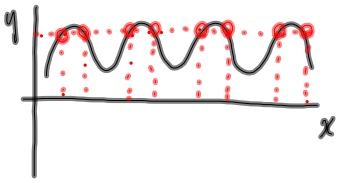
k-notation (infinite solution) + solving graphically



← infinite solution (need to have a convenient way to express this type of solution)

Number Sequences + k-notation

2, 4, 6, ... (positive even #s)

..... -3, -2, -1, 0, 1, 2, ... (integers (Z))

0, 1, 2, 3, ... (whole numbers (W))

5, 10, 15, ... The next two numbers are: 20, 25

There is another way to write a sequence of numbers by using "k-notation"

Ex 1: $3 + 4k, k \in Z$ where k is an element of the integers.

starting point ↑ 3 ↑ increment 4

$+4(-1)_k$ $+4(1)_k$

..... -5, -1, 3, 7, 11 .....

$+4(-2)_k$ $+4(2)_k$

Ex 2: $2 + 5k, k \in W$

2, 7, 12, 17, 22, ...

Ex 3: ..., -315, -45, 405, 765, ...

start ↑ -45

360 360 360

$45 + 360k, k \in Z$

Ex 4:

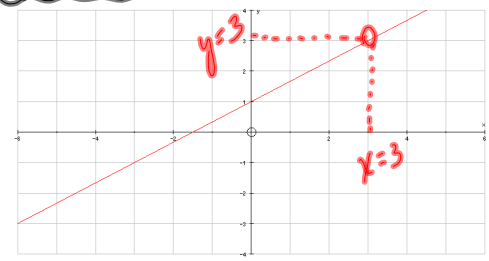
start ↑ 60

60, 240, 420, ...

180 180

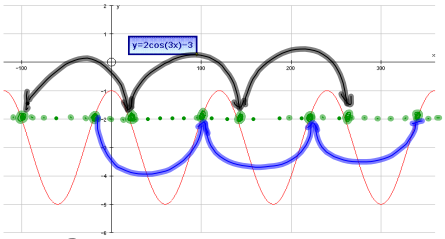
$60 + 180k, k \in W$

Single Solution



Use the graph to find x when $y = 3$

Infinite Solutions

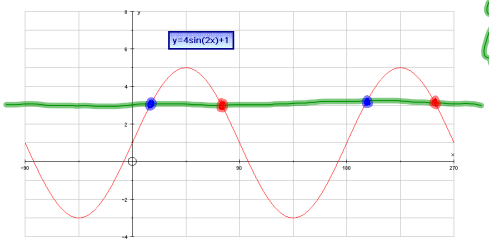


$y=-2$

$-2 = 2\cos(3x) - 3$

$$x = \begin{cases} \ldots\ldots -100, 20, 140, 260, \ldots\ldots \\ \ldots\ldots -20, 100, 220, 340, \ldots\ldots \end{cases}$$

$$x = \begin{cases} 20 + 120k, & k \in \mathbb{Z} \\ -20 + 120k, & k \in \mathbb{Z} \end{cases}$$



$y=3$

$3 = 4\sin(2x) + 1$

$$x = \begin{cases} 15 + 180k, & k \in \mathbb{Z} \\ 75 + 180k, & k \in \mathbb{Z} \end{cases}$$

Template for k notation:

$$x = \left\{ \begin{array}{l} \text{primary angle} \\ P\theta + (\text{per})k \\ S\theta + (\text{per})k \\ \text{secondary angle.} \end{array} \right\} k \in \mathbb{Z}$$