

Unit 3: Right Angled Acute Trigonometry

Math20-2: Assessment Standards

Geometry

Specific Outcome 1. Derive proofs that involve the properties of angles and triangles. [CN, R, V]

It is intended that deductive reasoning be limited to direct proof.)

- 1.1 Generalize, using inductive reasoning, the relationships between pairs of angles formed by transversals and parallel lines, with or without technology.
- 1.2 Prove, using deductive reasoning, properties of angles formed by transversals and parallel lines, including the sum of the angles in a triangle.
- 1.3 Generalize, using inductive reasoning, a rule for the relationship between the sum of the interior angles and the number of sides (n) in a polygon, with or without technology.
- 1.4 Identify and correct errors in a given proof of a property that involves angles.
- 1.5 Verify, with examples, that if lines are not parallel, the angle properties do not apply.
- 1.6 Prove, using deductive reasoning, that two triangles are congruent.

Specific Outcome 2. Solve problems that involve properties of angles and triangles. [CN, PS, V]

- 2.1 Determine the measures of angles in a diagram that includes parallel lines, angles and triangles, and justify the reasoning.
- 2.2 Identify and correct errors in a given solution to a problem that involves the measures of angles.
- 2.3 Solve a contextual problem that involves angles or triangles.
- 2.4 Construct parallel lines, given a compass or a protractor, and explain the strategy used.
- 2.5 Determine if lines are parallel, given the measure of an angle at each intersection formed by the lines and a transversal.

Specific Outcome 3. Solve problems that involve the cosine law and the sine law, excluding the ambiguous case. [CN, PS, R]

- 3.1 Draw a diagram to represent a problem that involves the cosine law or the sine law.
- 3.2 Explain the steps in a given proof of the sine law or cosine law.
- 3.3 Solve a contextual problem that requires the use of the sine law or cosine law, and explain the reasoning.
- 3.4 Solve a contextual problem that involves more than one triangle.

What do the Student know from Math 10-C?

Specific Outcome 4. Develop and apply the primary trigonometric ratios (sine, cosine, tangent) to solve problems that involve right triangles. [C, CN, PS, R, T, V]

- 4.1 Explain the relationships between similar right triangles and the definitions of the primary trigonometric ratios.
- 4.2 Identify the hypotenuse of a right triangle and the opposite and adjacent sides for a given acute angle in the triangle.
- 4.3 Solve right triangles.
- 4.4 Solve a problem that involves one or more right triangles by applying the primary trigonometric ratios or the Pythagorean theorem.
- 4.5 Solve a problem that involves indirect and direct measurement, using the trigonometric ratios, the Pythagorean theorem and measurement instruments such as a clinometer or metre stick.

What do Student know from Math 20-1?

Trigonometry

Specific Outcome 1. Demonstrate an understanding of angles in standard position $[0^\circ$ to 360°]. [R, V]

- 1.1 Sketch an angle in standard position, given the measure of the angle.
- 1.2 Determine the reference angle for an angle in standard position.
- 1.3 Explain, using examples, how to determine the angles from 0° to 360° that have the same reference angle as a given angle.
- 1.4 Illustrate, using examples, that any angle from 90° to 360° is the reflection in the x -axis and/or the y -axis of its reference angle.
- 1.5 Determine the quadrant in which a given angle in standard position terminates.
- 1.6 Draw an angle in standard position given any point $P(x, y)$ on the terminal arm of the angle.
- 1.7 Illustrate, using examples, that the points $P(x, y)$, $P(-x, y)$, $P(-x, -y)$ and $P(x, -y)$ are points on the terminal sides of angles in standard position that have the same reference angle.

Specific Outcome 2. Solve problems, using the three primary trigonometric ratios for angles from 0° to 360° in standard position. [C, ME, PS, R, T, V] [ICT: C6–4.1]

- 2.1 Determine, using the Pythagorean theorem or the distance formula, the

distance from the origin to a point $P(x, y)$ on the terminal arm of an angle.

2.2 Determine the value of $\sin\theta$, $\cos\theta$ or $\tan\theta$, given any point $P(x, y)$ on the terminal arm of angle θ .

2.3 Determine, without the use of technology, the value of $\sin\theta$, $\cos\theta$ or $\tan\theta$, given any point $P(x, y)$ on the terminal arm of angle θ , where $\theta = 0^\circ, 90^\circ, 180^\circ, 270^\circ$ or 360° .

2.4 Determine the sign of a given trigonometric ratio for a given angle, without the use of technology, and explain.

2.5 Solve, for all values of θ , an equation of the form $\sin\theta = a$ or $\cos\theta = a$, where $-1 \leq a \leq 1$, and an equation of the form $\tan\theta = a$, where a is a real number.

2.6 Determine the exact value of the sine, cosine or tangent of a given angle with a reference angle of $30^\circ, 45^\circ$ or 60° .

2.7 Describe patterns in and among the values of the sine, cosine and tangent ratios for angles from 0° to 360° .

2.8 Sketch a diagram to represent a problem. 2.9 Solve a contextual problem, using trigonometric ratios.

Specific Outcome 3. Solve problems, using the cosine law and sine law, including the ambiguous case. [C, CN, PS, R, T] [ICT: C6–4.1]

3.1 Sketch a diagram to represent a problem that involves a triangle without a right angle.

3.2 Solve, using primary trigonometric ratios, a triangle that is not a right triangle.

3.3 Explain the steps in a given proof of the sine law or cosine law.

3.4 Sketch a diagram and solve a problem, using the cosine law.

3.5 Sketch a diagram and solve a problem, using the sine law.

3.6 Describe and explain situations in which a problem may have no solution, one solution or two solutions.

What is Coming in Math 30-2

Relations and Functions

Specific Outcome 8. Represent data, using sinusoidal functions, to solve problems. [C, CN, PS, T, V] [ICT: C6–4.1, C6–4.3, C6–4.4]

8.1 Describe, orally and in written form, the characteristics of a sinusoidal function by analyzing its graph.

8.2 Describe, orally and in written form, the characteristics of a sinusoidal function by analyzing its equation.

8.3 Match equations in a given set to their corresponding graphs.

8.4 Graph data, and determine the sinusoidal function that best approximates the data.

8.5 Interpret the graph of a sinusoidal function that models a situation, and explain the reasoning.

8.6 Solve, using technology, a contextual problem that involves data that is best represented by graphs of sinusoidal functions, and explain the reasoning.