

Gradient & Equation of a Straight Line

Today we are revising...

How to find the gradient and equation of a straight line.

I will know if I have been successful if...

I can recall two straight line formula.

I can find the gradient of a straight line.

I can find the equation of a straight line.



Gradient of a Straight Line Given 2 Points

Given two coordinate points on a straight line (x_1, y_1) and (x_2, y_2) the gradient of a straight line is given by the formula...

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

One Example

Find the gradient of the straight line between the points (2, 4) and (5, 13)

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

7 Questions

1) (4, 3) and (8, 11)

2) (1, 9) and (3, 1)

3) (-2, 6) and (8, 8)

4) (5, -9) and (8, -15)

5) (0, 6) and (5, 11)

6) (-2, -3) and (7, -9)

7) (-4, 0) and (-1, 5)

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

Answers

- 1) (4, 3) and (8, 11) $m = 2$
 2) (1, 9) and (3, 1) $m = -4$
 3) (-2, 6) and (8, 8) $m = 0.2$
 4) (5, -9) and (8, -15) $m = -2$
 5) (0, 6) and (5, 11) $m = 1$
 6) (-2, -3) and (7, -12) $m = -1$
 7) (-4, 0) and (-1, 5) $m = -9$

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

Equation of a Straight Line Given 2 Points

Given two coordinate points on a straight line (x_1, y_1) and (x_2, y_2) the equation of a straight line is given by the formula...

$$y - b = m(x - a)$$

where

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

One Example

Find the equation of the straight line between the points (4, 5)
and (6, 9)

$$y - b = m(x - a)$$

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

5 Questions

1) (2, 5) and (4, 9)

2) (2, 4) and (4, 10)

3) (4, 3) and (8, 7)

4) (4, -4) and (7, -7)

5) (-4, 1) and (0, -7)

$$y - b = m(x - a)$$

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

Answers

1) $y = 2x + 1$

2) $y = 3x - 2$

3) $y = x - 1$

4) $y = -x$

5) $y = -2x - 7$

Homework

Sketch $y = \sin(x)$ and $y = \sin(2x)$ together on the same page.

Practice - What do you notice?

x	0	45	90	135	180	225	270	315	360
y									

1) $y = \sin(3x)$

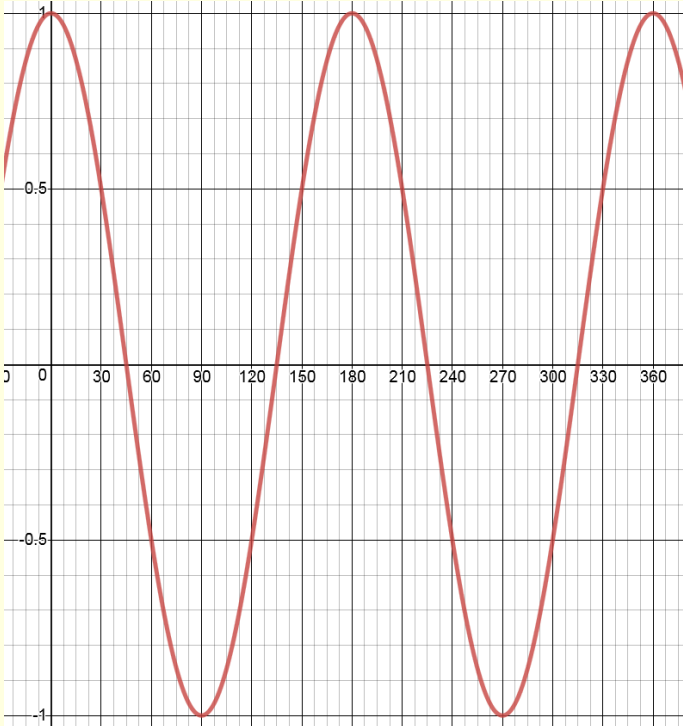
2) $y = \cos(2x)$

3) $y = \cos(4x)$

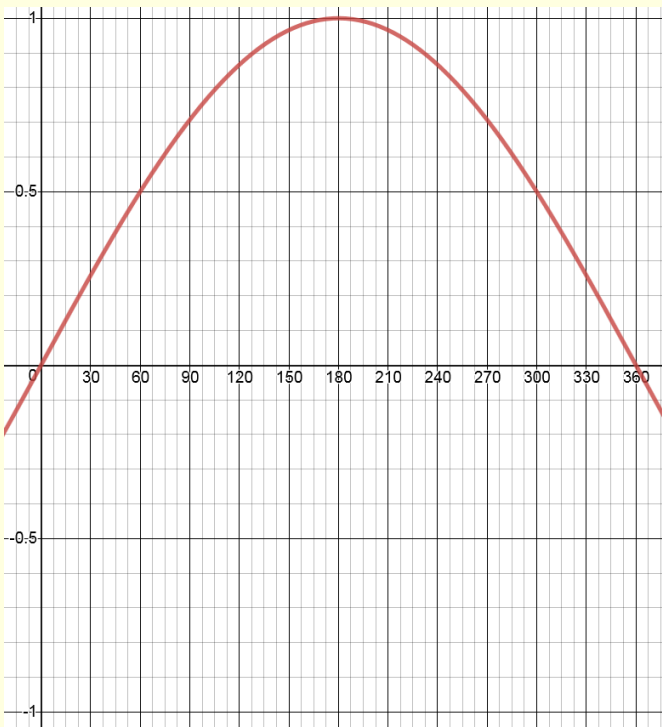
Note

$\sin(ax)$ and $\cos(ax)$ have a period of $\frac{360}{a}$ and so the graph repeats itself a times.

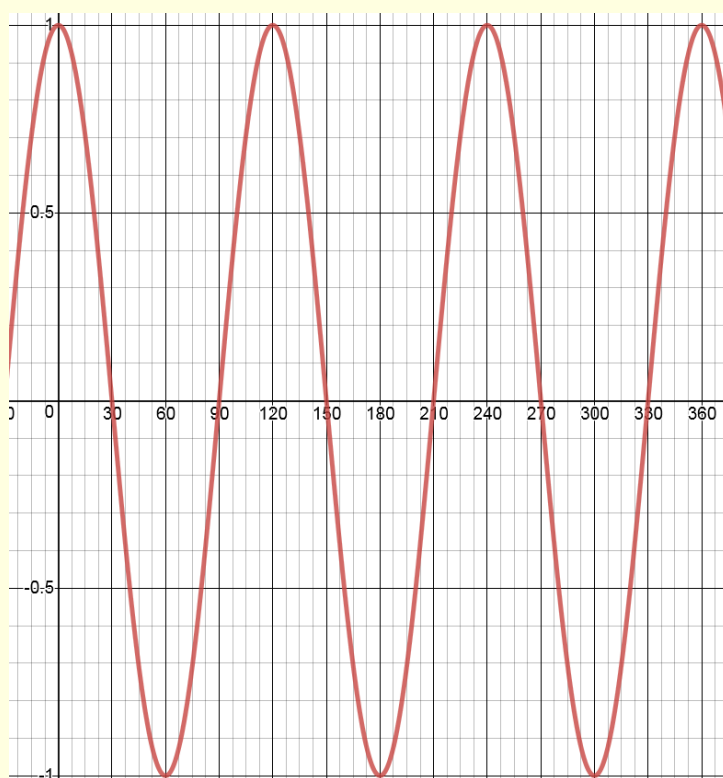
What is this graph?



What is this graph?



What is this graph?



4.1 Working with Graphs of Trigonometric Functions (1)

Same as last time but

Question 2 and 3

Adding a Constant

$$y = \sin(x) + a \text{ or } y = \cos(x) + a$$

The graph moves up in the y direction by a units.

$$y = \sin(x) - a \text{ or } y = \cos(x) - a$$

The graph moves down in the y direction by a units.

Using desmos lets see how this works.

Summary of Transformations

$$y = a\sin(x) \text{ or } y = a\cos(x)$$

Stretches the graphs in the y direction.



$$y = \sin(ax) \text{ or } y = \cos(ax)$$

The graph repeats itself a times between 0 and 360.



$$y = \sin(x) + a \text{ or } y = \cos(x) + a$$

The graph moves up and down in the y direction.



So without using a table of values can we sketch these curves?

1) $y = 3\cos(2x)$

2) $y = 2\sin(3x) + 1$

3) $y = \cos(4x) - 1$

So without using a table of values can we sketch these curves?

1) $y = 3\cos(2x)$



2) $y = 2\sin(3x) + 1$

3) $y = \cos(4x) - 1$

Without using a table of values, sketch the following curves.

1) $y = 4\cos(2x)$

4) $y = 5\sin(2x) + 1$

2) $y = 3\cos(x) + 1$

5) $y = -2\cos(2x)$

3) $y = 4\sin(3x)$

6) $y = \tan(3x) - 1$

We'll check this in Desmos so make sure you have an answer to as many as possible.

Homework and the Past Prelim Challenge

Past Prelim Paper 1

Due 23rd October