ ,  $180^\circ$ , and  $360^\circ$ ).**

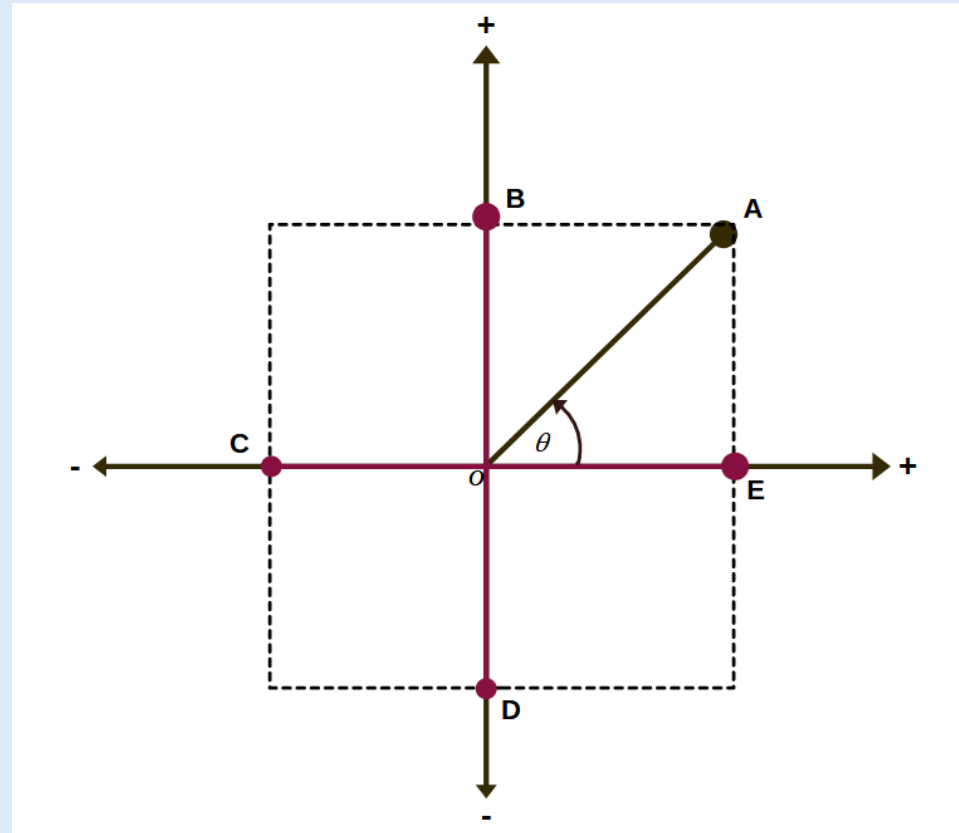
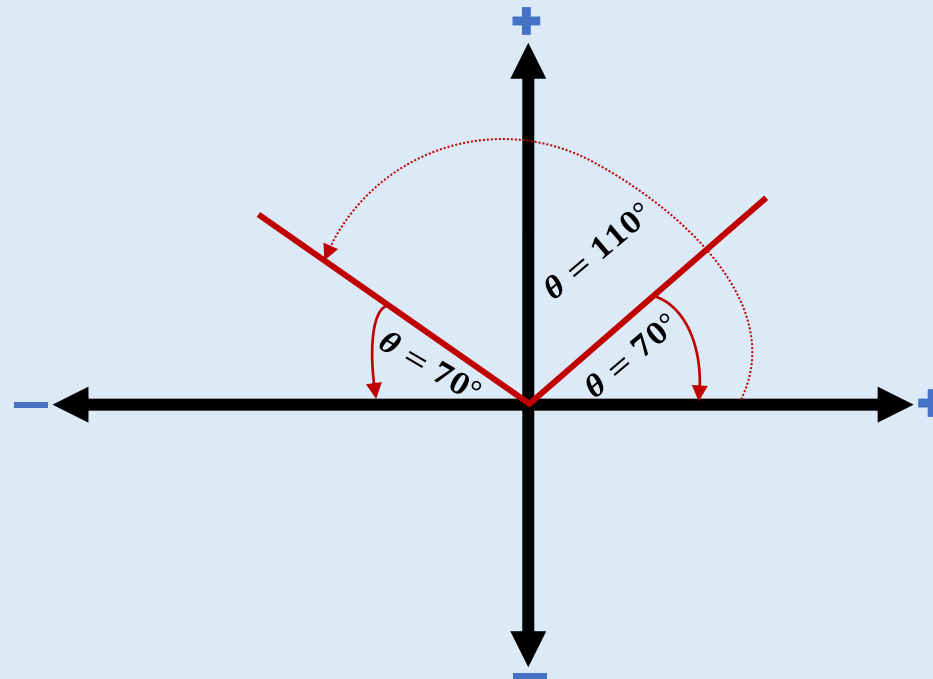
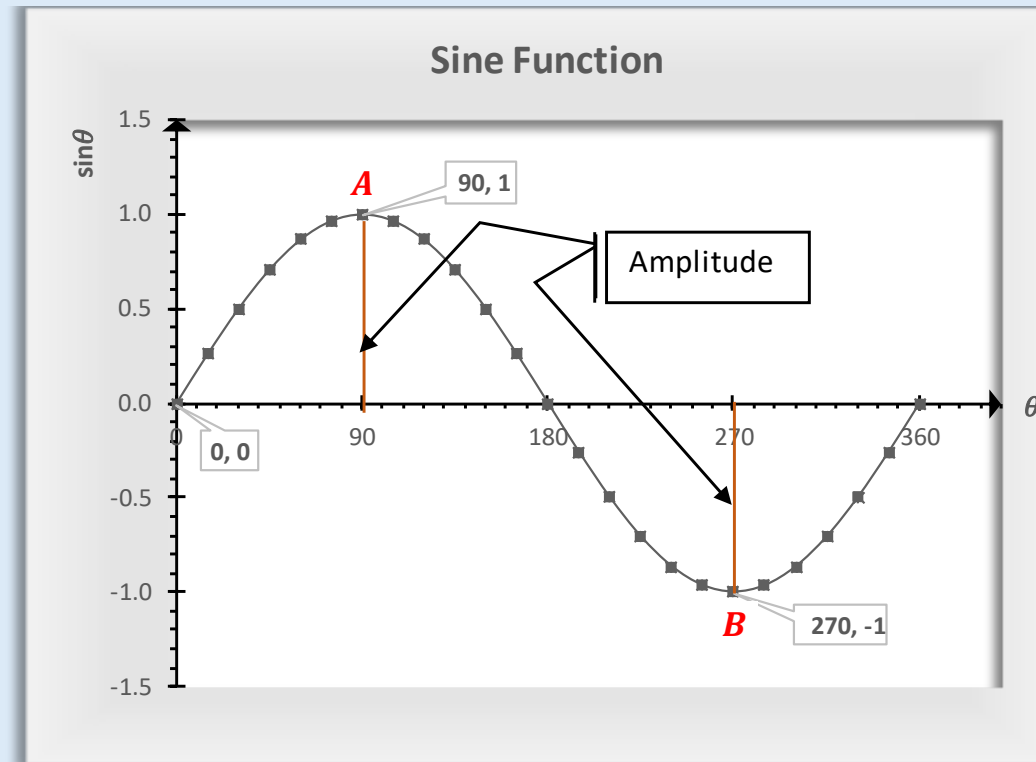


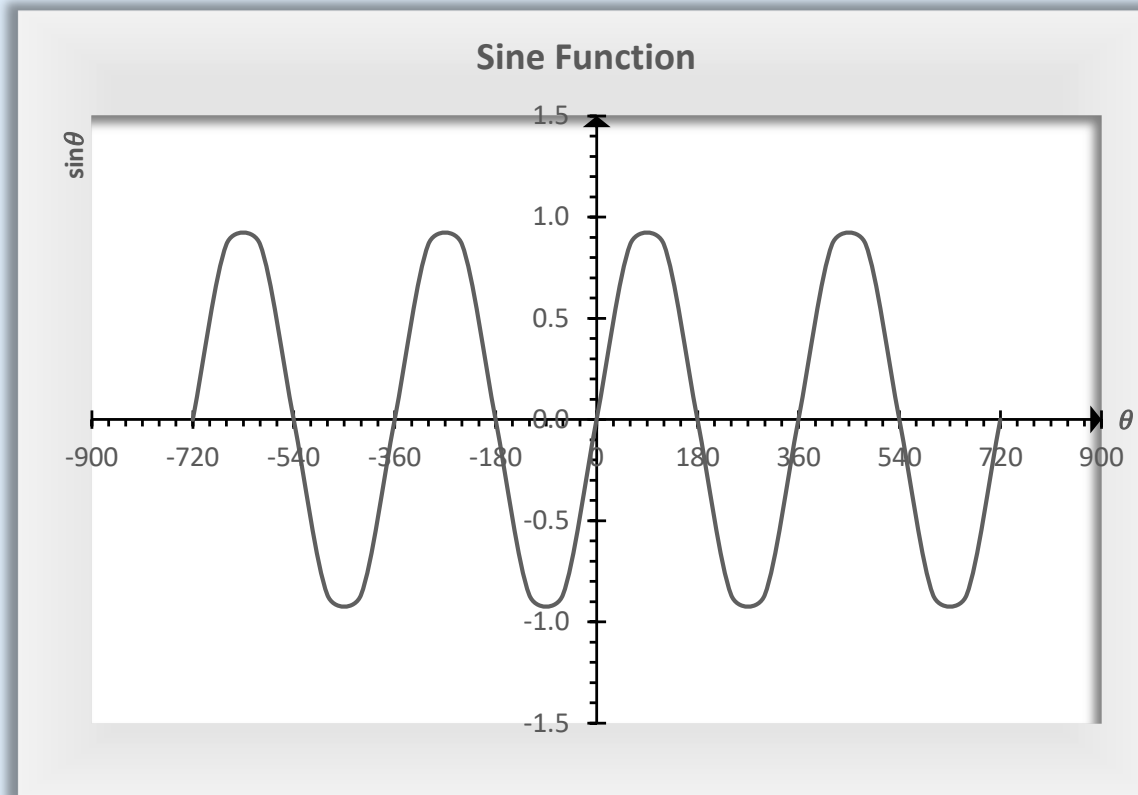
Fig. 1-18: Solution to Example 12(a).



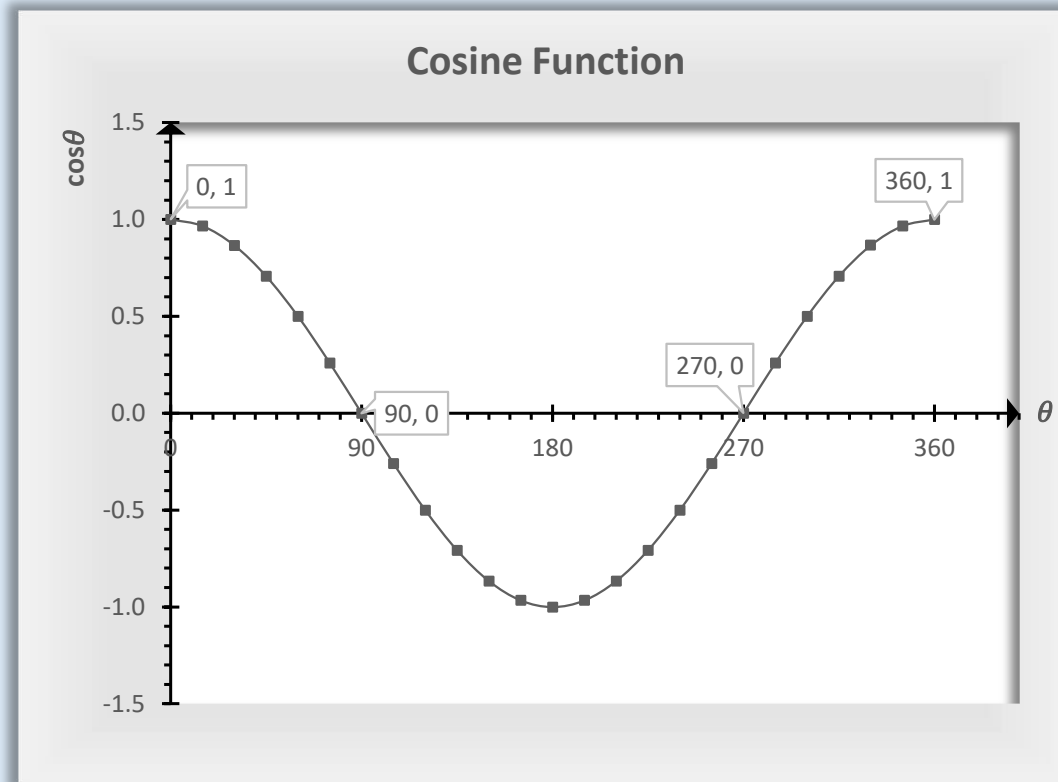
**Fig. 1-19: Sine function in the interval  $0^\circ \leq \theta \leq 360^\circ$  illustrated.**



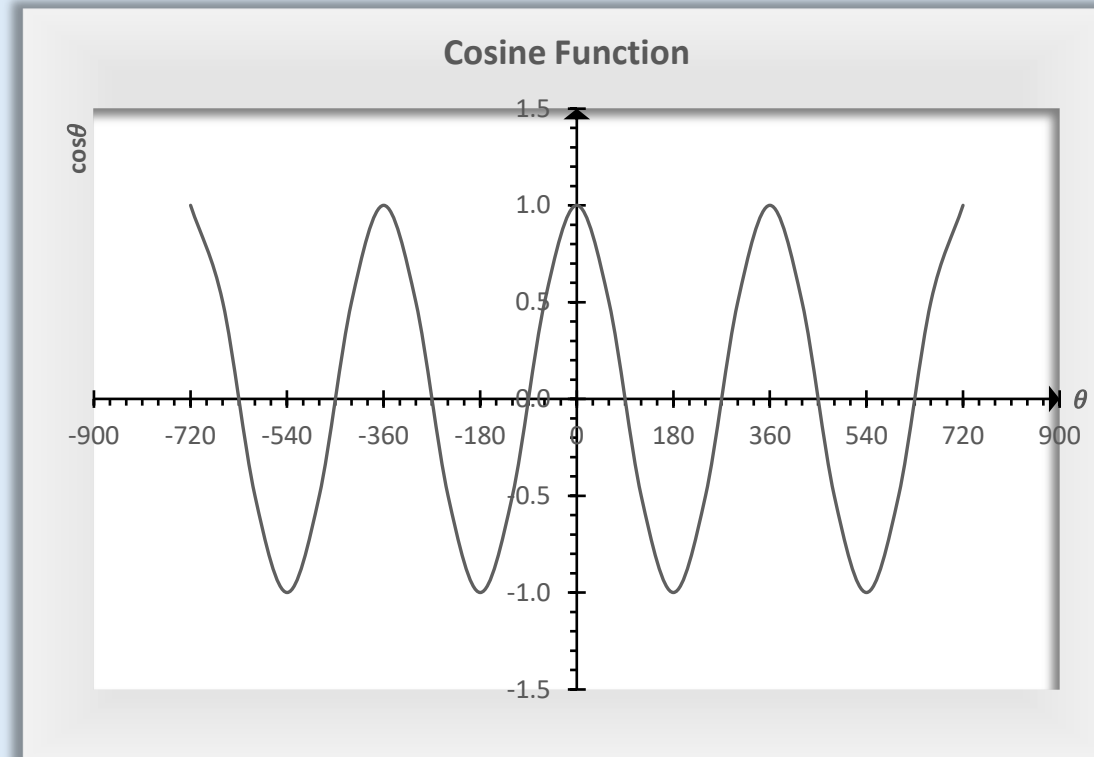
**Fig. 1-20: Sine function in the interval  $-720^\circ \leq \theta \leq 720^\circ$  illustrated**



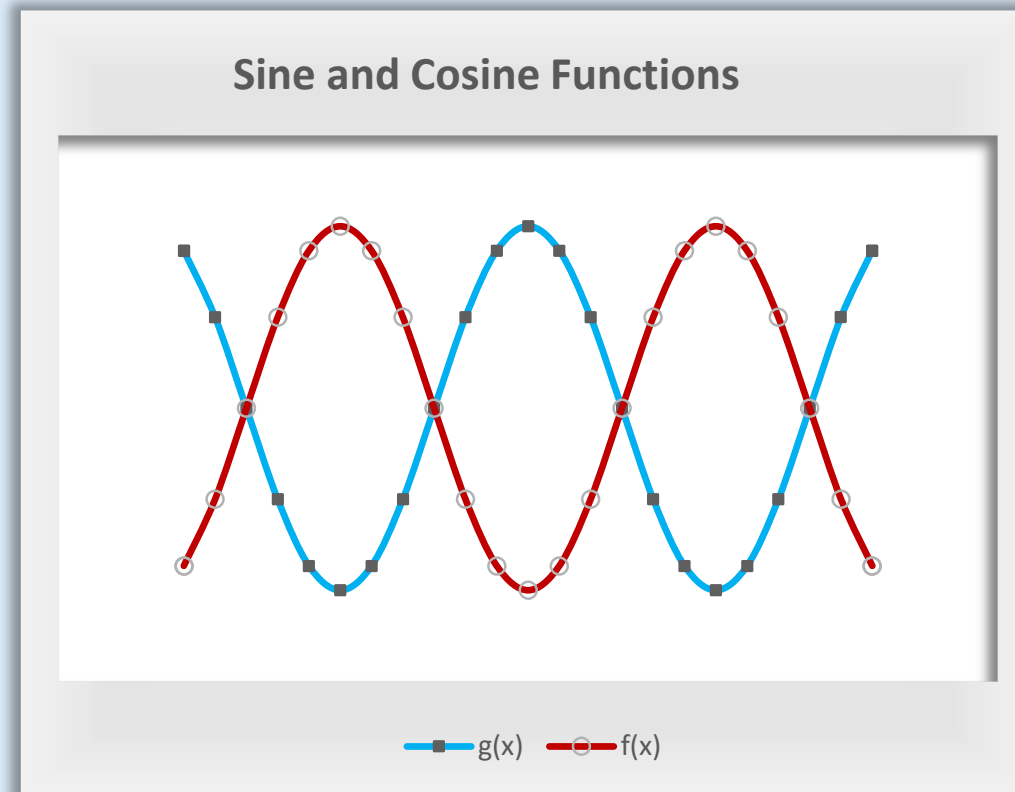
**Fig. 1-21: Cosine function in the interval  $0^\circ \leq \theta \leq 360^\circ$  illustrated**



**Fig. 1-22: Cosine function in the interval  $-720^\circ \leq \theta \leq 720^\circ$  illustrated**

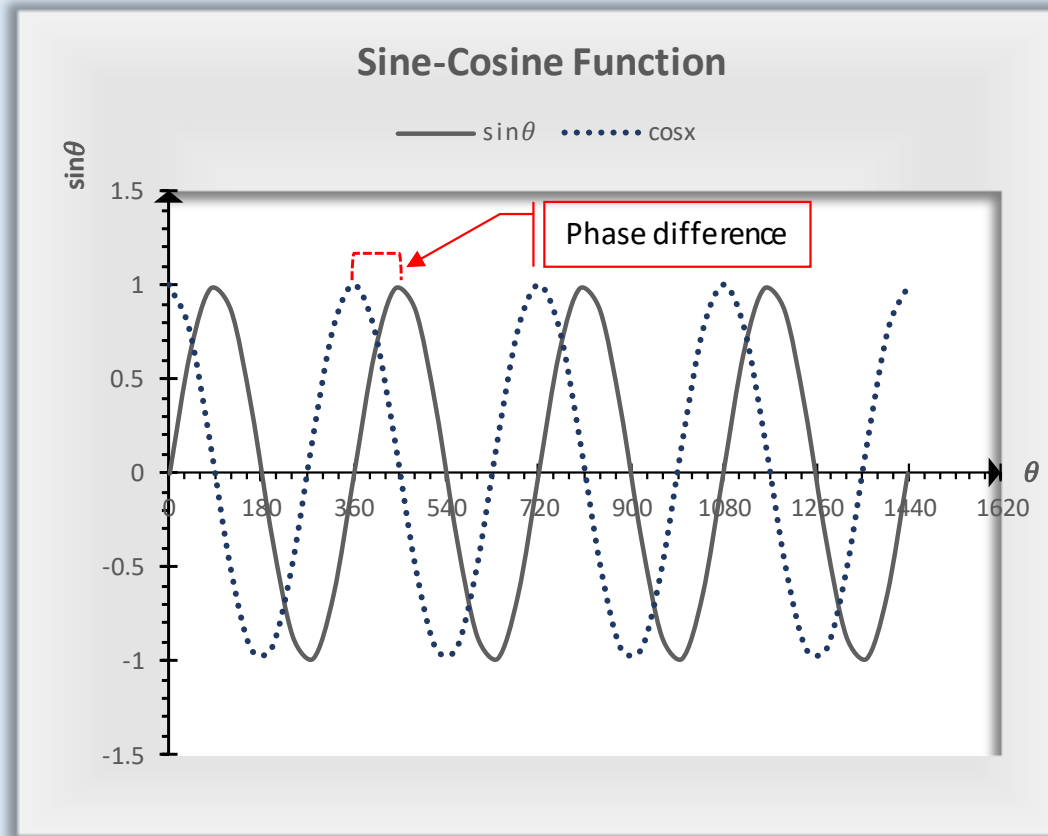


**Fig. 1-23: Sine and cosine functions indistinguishably drawn.**

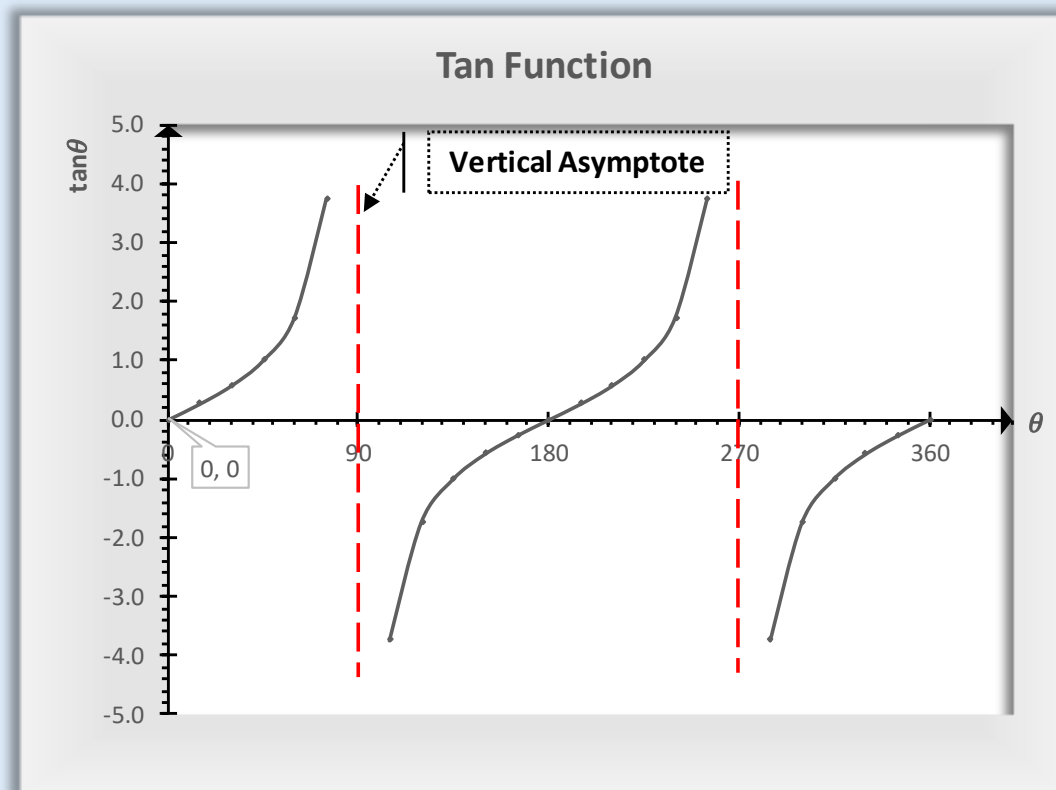




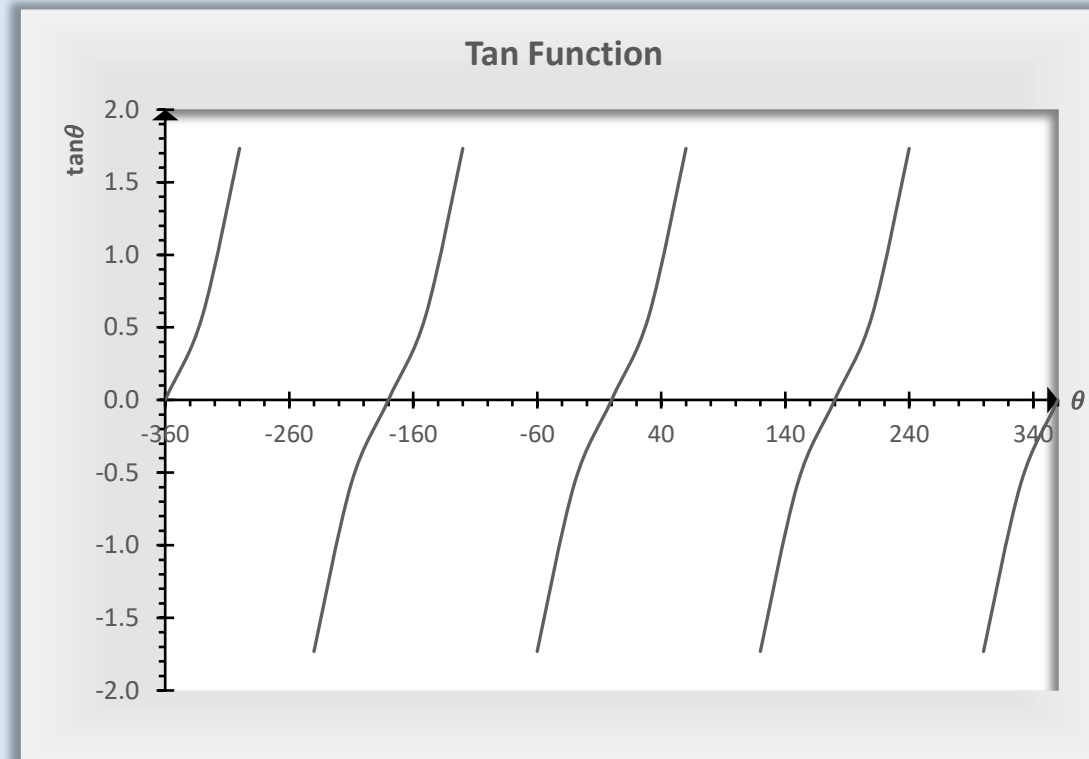
**Fig. 1-24: Phase difference illustrated.**



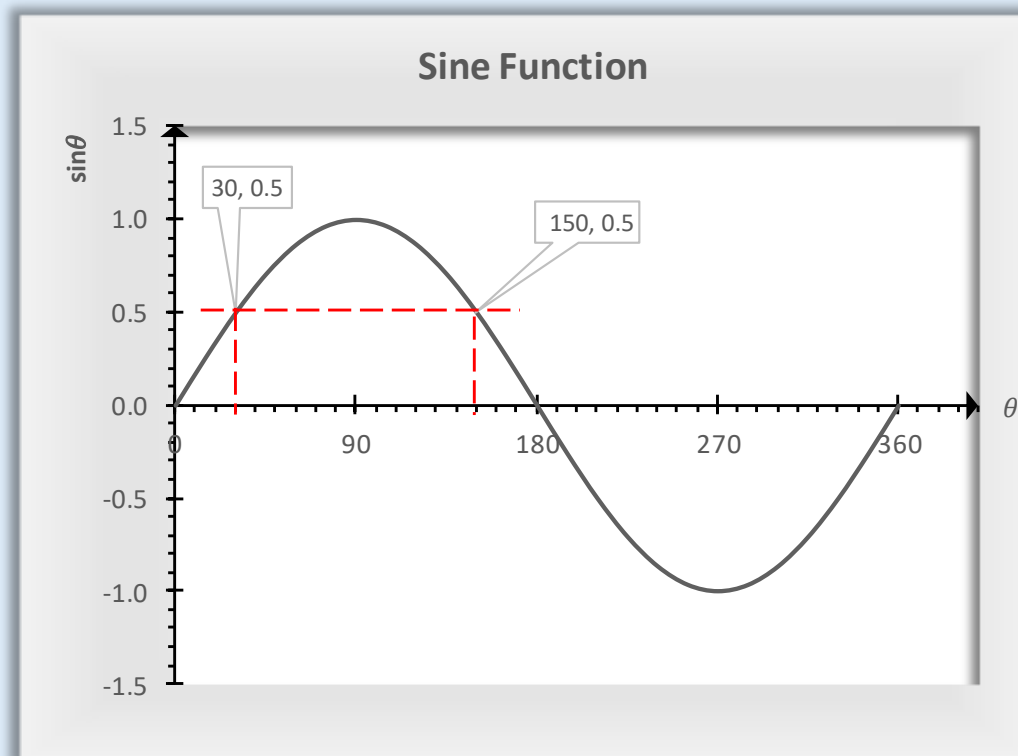
**Fig. 1-25: Tangent function in the interval  $0^\circ \leq \theta \leq 360^\circ$  illustrated**



**Fig. 1-26: Tangent function in the interval  $-360^\circ \leq \theta \leq 360^\circ$  illustrated**



**Fig. 1-27: Solution to Example 15(a).**



**Fig. 1-28: Solution to Example 15(b).**

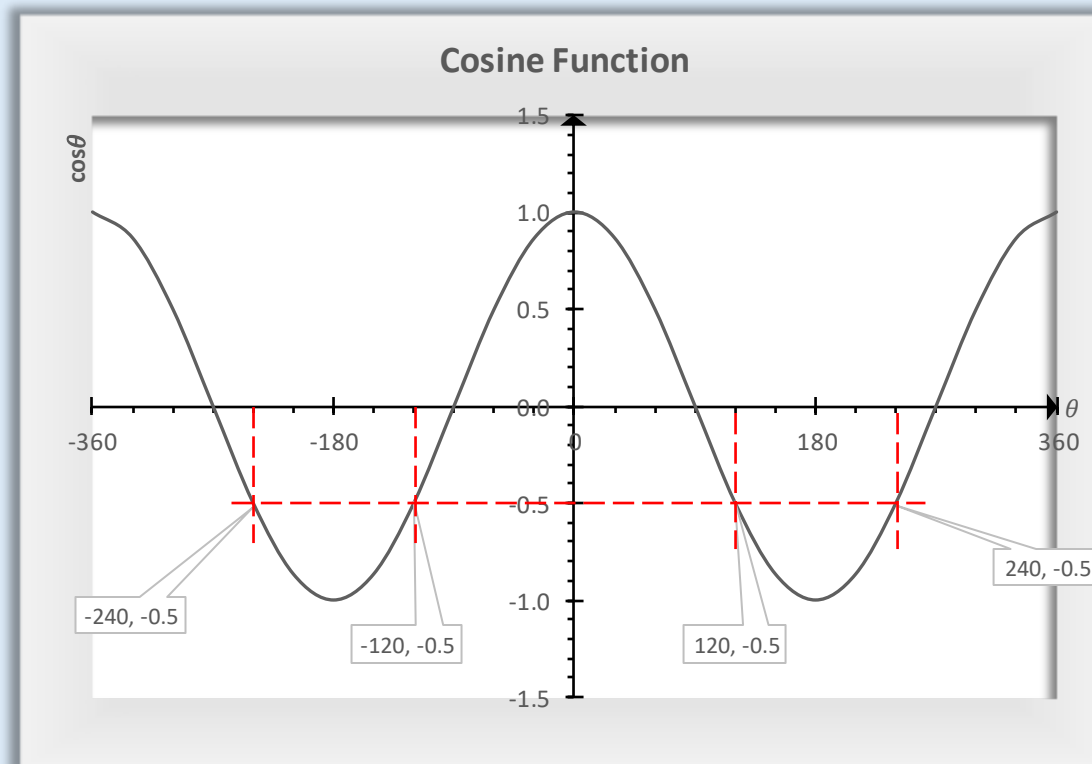
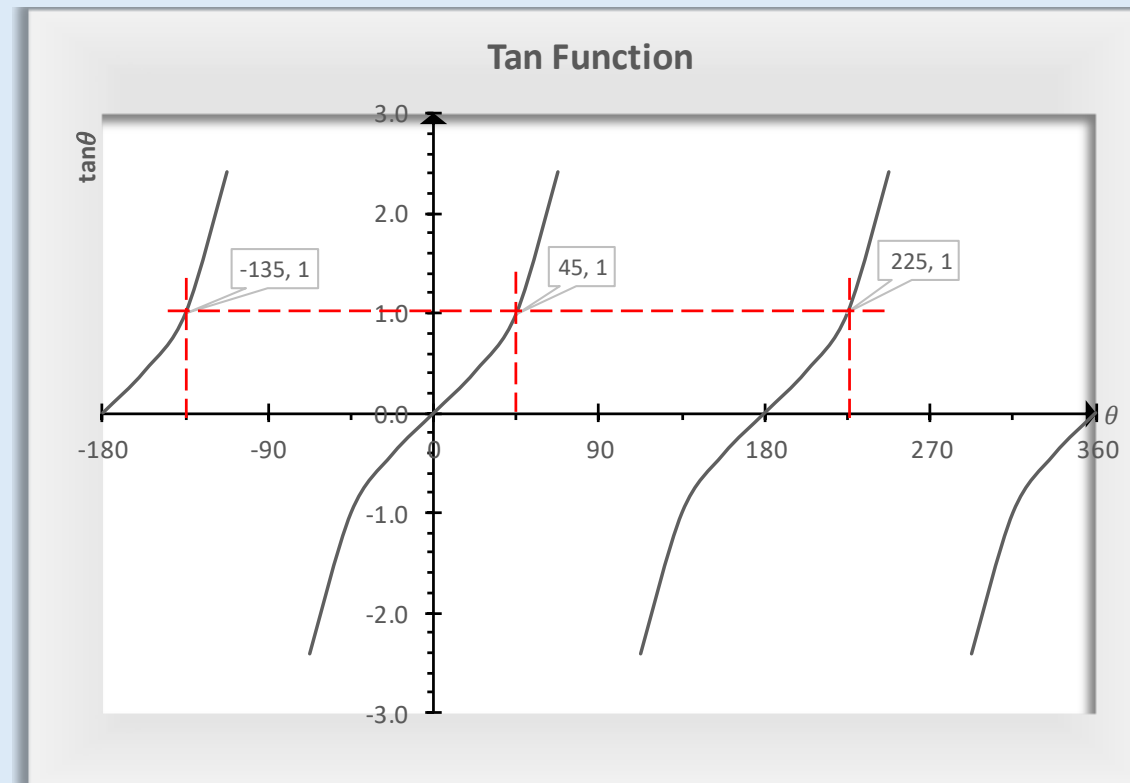


Fig. 1-29: Solution to Example 15(c).



# Thank You

