2-2- the angle between two lines

A calculator to find the angle between two lines L_1 and L_2 given by their general equation of the form

$$a\,x + b\,y = c$$

The formula used to find the acute angle (between 0 and 90°) between two lines L_1 and L_2 with slopes m_1 and m_2 is given by

$$\theta = |\tan^{-1}((m_2 - m_1) / (1 + m_2 \times m_1))|$$

Example:

1) Find the angle between the following two lines.

Line 1: $3x - 2y = 4$

Line 2: $x + 4y = 1$

Solution :

Put $3x - 2y = 4$ into slope-intercept form so you can clearly identify the slope.

$3x - 2y = 4$

$2y = 3x - 4$

$y = 3x / 2 - 4/2$

$y = (3/2)x - 2$

Put x + 4y = 1 into slope-intercept form so you can clearly identify the slope.

$x + 4y = 1$

$4y = -x + 1$

$y = -x/4 + 1/4$

$y = (-1/4)x + 1/4$

The slopes are 3/2 and -1/4 or 1.5 and -0.25. It does not matter which one is m_1 or m_2. You will get the same answer.

Let $m_1 = 1.5$ and $m_2 = -0.25$

$\theta = |\tan^{-1}((m_2 - m_1) / (1 + m_2 \times m_1))|$

$\tan \theta = 1.5 - -0.25 / 1 + 1.5 \times -0.25$

$\tan \theta = 1.5 + 0.25 / 1 + -0.375$

$\tan \theta = 1.75 / 0.625 = 2.8$

$\theta = \tan^{-1}(2.8) = 70.35$ degrees

Equations for the chapter one

Q1 /Find the slope of a line through two points (-1, -7) and (2, 3).

Q2 / What is the equation of the vertical line passing through

(-11,3)?

Q3 / What is the slope of the line x = -8?

Q4 / What is the slope of a line perpendicular to the line 4x - 3y + 7 = 0.

Q5 / Find the equation of a line passing through (4, -3), and has the slope of t perpendicular line as 2/3.

Q6 /How far is the point (6,8) from the origin?

Q7 / Find the distance between the two points (–3, 2) and (3, 5).

Q8 /Find the distance of the point (-3, 5) from the line $4x - 3y - 26 = 0$.

Q9 / Find the angle between two lines having slopes of 1, and 1/2 respectively.

Chapter Tow

1-What are Trigonometric Functions?

2- Trigonometric Functions Formulas

3-Trigonometric Functions Values

4-Trig Functions in Four Quadrants

5-Trigonometric Functions Identities

6-Sum and Difference Identities

7-Half-Angle Identities

8-Double Angle Identities

9-Triple Angle Identities

10- Product identities

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Chapter Tow

Trigonometric Functions

Trigonometric functions are the basic six functions that have a domain input value as an angle of a right triangle, and a numeric answer as the range. The trigonometric function (also called the 'trig function') of $f(x) = \sin\theta$ has a domain, which is the angle θ given in degrees or radians, and a range of [-1, 1]. Similarly we have the domain and range from all other functions. Trigonometric functions are extensively used in calculus, geometry, algebra.

Here in the below content, we shall aim at understanding the trigonometric functions across the four quadrants, their graphs, the domain and range, the formulas, and the differentiation, integration of trigonometric functions. We will solve a few examples using these six trig functions for a better understanding of them and their applications.

2-1-What are Trigonometric Functions?

There are six basic trigonometric functions used in Trigonometry. These functions are trigonometric ratios. The six basic trigonometric functions are sine function, cosine function, secant function, co-secant function, tangent function, and co-tangent function. The trigonometric functions and identities are the ratio of sides of a right-angled triangle. The sides of a right triangle are the perpendicular side, hypotenuse, and base, which are used to calculate the sine, cosine, tangent, secant, cosecant, and cotangent values using trigonometric formulas.

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