



Lawton Public Schools

Math Curriculum Alignment Guide

for

Trigonometry

**Barry Beauchamp, Superintendent
Dr. Linda Dzialo, Deputy Superintendent**

January 2002

Course/Level
Trigonometry

PASS Objective:

Time Range:
Hours 1
Quarter 1

Strand/National Standard
Measurement - 1

Assessment
Instrument

ITBS	CRT	EOI	ACT X	SAT X	AP
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Lesson Objective: Become familiar with angle terminology and be able to draw and label angles.

Prerequisites: Knowledge of degree measure of an angle.

Blooms	K	C *	A	A	S	E
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Suggested Teaching Strategies:

- Emphasize standard position. Point out that in trigonometry angles can be positive or negative and of any degree.

Aligned Instructional Resources:

- Trigonometry, Prentice Hall, pp. 12-16

Assessment Sample Format:

Draw and label an angle of -120° .

Additional Resources/Notes:

Date(s) Taught							
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Course/Level
Trigonometry

PASS Objective:

Time Range:
Hours 5
Quarter 1

Strand/National Standard
Problem Solving - 3

Assessment
Instrument

ITBS	CRT	EOI	ACT X	SAT X	AP
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Lesson Objective: Find the exact values of the six trigonometric functions for the special angles in a unit circle.

Prerequisites: Know the ratios of the sides of the 45° - 45° - 90° and 30° - 60° - 90° triangles.

Blooms	K	C	A *	A	S	E
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Suggested Teaching Strategies:

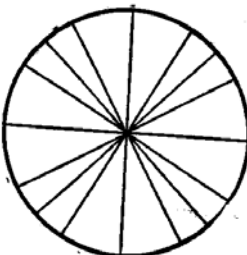
- Use a circle template and divide the unit circle into halves, sixths (semicircle into thirds), twelfths (semicircle into sixths), and eighths (semicircle into fourths).

Aligned Instructional Resources:

- Trigonometry, Prentice Hall, pp. 20, 39-44

Assessment Sample Format:

- Label each point with the appropriate ordered pair. List the sine and cosine for each point. Find the tangent of each angle.



- The terminal side of angle θ , in standard position, passes through the point $(3,-4)$. Find the exact values of the six trig functions of θ .

Additional Resources/Notes:

Date(s) Taught							
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Course/Level
Trigonometry

PASS Objective:

Time Range:
Hours 3 to 4
Quarter 1

Strand/National Standard
Measurement – 2

Assessment
Instrument

ITBS	CRT	EOI	ACT X	SAT X	AP
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Lesson Objective: Measure angles using degrees and radians and be able to convert between the two formats.

Prerequisites: Familiarity with degrees/minutes/seconds. Know quadrant numbers.

Blooms	K	C *	A	A	S	E
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Suggested Teaching Strategies:

- Define radian using twist ties by measuring the number of radians in a semicircle.

Aligned Instructional Resources:

- Trigonometry, Prentice Hall, pp. 17-22
- Circle template, twist ties, protractors

Assessment Sample Format:

Given an angular displacement of $7\pi/6$, find the displacement in degrees.

Find the radian measure of an angle that is 320° .

Additional Resources/Notes:

Date(s) Taught							
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Course/Level
Trigonometry

PASS Objective:

Time Range:
Hours 2
Quarter 1

Strand/National Standard
Problem Solving – 2 & Connections - 3

Assessment
Instrument

ITBS	CRT	EOI	ACT	SAT	AP
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Lesson Objective: Relate circular trigonometry to the real-world phenomena of angular and linear velocity.

Prerequisites: Know how to find the length of an arc and how to do unit conversions.

Blooms	K	C	A	A	S *	E
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Suggested Teaching Strategies:

- Stress unit conversions and the difference between angular and linear velocity.

Aligned Instructional Resources:

- Trigonometry, Prentice Hall, pp. 23-28

Assessment Sample Format:

Calculate the angular velocity in radians per minute of a Ferris wheel 250 feet in diameter. It takes 45 seconds for the ferris wheel to rotate once.

Additional Resources/Notes:

Date(s) Taught						
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Course/Level
Trigonometry

PASS Objective:

Time Range:
Hours 3 to 5
Quarter 1

Strand/National Standard
Measurement - 2

Assessment
Instrument

ITBS	CRT	EOI	ACT X	SAT X	AP
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Lesson Objective: Define and use the six trigonometric functions in solving right triangles.

Prerequisites: Understand the parts of a right triangle. Be able to label the parts correctly. Know and be able to use the Pythagorean Theorem.

Blooms	K	C	A *	A	S	E
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Suggested Teaching Strategies:

- Emphasize the relationship between circular functions and angle functions.

Aligned Instructional Resources:

- Trigonometry, Prentice hall, pp. 29-38, 112-117
- Trigonometry, Addison Wesley, pp. 26-37

Assessment Sample Format:

Solve the following right triangle: angle B = 37°, angle A = 90°, c = 12

Additional Resources/Notes:

Date(s) Taught							
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Course/Level
Trigonometry

PASS Objective:

Time Range:
Hours 5
Quarter 1

Strand/National Standard
Numbers and Operations - 3

Assessment
Instrument

ITBS	CRT	EOI	ACT	SAT	AP
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Lesson Objective: Become proficient in the use of a scientific calculator.

Prerequisites: Basic knowledge of using a scientific calculator.

Blooms	K	C *	A	A	S	E
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Suggested Teaching Strategies:

- Stress when to use the reciprocal key in problems such as $\csc 48^\circ$ versus $\csc \theta = 2.789$.

Aligned Instructional Resources:

- Trigonometry, Prentice Hall, pp. 46-50
- Scientific calculator

Assessment Sample Format:

Evaluate $\sec 72^\circ 15'$

Solve $\csc \theta = 2.168$

Additional Resources/Notes:

Date(s) Taught							
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Course/Level
Trigonometry

PASS Objective:

Time Range:
Hours 10
Quarter 1

Strand/National Standard
Representation - 3

Assessment
Instrument

ITBS	CRT	EOI	ACT X	SAT X	AP
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Lesson Objective: Students should be able to graph and read graphs of the sinusoids, and be familiar with the graphs of the other functions.

Prerequisites: Basic graphing on the coordinate plane. Effects of altering parameters in graphing functions.

Blooms	K	C	A	A *	S	E
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Suggested Teaching Strategies:

- Discover how a change in the parameters effects the graph. Use the graphing calculator to look for patterns. Teach to graph by hand using the 'critical points.'

Aligned Instructional Resources:

- Trigonometry, Prentice Hall, Chapter 2
- Graphing calculators

Assessment Sample Format:

Graph $y = 3 - 2 \cos 2(x - \pi/4)$

Additional Resources/Notes:

Date(s) Taught							
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Course/Level
Trigonometry

PASS Objective:

Time Range:
Hours 3
Quarter 1

Strand/National Standard
Representation - 3

Assessment
Instrument

ITBS	CRT	EOI	ACT X	SAT X	AP
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Lesson Objective: Use the periodic nature of sinusoids to solve real-world phenomena.

Prerequisites: Knowledge of graphing sinusoids.

Blooms	K	C	A	A	S *	E
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Suggested Teaching Strategies:

- Have students graph first, then write the equation.

Aligned Instructional Resources:

- Trigonometry, Prentice Hall, pp. 100-110
- Trigonometry, Addison Wesley, pp. 98-111

Assessment Sample Format:

The pendulum of a clock swings so that the distance its tip travels from its vertical position as a function of time is sinusoidal. If the displacement of the pendulum on a grandfather clock is 5 inches and the pendulum makes one complete cycle in 2 seconds, write the equation for its motion.

Additional Resources/Notes:

Date(s) Taught							
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Course/Level
Trigonometry

PASS Objective:

Time Range:
Hours 5 to 6
Quarter 2

Strand/National Standard
Problem Solving - 2

Assessment
Instrument

ITBS	CRT	EOI	ACT X	SAT X	AP
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Lesson Objective: Use right triangle ratios to solve real-world problems.

Prerequisites: Be familiar with angles of elevation and depression.

Blooms	K	C	A	A *	S	E
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Suggested Teaching Strategies:

- Emphasize that angles of depression and elevation are measured from the horizontal. Make drawings. Bearings and courses are measured clockwise from the North.

Aligned Instructional Resources:

- Trigonometry, Prentice Hall, pp. 118-129
- Trigonometry, Addison Wesley, p. 281

Assessment Sample Format:

From an airplane flying over a bridge at an altitude of 640m., the angle of depression to the airport is 26° . How far is it from the bridge to the airport?

Additional Resources/Notes:

Date(s) Taught							
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Course/Level
Trigonometry

PASS Objective:

Time Range:
Hours 1 to 2
Quarter 2

Strand/National Standard
Reasoning and Proof - 3

Assessment
Instrument

ITBS	CRT	EOI	ACT X	SAT X	AP
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Lesson Objective: Derive basic trigonometric identities using the definitions of the trigonometric functions.

Prerequisites: Know the Pythagorean Theorem. Know how to add and subtract rational expressions.

Blooms	K	C	A	A	S *	E
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Suggested Teaching Strategies:

- Show alternate forms of Pythagorean Identities.

Aligned Instructional Resources:

- Trigonometry, Prentice Hall, pp. 130-135

Assessment Sample Format:

Use the definition of sine and cosine functions to prove $\sin^2 \theta + \cos^2 \theta = 1$.

Additional Resources/Notes:

Date(s) Taught							
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Course/Level
Trigonometry

PASS Objective:

Time Range:
Hours 5 to 7
Quarter 2

Strand/National Standard
Reasoning and Proof - 2

Assessment
Instrument

ITBS	CRT	EOI	ACT	SAT	AP
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Lesson Objective: Use basic identities to verify other identities.

Prerequisites: Be able to work with and simplify rational expressions, and be able to factor.

Blooms	K	C	A	A	S *	E
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Suggested Teaching Strategies:

- Use cooperative learning.

Aligned Instructional Resources:

- Trigonometry, Prentice Hall, pp. 136-144

Assessment Sample Format:

Verify: $2 \csc \theta = \frac{1}{\csc \theta - \cot \theta} + \frac{1}{\csc \theta + \cot \theta}$

Additional Resources/Notes:

Date(s) Taught							
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Course/Level
Trigonometry

PASS Objective:

Time Range:
Hours 2
Quarter 2

Strand/National Standard
Problem Solving - 3

Assessment
Instrument

ITBS	CRT	EOI	ACT X	SAT X	AP
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Lesson Objective: Use the Law of Sines to solve oblique triangles.

Prerequisites: Knowledge of congruent triangle theorems: ASA, AAS, SSA.

Blooms	K	C	A *	A	S	E
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Suggested Teaching Strategies:
Make a drawing. Use when any two angles and one side are known, or when two sides and the non-included angle are known.

Aligned Instructional Resources:

- Trigonometry, Prentice Hall, pp. 156-167
- Trigonometry, Addison Wesley, pp. 252-262, 281-292

Assessment Sample Format:
Given: angle $A = 3.9^\circ$, $a = 30.6$, and $b = 37.9$, find all missing parts of the triangle(s).

Additional Resources/Notes:

Date(s) Taught							
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Course/Level
Trigonometry

PASS Objective:

Time Range:
Hours 1
Quarter 2

Strand/National Standard
Problem Solving - 3

Assessment
Instrument

ITBS	CRT	EOI	ACT X	SAT X	AP
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Lesson Objective: Use the Law of Cosines to solve oblique triangles.

Prerequisites: Knowledge of congruent triangle theorems: SSS, SAS.

Blooms	K	C	A	A *	S	E
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Suggested Teaching Strategies:

- Make a drawing. Use for SSS and SAS. Law of Cosines will give an obtuse angle and Law of Sines will not.

Aligned Instructional Resources:

- Trigonometry, Prentice Hall, pp. 168-174
- Trigonometry, Addison Wesley, pp. 244-248, 281-292

Assessment Sample Format:

Given: $a = 4$, $b = 7$, and $c = 9$, find angle B.

Additional Resources/Notes:

Date(s) Taught							
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Course/Level
Trigonometry

PASS Objective:

Time Range:
Hours 2
Quarter 2

Strand/National Standard
Geometry - 1

Assessment
Instrument

ITBS	CRT	EOI	ACT X	SAT X	AP
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Lesson Objective: Use trigonometric formulas to find the area of triangles.

Prerequisites: Know that area of a quadrilateral can be found by dividing it into two triangles.

Blooms	K	C	A	A	S *	E
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Suggested Teaching Strategies:

- Area = $\frac{1}{2} ab \sin C$, for SAS
 - Area = $\frac{a^2 \sin B \sin C}{2 \sin A}$, for ASA
 - Area = $\sqrt{s(s-a)(s-b)(s-c)}$, for SSS

where $s = \frac{a+b+c}{2}$

Aligned Instructional Resources:

- Trigonometry, Prentice Hall, pp. 181-189
- Trigonometry, Addison Wesley, pp. 249-251, 281-292

Assessment Sample Format:

Find the area of the quadrilateral ABCD.

Additional Resources/Notes:

Date(s) Taught						
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Course/Level
Trigonometry

PASS Objective:

Time Range:
Hours 3
Quarter 2

Strand/National Standard
Problem Solving - 3

Assessment
Instrument

ITBS	CRT	EOI	ACT	SAT	AP
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Lesson Objective: Use vectors to solve oblique triangle problems.

Prerequisites: Knowledge of triangles.

Blooms	K	C	A	A	S *	E
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Suggested Teaching Strategies:

- Emphasize vocabulary. Use both the tail-to-head method and parallelogram method to find the sum of two vectors.

Aligned Instructional Resources:

- Trigonometry, Prentice Hall, pp. 190-197
- Trigonometry, Addison Wesley, pp. 281-292

Assessment Sample Format:

Stump Force Problem: Joe Jamoke and Ivan Hoe are pulling up a tree stump. Joe can pull with a force of 200 pounds and Ivan with a force of 250 pounds. A total force of 400 pounds is sufficient to pull up the stump.

A. If they pull at an angle of 25° to each other, will the sum of their force vectors be enough to pull up the stump?

B. At what angle must they pull in order to exert *exactly* the 400 pounds needed to pull up the stump?

From Trigonometry, Addison Wesley

Additional Resources/Notes:

Date(s) Taught							
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Course/Level
Trigonometry

PASS Objective:

Time Range:
Hours 3
Quarter 2

Strand/National Standard
Problem Solving - 3

Assessment
Instrument

ITBS	CRT	EOI	ACT	SAT	AP
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Lesson Objective: Be able to use the sum and difference identities for sine and cosine.

Prerequisites: Ability to work with fractions.

Blooms	K	C	A	A *	S	E
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Suggested Teaching Strategies:

- Review the values of sine and cosine for the special angles.

Aligned Instructional Resources:

- Trigonometry, Prentice Hall, pp. 208-219

Assessment Sample Format:

Given: $\cos \alpha = -3/5$ and $\tan \beta = 5/13$, $90^\circ \leq \alpha \leq 180^\circ$ and $180^\circ \leq \beta \leq 270^\circ$, find $\sin(\alpha + \beta)$.

Additional Resources/Notes:

Date(s) Taught							
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Course/Level
Trigonometry

PASS Objective:

Time Range:
Hours 3
Quarter 2

Strand/National Standard
Problem Solving - 3

Assessment
Instrument

ITBS	CRT	EOI	ACT	SAT	AP
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Lesson Objective: Be able to use the double and half angle identities.

Prerequisites: Be able to evaluate formulas and work with radicals.

Blooms	K	C	A	A *	S	E
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Suggested Teaching Strategies:

- Review how to determine whether $\sin \theta/2$ or $\cos \theta/2$ will be positive or negative according to the quadrant.

Aligned Instructional Resources:

- Trigonometry, Prentice Hall, pp. 226-236

Assessment Sample Format:

Given: $\sin \theta = -8/17$, find $\sin 2\theta$, $\cos 2\theta$, and $\tan 2\theta$.

Additional Resources/Notes:

Date(s) Taught							
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Course/Level
Trigonometry

PASS Objective:

Time Range:
Hours 2
Quarter 3

Strand/National Standard
Algebra - 4

Assessment
Instrument

ITBS	CRT	EOI	ACT	SAT	AP
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Lesson Objective: Be able to graph and find the inverse trigonometric functions.

Prerequisites: Be able to work with algebraic inverse functions.

Blooms	K	C	A	A *	S	E
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Suggested Teaching Strategies:

- Stress the difference between inverse functions and inverse relations.

Aligned Instructional Resources:

- Trigonometry, Prentice Hall, pp. 250-264

Assessment Sample Format:

Evaluate: $\sin(\cos^{-1} 1/2)$.

Additional Resources/Notes:

Date(s) Taught							
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Course/Level
Trigonometry

PASS Objective:

Time Range:
Hours 3 to 5
Quarter 3

Strand/National Standard
Problem Solving - 3

Assessment
Instrument

ITBS	CRT	EOI	ACT	SAT	AP
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Lesson Objective: Solve trigonometric equations.

Prerequisites: Solve algebraic equations. Know the quadratic formula.

Blooms	K	C	A	A	S *	E
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Suggested Teaching Strategies:

- Watch for extraneous answers.

Aligned Instructional Resources:

- Trigonometry, Prentice Hall, pp. 265-272

Assessment Sample Format:

Find the general solution(s) of $3 \tan^2 x - 4 \tan x - 7 = 0$

Additional Resources/Notes:

Date(s) Taught							
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Course/Level
Trigonometry

PASS Objective:

Time Range:
Hours 1
Quarter 3

Strand/National Standard
Numbers and Operations - 1

Assessment
Instrument

ITBS	CRT	EOI	ACT	SAT	AP
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Lesson Objective: Be able to work in the polar coordinate system.

Prerequisites: Know the rectangular coordinate system.

Blooms	K	C	A *	A	S	E
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Suggested Teaching Strategies:

- Point out that there is a unique ordered pair for each point in the rectangular system, but in the polar system there are an infinite number of ordered pairs to represent one point.

Aligned Instructional Resources:

- Trigonometry, Prentice Hall, p. 286-291

Assessment Sample Format:

Given (5,7) in the Cartesian Plane, find an equivalent polar coordinate.

Additional Resources/Notes:

Date(s) Taught							
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Course/Level
Trigonometry

PASS Objective:

Time Range:
Hours 1
Quarter 3

Strand/National Standard
Numbers and Operations – 1

Assessment
Instrument

ITBS	CRT	EOI	ACT	SAT	AP
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Lesson Objective: Use polar coordinates to express complex numbers.

Prerequisites: Skill with the complex number system.

Blooms	K	C	A	A *	S	E
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Suggested Teaching Strategies:

- Compare and contrast the conversions between rectangular and polar and between complex and polar.

Aligned Instructional Resources:

- Trigonometry, Prentice Hall, pp. 303-312

Assessment Sample Format:

Write $3 + i\sqrt{2}$ in polar form.

Additional Resources/Notes:

Date(s) Taught							
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