

1.3 Obtuse Angles Investigation

Learning Goals: I am learning to...

- Make connections between the primary trigonometric ratios of obtuse angles and their supplementary angles



Before we can complete the investigation, it is important to understand some of the different types of angles.

Terminology	Definition	Diagram
Acute Angle	An angle less than 90°	
Right Angle	An angle equal to 90°	
Obtuse Angle	An angle between 90° and 180°	
Supplementary Angle	Two angles whose sum is 180°	$x + y = 180^\circ$

Part A: Evaluating Angles

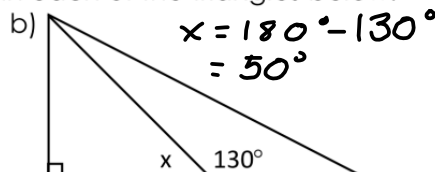
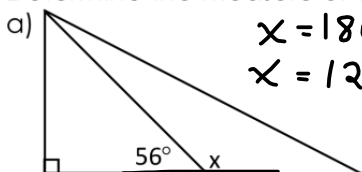
Using a scientific calculator, determine the ratio of each angle below. Round all answers to four decimal places.

Angle	Sine	Cosine	Tangent
20°	0.3420	0.9397	0.3640
41°	0.6561	0.7547	0.8693
88°	0.9994	0.0349	28.6363
92°	0.9994	-0.0349	-28.6363
139°	0.6561	-0.7547	-0.8693
160°	0.3420	-0.9397	-0.3640

MAP4C1 Unit 1: Trigonometry

Part B: Investigating Obtuse and Supplementary Angles

1) Determine the measure of the unknown angle, x in each of the triangles below.



2) Complete the chart for each set of supplementary angles (acute and obtuse). Round each ratio to four decimals.

a)

Trig Ratio	Acute Angle (56°)	Obtuse Angle ($x = 124^\circ$)
Sine	0.8290	0.8290
Cosine	0.5592	-0.5592
Tangent	1.4826	-1.4826

b)

Trig Ratio	Acute Angle (50°)	Obtuse Angle ($x = 130^\circ$)
Sine	0.7660	0.7660
Cosine	0.6428	-0.6426
Tangent	1.1918	-1.1918

3) What do you notice about each ratio in the charts above?

- Sine is the same for acute and obtuse
- Cos and tan ratios are opposite signs (acute $\rightarrow +$)
(obtuse $\rightarrow -$)

4) Looking back at the chart in part A on the previous page, which pairs of angles are supplementary?

- 20° and 160° 88° and 92°
 41° and 139°

5) In general, what did you notice was the same and what was different about the trigonometric ratios of the supplementary angles?

- The sine ratio is the same for acute and obtuse angles
- Cos and tan ratios have the same value, but opposite signs for acute vs. obtuse angles.

Summary of Key Concepts

- Sine of an acute and obtuse angle is ALWAYS +
- Cosine of an acute angle is +, obtuse angle is -
- Tangent of an acute angle is +, obtuse is -