



Geometry Help

Click on the contents button for more information.

Introduction

The goal in geometry is to be able to do many of the things that a surveyor, a draftsman, or an architect can do. For example, if we are given the lengths of the sides of a lot and the angles formed at the vertices, we should be able to make a scale drawing of the lot using a ruler, a compass, and a protractor. We should be able to divide this drawing of the lot into triangles and construct and measure the altitudes of the triangles. We should then be able to find the areas of the triangles to get the total area of the lot. We should then be able to use ratio and proportions to convert this area into acreage. We should also be able to use right triangle trigonometry to find the grade of the lot, or the height of objects on or near the lot.

We should be able to use the compass to locate the corner of a house to be built on the lot. We should be able to use the 6-8-10 triangle to line up square corners for the house. We should be able to measure the diagonals of rectangular foundation markers to insure 90 degree angles. We should be able to find perimeters, areas, and volumes in order to estimate how much materials to buy. We should be able to construct house floor plans using the ruler, compass, and protractor, changing dimensions to satisfy needs for use and space. We should be able to interpret and construct either similar or congruent geometric drawings of house elevation plans or perspectives. In short, from our knowledge of basic geometry we should be able to determine any needed geometric facts in order to solve these or similar problems.

In this program we will take the Euclidean approach to geometry. We will start with a few assumptions and gradually build on these until we have developed all of the geometric results that we need to achieve our goals.

Axioms from Geometry

1. A line contains at least two points. A plane contains at least three noncollinear points. Space contains at least four noncoplanar, noncollinear points.
2. If two points are contained in a plane, then the line that contains them is also contained in the plane.
3. If two planes intersect, they intersect in a line.
4. Two distinct points determine a line.
5. Three noncollinear points determine a plane.
6. The distance between two points is unique.
7. Given a line segment with one endpoint at zero on a number line, there is unique real number coordinate at the other end.
8. If point Q is between A and B then the length of \overline{AQ} plus the length of \overline{QB} equals the length of \overline{AB} .
9. A line segment has a unique midpoint.
10. The measure of an angle is unique.
11. If you place a protractor on an angle with the initial side at zero degrees, then there is a unique degree measure at the terminal side of the angle.
12. If point P is interior to $\angle ABC$, then the measure of $\angle ABP$ plus the measure of $\angle PBC$ equals the measure of $\angle ABC$.
13. The angle bisector of a given angle is unique.
14. All right angles are congruent.
15. If two angles form a linear pair, then they are supplementary.
16. If two angles and the included side of one triangle are congruent to the corresponding parts of another triangle, then the triangles are congruent.
17. If two sides and the included angle of one triangle are congruent to the corresponding parts of another triangle, then the triangles are congruent.
18. If three sides of one triangle are congruent to the corresponding sides of another triangle, then the triangles are congruent.
19. Two coplanar lines crossed by a transversal are parallel if and only if the resulting corresponding angles are congruent.

20. Two triangles are similar if three angles of one triangle are equal to the three corresponding angles of the other triangle.
21. Two circles are congruent if and only if their radii are equal.
22. Formula axiom:
- a) Circumference of a Circle: $C = 2\pi r = \pi d$
- b) Area of a Circle: $A = \pi r^2$
- c) Area of a Sector: $A = \frac{1}{2}\theta r^2$, where θ is in radian measure
- d) Arc length $S = r\theta$, where θ is in radian measure
23. If a line is tangent to a circle at point P, then the line is perpendicular to the radius at point P.
24. If a radius is perpendicular to a line at a point on the circle, then the line is a tangent line.
25. If A, P, and B are points on a circle with P between A and B, then $m \text{ arc } AB = m \text{ arc } AP + m \text{ arc } PB$.

Axioms from Algebra

1. The sum of two real numbers is a real number Closure axiom for addition
2. $a + (b + c) = (a + b) + c$ Associative axiom for addition
3. $a + b = b + a$ Commutative axiom for addition
4. $a + 0 = a$ Additive identity axiom
5. $a + (-a) = 0$ Additive inverse axiom
6. The product of two real numbers is a real number Closure axiom for multiplication
7. $a(b \times c) = (a \times b)c$ Associative axiom for multiplication
8. $a \times b = b \times a$ Commutative axiom for multiplication
9. $a \times 1 = a$ Multiplicative identity axiom
10. $a \times 1/a = 1$ Multiplicative inverse axiom
11. $a(b + c) = ab + ac$ Distributive axiom
12. $a = a$ Reflexive axiom
13. If $a = b$, then $b = a$ Symmetric axiom
14. If $a = b$ and $b = c$, then $a = c$ Transitive axiom
15. If $a = b$, then you can substitute a for b Substitution axiom
16. Either $a = b$, $a > b$, or $a < b$ Trichotomy axiom
17. If $a = b$, then $a + c = b + c$ Addition axiom for equations
18. If $a = b$, then $ac = bc$ Multiplication axiom for equations
19. If $a < b$, then $a + c < b + c$ Addition axiom for inequalities
20. If $a < b$ and $c > 0$, then $ac < ab$
If $a < b$ and $c < 0$, then $ac > ab$ Multiplication axiom for inequalities

Postulates

A postulate is by definition the same thing as an axiom. Please see axioms for geometry.

Theorems

- 2.8.1** If $a = b$ and $c = d$, then $a + c = b + d$.
- 2.8.2** If $a = b$ and $c = d$, then $ac = bd$.
- 2.8.3** Congruence of segments is reflexive, symmetric, and transitive.
- 2.8.4** If \overleftrightarrow{AC} and \overleftrightarrow{EB} intersect at P, then $\angle APB$ and $\angle BPC$ are supplementary.
- 2.8.5** Supplements of congruent angles are congruent.
- 2.8.6** Supplements of an angle are congruent.
- 2.8.7** Complements of congruent angles are congruent.
- 2.8.8** Complements of an angle are congruent.
- 2.8.9** Vertical angles are congruent.
- 2.8.1** Congruence of angles is reflexive, symmetric, and transitive.
- 0**
- 3.4.1** Two coplanar lines crossed by a transversal are parallel if and only if alternate interior angles are equal.
- 3.4.2** Two coplanar lines crossed by a transversal are parallel if and only if the interior angles on the same side of the transversal are supplementary.
- 3.5.1** The sum of the measures of the interior angles of a triangle is 180° .
- 3.5.2** The measure of an exterior angle of a triangle is equal to the sum of the measures of the corresponding remote interior angles.
- 3.5.3** The sum of the measures of the exterior angles of a triangle is 720° .
- 3.5.4** If two angles of one triangle are congruent to two angles of another triangle, then the remaining corresponding angles are congruent.

- 3.5.5** If two angles and the side opposite one of the angles in one triangle are congruent to the corresponding parts of another triangle, then the triangles are congruent.
- 3.5.6** Congruence of triangles is reflexive, symmetric, and transitive.
- 3.6.1** Two sides of a triangle are congruent if and only if the angles opposite these sides are congruent.
- 3.6.2** A triangle is equilateral if and only if it is equiangular.
- 4.2.1** Each diagonal of a parallelogram divides the figure into two congruent triangles.
- 4.2.2** Opposite sides of a parallelogram are congruent.
- 4.2.3** Opposite angles of a parallelogram are congruent.
- 4.2.4** Consecutive angles of a parallelogram are supplementary.
- 4.2.5** The diagonals of a parallelogram bisect each other.
- 4.2.6** If both pairs of opposite sides of a quadrilateral are congruent, then it is a parallelogram.
- 4.2.7** If both pairs of opposite angles of a quadrilateral are congruent, then it is a parallelogram.
- 4.2.8** If the diagonals of a quadrilateral bisect each other, then it is a parallelogram.
- 4.3.1** A parallelogram is a rhombus if and only if the diagonals are perpendicular.
- 4.3.2** A parallelogram is a rhombus if and only if the diagonals bisect opposite angles.
- 4.4.1** A parallelogram is a rectangle if and only if its diagonals are congruent.

- 4.4.2** The segment joining the midpoints of two sides of a triangle is parallel to the third side and equal to one-half of it.
- 4.5.1** Each pair of base angles in an isosceles trapezoid are equal.
- 4.5.2** The diagonals of an isosceles trapezoid are congruent.
- 4.5.3** The median of a trapezoid is parallel to the bases, and its length is one-half the sum of the lengths of the bases.
- 4.6.1** The sum of the measures of the interior angles of a convex polygon with n sides is $(n-2) \times 180$.
- 4.6.2** The sum of the measures of the exterior angles of a convex polygon is 720.
- 4.6.3** The measure of each exterior angle of a regular polygon with n sides is $720/2n$
- 4.6.4** The measure of each interior angle of a regular polygon with n sides is $(n-2) \times 180/n$.
- 5.5.1** The ratio of the perimeters of two similar polygons is equal to the ratio of a pair of corresponding sides of the polygons.
- 5.6.1** Two triangles are similar if two angles of one triangle are equal to the two corresponding angles of the other triangle. (AA)
- 5.6.2** Two triangles are similar if one pair of corresponding angles are equal and the including sides are proportional. (SAS)
- 5.6.3** Two triangles are similar if the three sides of one triangle are proportional to the corresponding three sides of the other triangle. (SSS)
- 5.6.4** The areas of two similar triangles are proportional to the squares of two corresponding sides.
- 5.6.5** Similarity of triangles is reflexive, transitive, and symmetric.

- 5.8.1** If a line segment intersects two sides of a triangle and is parallel to the third side, then this line segment divides the two intersected sides proportionally.
- 5.8.2** An angle bisector of a triangle divides the side opposite the angle into two segments whose lengths are proportional to the two sides of the triangle that include the angle.
- 5.8.3** If two triangles are similar, corresponding angle bisectors are proportional to corresponding sides.
- 5.8.4** If two triangles are similar, corresponding medians are proportional to corresponding sides.
- 5.8.5** If two triangles are similar, corresponding altitudes are proportional to corresponding sides.
- 5.8.6** Three or more parallel lines crossed by two transversals cut off proportional segments.
- 5.8.7** If an altitude is constructed from the 90 degree angle to the hypotenuse of a right triangle, the new triangles formed are similar to the original right triangle.
- 7.1.1** The diameter, \overline{AB} , of circle P is twice the radius.
- 7.2.1** Tangent segments \overline{CA} and \overline{CB} from point C external to circle P, and tangent at points A and B, are equal in length.
- 7.3.1** If a line through the center of a circle bisects a chord (not a diameter), then the line is perpendicular to the chord.
- 7.3.2** If a line through the center of a circle is perpendicular to a chord (not a diameter), then the line bisects the chord.
- 7.3.3** In a circle if two chords are of equal length, then they are the same distance from the center of the circle.
- 7.3.4** In a circle if two chords are the same distance from the center, then they are the same length.
- 7.4.1** If two arcs are congruent, then their corresponding chords are

congruent.

- 7.4.2** If two chords are congruent, then their corresponding arcs are congruent.
- 7.5.1** The measure of an inscribed angle is one-half the measure of its intercepted arc.
- 7.5.2** If two inscribed angles intercept the same arc, then the angles are congruent.
- 7.5.3** If an angle is inscribed in a semicircle, then it is a right angle.
- 7.5.4** If a quadrilateral is inscribed in a circle, then its opposite angles are supplementary.

Definitions

- 1.2.1 SPACE** Space is the set of all points.
- 1.2.2 GEOMETRIC FIGURE** Any collection of points, lines, or planes.
- 1.2.3 COLLINEAR** A collection of points is collinear if there is a line containing all of the points.
- 1.2.4 COPLANAR** A collection of points is coplanar if there is a plane containing all of the points.
- 1.2.5 COORDINATE** If a point A is located at a certain real number on a scaled number line, then that real number is the coordinate of the point A.
- 1.2.6 DISTANCE** If two points, A and B, are located on a number line, then the positive difference of their coordinates is the distance between A and B.
- 1.2.7 LINE SEGMENT** If points A and B are on line l, then the line segment determined by A and B are the endpoints A and B combined with all of the points between A and B.
- 1.2.8 ENDPOINTS** The endpoints of the line segment determined by A and B are the points A and B.
- 1.2.9 LENGTH** The length of a line segment determined by A and B is the distance from A to B.
- 1.2.1 CONGRUENT** Two line segments are congruent if they have the same length.

1.4.1	MIDPOINT	The midpoint M of segment π is the point halfway between A and B, such that $AM=MB$.
1.4.2	BISECTOR	The bisector of a line segment is another line, point, or plane that passes through the midpoint of the segment.
1.6.1	ANGLE	An angle is the union of two rays that share a common endpoint.
1.6.2	CONGRUENT ANGLE	Two angles are congruent if they have the same measure.
1.6.3	ANGLE BISECTOR	An angle bisector is a ray or half-plane interior to π ABC that divides the angle into two angles with equal measure.
1.7.1	STRAIGHT ANGLE	A straight angle is an angle whose sides form a line or whose measure is 180π
1.7.2	ACUTE ANGLE	An acute angle is an angle whose measure is between 0π and 90π .
1.7.3	RIGHT ANGLE	A right angle is an angle whose measure is equal to 90π .
1.7.4	OBTUSE ANGLE	An obtuse angle is an angle whose measure is between 90π and 180π .
1.7.5	COMPLEMENTARY ANGLES	Two angles are complementary angles if the sum of their measures is 90π .
1.7.6	SUPPLEMENTARY ANGLES	Two angles are called supplementary angles if the sum of their measures is 180π .
1.7.7	VERTICAL ANGLES	Two angles are called vertical angles if their sides form two pairs of opposite rays.
1.7.8	ADJACENT ANGLES	Two angles are adjacent if they share a common side and have the same vertex.
1.7.9	PERPENDICULAR LINES	Two lines are perpendicular lines if they intersect at right angles.
1.7.10	PERPENDICULAR BISECTOR	A perpendicular bisector of a line segment is a line that intersects the segment at a right angle and passes through the midpoint of the segment.
2.7.1	LINEAR PAIR	A linear pair of angles is an adjacent pair of angles whose outside rays form a straight angle.
3.1.1	TRIANGLE	A triangle is the union of three line segments joining

three noncollinear points.

- 3.1.2 ACUTE TRIANGLE** An acute triangle is one in which all angles are acute angles.
- 3.1.3 OBTUSE TRIANGLE** An obtuse triangle is a triangle with one obtuse angle.
- 3.1.4 RIGHT TRIANGLE** A right triangle is a triangle with one right angle. In a right triangle the longest side is called the hypotenuse, and the other two sides are called the legs of the triangle.
- 3.1.5 EQUILATERAL TRIANGLE** An equilateral triangle is a triangle with all angles equal.
- 3.1.6 SCALENE TRIANGLE** A scalene triangle is a triangle with no two sides equal.
- 3.1.7 ISOSCELES TRIANGLES** An isosceles triangle is a triangle with two equal sides. The third side is called the base.
- 3.1.8 EQUILATERAL TRIANGLE** A triangle is called an equilateral triangle if all three sides are equal in length.
- 3.3.1 CONGRUENT TRIANGLES** Two triangles are congruent if all the pairs of corresponding parts are congruent.
- 3.4.1 PARALLEL LINES** Two lines are parallel if they are coplanar and they do not intersect.
- 3.4.2 SKEW LINES** Two lines are skew lines if they are not coplanar.
- 3.4.3 TRANSVERSAL** A transversal is a line that intersects two other coplanar lines.
- 3.6.1 MEDIAN** A median of a triangle is the line segment joining a vertex to the midpoint of the opposite side.
- 3.6.2 ALTITUDE** An altitude of a triangle is a line segment from a vertex perpendicular to the opposite side.

- 3.6.3 ANGLE BISECTOR OF A TRIANGLE** An angle bisector of a triangle is a line segment that extends from a vertex to the side opposite in such a way that it bisects the angle at the vertex.
- 4.1.1 QUADRILATERAL** A quadrilateral is the union of four coplanar segments with each segment intersecting exactly two other segments at the endpoints, and no two segments collinear.
- 4.1.2 PARALLELOGRAM** A parallelogram is a quadrilateral in which both pairs of opposite sides are parallel.
- 4.1.3 RHOMBUS** A rhombus is a parallelogram with four equal sides.
- 4.1.4 RECTANGLE** A rectangle is a parallelogram with four right angles.
- 4.1.5 SQUARE** A square is a rectangle with four equal sides.
- 4.1.6 TRAPEZOID** A trapezoid is a quadrilateral with exactly one pair of opposite sides parallel. The parallel sides are called bases, and the nonparallel sides are the legs. If the legs are equal, the trapezoid is called an isosceles trapezoid.
- 4.5.1 MEDIAN OF A TRAPEZOID** The median of a trapezoid is the line segment that joins the midpoints of the legs of the trapezoid.
- 4.6.1 POLYGON** A polygon is the union of three or more coplanar line segments with each segment intersecting exactly two other segments, one at each endpoint, and with no two intersecting line segments collinear.
- 4.7.1 PERIMETER** The perimeter of a polygon is the sum of the measures of the lengths of the sides.
- 5.5.1 SIMILAR POLYGONS** Two polygons are similar if there is a correspondence between their vertices such that corresponding angles are equal, and corresponding sides are proportional.
- 5.6.1 SIMILAR TRIANGLES** Two triangles are similar if corresponding angles are equal, and corresponding sides are proportional.
- 7.1.1 CIRCLE** A circle is the set of all points in a plane that are a fixed distance from a point called the center of the circle.

7.1.2	RADIUS	A radius of a circle is a line segment joining the center of the circle to one of the points on the circle.
7.1.3	DIAMETER	A diameter of a circle is a line segment that contains the center of the circle and has its endpoints on the circle.
7.1.4	SECANT	A secant is a line that intersects a circle in two points.
7.1.5	TANGENT	A tangent to a circle is a line that intersects the circle in exactly one point. The point is called the point of the tangent.
7.1.6	CHORD	A chord is a line segment with endpoints on the circle.
7.4.1	ARC	An arc of a circle is an unbroken portion of the circle.
7.4.2	SEMICIRCLE	An arc of a circle is a semicircle if the endpoints of the arc are on the endpoints of a diameter.
7.4.3	MAJOR ARC	A major arc is an arc that is larger than a semicircle. A minor arc is an arc that is smaller than a semicircle.
7.4.4	CENTRAL ANGLE	A central angle is an angle whose vertex is at the center of a circle and whose sides are radii of the circle.
7.4.5	CONGRUENT ARCS	Two arcs are congruent if they have the same measure and are on the same or congruent circles.
7.5.1	INSCRIBED ANGLE	An inscribed angle is an angle whose vertex is on a circle and whose sides intersect the circle in two other points.
7.7.1	INSCRIBED POLYGON	A polygon is inscribed in a circle if its vertices lie on the circle.
7.7.2	CIRCUMSCRIBED POLYGON	A polygon is circumscribed about a circle if the sides are tangent to the circle.
7.7.3	CONCURRENT LINES	Two or more lines are concurrent if they intersect on a single point.
7.7.4	CIRCUMCENTER	The circumcenter is the intersection of the

perpendicular bisectors of the sides.

7.7.5 INCENTER

The incenter is the intersection of the angle bisectors of the triangle.

7.7.6 ORTHOCENTER

The orthocenter is the intersection of the lines containing the altitudes of the triangle.

7.7.7 CENTROID

The centroid of a triangle is the intersection of the medians of the triangle.

Having Trouble?

If you are getting an **Invalid Property Value** message this is usually due to the fact that this program tried but could not install the font resource (needed for this program) into the Windows 95 font table. Why? Good question. Some programs (especially font managers) take over control of the font table and don't allow installation of fonts unless they are installed manually or through the font manager. Is this a nice thing to do? We don't think so and we don't believe Microsoft does either. There is a fix though. To run our program correctly you will have to manually install the font(s) by using the **Install New Font** option in the **File Menu** of the Windows 95 **Font Folder**. All of our true type fonts (usually just one) are located in our program's directory. **Make sure** that you **remove** the **check mark** from the **Copy fonts to Windows folder (check box)** before you click the **OK** button. If your still having trouble call Technical Support.

Selecting Chapters and Sections



To select a chapter or section double click with the mouse or use the up and down arrow keys to highlight the topic and then press the ENTER key. This brings up the Problems window.

Click the part of the Angular Measurement window that you want to know more about.

Angular Measurement

Directions: Please measure the given angle to the nearest degree. Press the Next Problem button to see the next problem, and press the Answer button to see the correct angular measurement.

Next Problem **Answer** 40° acute angle

Exit

The diagram shows a space shuttle with a protractor overlaid. The vertex of the angle is at point P, which is on the horizontal line extending from the base of the shuttle. The angle is measured from the horizontal line to the top of the shuttle at point B. The angle is 40 degrees.

This is the display area for the compass and the drawing. This is where you measure the given angle by inspection.

Click on this button to see the answer.

This is where the answer will be displayed if you click over the Answer button.

This will display the next measurement. After the eleventh drawing is displayed, if you click this button the program will loop back to the first drawing.

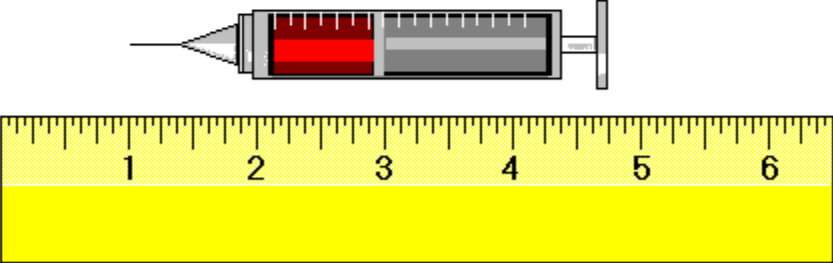
[Click here to exit and close this window.](#)

Click the part of the Linear Measurement window that you want to know more about.

Linear Measurement

Directions: Please measure the given figure to the nearest eighth of an inch. Press the Next Problem button to see the next problem, and press the Answer button to see the correct linear measurement.

Next Problem **Answer** 3 3/4 inches Exit



The image shows a syringe with a red plunger and a yellow ruler below it. The ruler is marked from 1 to 6 inches. The plunger is positioned at the 3 3/4 inch mark.

This is the display area for the ruler and the drawing. This is where you measure the given length by inspection.

Click on this button to see the answer.

This is where the answer will be displayed if you click over the Answer button.

This will display the next measurement. After the eleventh drawing is displayed, if you click this button the program will loop back to the first drawing.

[Click here to exit and close this window.](#)

Click the part of the Construction window that you want to know more about.

Geometric Constructions

Click over the construction that you wish to see from this list box. Press F1 if you need help.

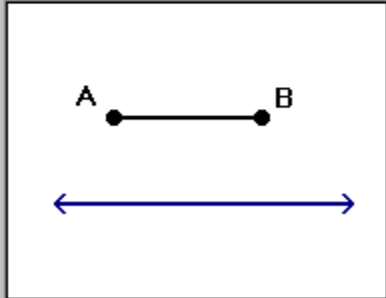
- 1 Construct a line segment congruent to a given line segment
- 2 Construct the perpendicular bisector of a given segment
- 3 Construct an angle congruent to a given angle
- 4 Construct the bisector of a given angle
- 5 Construct a line perpendicular to a given line through a given point
- 6 Construct a line parallel to a given line through a given point
- 7 Construct a line that is perpendicular to a given line and passing through a point not on the line
- 8 Construct the altitude of a triangle from a given vertex
- 9 Divide a segment into three congruent segments
- 10 Divide a given segment into segments whose lengths are proportional to the lengths of 3 other segments

To construct a line segment congruent to line segment \overline{AB} , you should complete the following steps by clicking the step option buttons in sequence.

Instructions

Step 1
 Step 2
 Step 3
 Step 4
 Step 5

Draw a line with a ruler.



Exit

This is a list box allowing you to select any one of the twenty four constructions available in this window. Click to select or use the scroll bars to select constructions not presently visible.

This area displays general instructions.

Click on these step option buttons to view the instructions and results needed to build each construction.

This area displays the instructions for the selected step.

This is the drawing area. The result of following the instructions for the selected step is displayed in this area.

Click the part of the Problems window that you want to know more about.

The screenshot shows a software window titled "Section 1 Introduction" with a menu bar containing "Example", "Worked", "Details", "Calc", "Construct", "Measurement", "Print", "Score", "Help", and "Exit". Below the menu bar is a toolbar with icons for "example", "worked", "details", a grid, a printer, a "100%" score, and "Exit". The text "Total Problems 3" is displayed on the right. The main content area has an "Instructions" section: "Please answer the following questions about the origins of geometry." Below this is "PROBLEM 2" with the question: "Who is credited with systematically developing the method of logical deductive reasoning?" The options are: A) Plato, B) Aristotle, C) Euclid, and D) Alexander. At the bottom, there are four buttons labeled "A", "B", "C", and "D", and two navigation buttons: "PgUp-Previous" and "PgDn-Next".

Section 1 Introduction

Example Worked Details Calc Construct Measurement Print Score Help Exit

example worked details 100% Exit Total Problems 3

Instructions
Please answer the following questions about the origins of geometry.

PROBLEM 2
Who is credited with systematically developing the method of logical deductive reasoning?

A) Plato B) Aristotle
C) Euclid D) Alexander

A B C D PgUp-Previous PgDn-Next

Select **A**, **B**, **C** or **D** as your choice for the answer to the problem. A right or wrong response will then appear.

Select PageUp to view the previous problem and PageDown to see the next problem.

This is the display area for all problems.

Clicking here will exit or close the Problems window.

Instructions for all problems of this type.

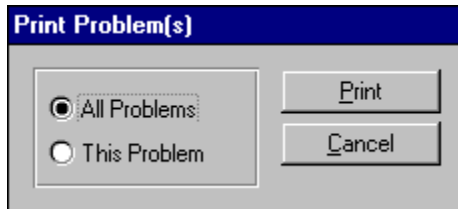
The Example window displays an example problem similar to the current one you are viewing in the Problems window.

The Worked window displays the current problem worked out step-by-step.

The Details window describes in depth the material needed to successfully complete the problem.

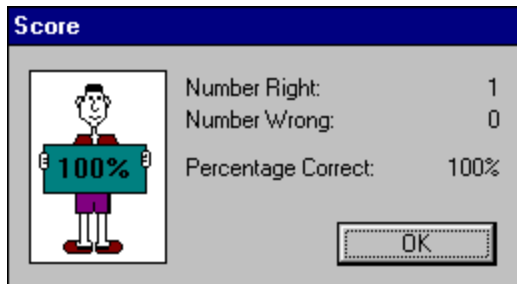
Click here to select either the angular or linear measurement windows. These problems provide good practice at determining the measure of angles and lines. For more information, select either the **Angular Measurement** or **Linear Measurement** help topics from the help contents.

Printing Problems



Clicking this option allows you to print **one** or **all** of the problems in this section.

Your Score



A dialog box titled "Score" with a blue header. On the left is a cartoon character holding a sign that says "100%". To the right, the following statistics are listed:

Number Right:	1
Number Wrong:	0
Percentage Correct:	100%

An "OK" button is located at the bottom right of the dialog box.

Clicking on this option will display the number of correct and incorrect answers that you have chosen in this section. If you answered a problem incorrectly and went back and changed it to the correct answer, it would no longer be counted as incorrect. Your score is not available in a review section.

The Resume Feature

By clicking this option the program will automatically return you to the chapter, section and problem that you were working on before you last exited the program. All your previous answers for that section are also restored.

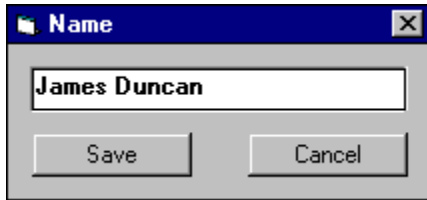
Playing Sounds

To play the sounds that come with this program, you'll need to click over the **Sound** option located on the main menu bar. You can either enable or disable the programs ability to play sounds by clicking over the appropriate command. The current option selected will have a check mark in front of it and the settings are automatically saved when they are changed. To properly hear the sound (.WAV) files you'll need to have a sound driver installed as well as a sound card that gives you sound capabilities. Consult your Windows or sound card documentation for further assistance.

Many thanks to **Megan Kelly** for the use of her voice. Also, many thanks to **Beachware** for letting us use some of the sounds from their Shareware Breakthrough Sound Works Collection in this program.

Also, many thanks to **Elizabeth Lassiter** for typing this program.

Entering Your Name

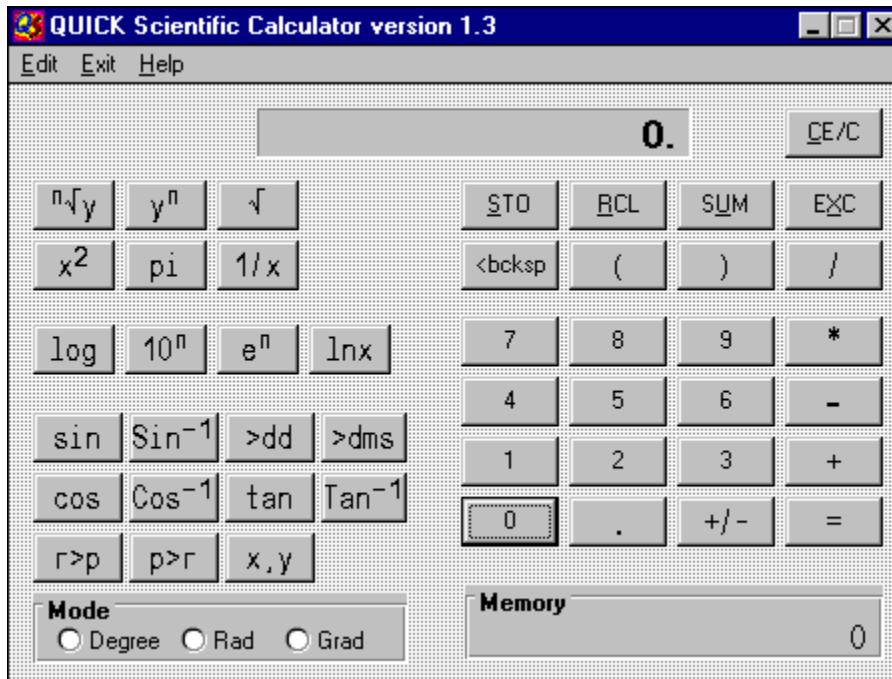


Clicking this option allows you to enter and save your name. When you send problems to the printer the name saved here will be displayed at the top of the printout.

Review Sections

Reviews are a compilation of all the sections in the chapter. No examples, worked, or details text can be displayed in a review section; however, your score and right or wrong responses are available.

Calculator Help



Click the part of the Calculator window that you want to know more about.

Finds y raised to the nth power. $3^2 = \underline{9}$

Returns the square root of the number.

Returns the number squared.

Returns the constant pi.

Calculates the common logarithm (base 10) of the number being displayed.

Calculates the common antilogarithm of the number being displayed, by raising 10 to the displayed power.

Calculates the natural antilogarithm of the number being displayed. It raises the constant **e** to the displayed power.

Calculates the natural logarithm (base e) of the number being displayed.

Returns the sine of the value being displayed.

Returns the sine inverse of the value being displayed.

Returns the cosine of the value being displayed.

Returns the cosine inverse of the value being displayed.

Returns the tangent of the number being displayed.

Returns the tangent inverse of the value being displayed.

Converts degrees, minutes, seconds to decimal degrees.

Converts decimal degrees to degrees, minutes, seconds.

Changes rectangular coordinates to polar coordinates.

Changes polar coordinates to rectangular coordinates.

Values will display in degrees.

Values will display in radians.

Values will display in gradients.

The display area for the entered/computed values.

Parentheses - used for parenthetical expressions. i.e. $(7+3)/2 = \underline{5}$

Used to separate x,y values when changing polar to rectangular or rectangular to polar coordinates. i.e. to convert (7,8) from rectangular to polar enter: 7 <x,y> 8 <p>r>
36.8698 <x,y> 10.

Clicking on this key causes the displayed value to be stored in the memory register replacing any value already in that register.

Clicking on this key copies the contents of the memory register to the displayed value window. The value in the memory register now becomes the displayed value.

Clicking on this key sums the displayed value and the contents of the memory register with the result being stored in the memory register.

Clicking on this key causes the displayed value and the contents of the memory register to be exchanged.

Clicking on this key clears the current calculation and displayed value. This key **does not** clear the memory register. To do that click on this key and then click the STO key.

Clicking on this key deletes the last digit of the displayed value during the entry process. This key is general used to edit an entry if the wrong digit was pressed.

division operator.

multiplication operator

subtraction operator

addition operator

= performs any calculation on the previous two numbers.

square root function

Clicking on the key finds the **n th** root of **x** . Enter **x** , click this key, enter **n** and click the EQUAL key.

Clicking on this key calculates x to the **nth** power.

the memory register

changes the sign of the displayed value

inserts a decimal point

returns the reciprocal of the displayed value $1/x$

