

Answer on Question #80064 - Math - Algebra

Can you please tell me the rules of finding periods of any function.

Solution:

The function is called periodic when there is such a number  $T > 0$  that equality  $f(x \pm T) = f(x)$  is fulfilled for any number from the definition area of the function. Number  $T$  is called period of function.

How do we find the period of a function of the form  $y = Af(kx + b)$  where  $A$ ,  $k$  and  $b$  are some numbers?

1. We use the formula to find a period of a function:

$$T_1 = \frac{T_0}{|k|};$$

$T_0$  is main the period of a function. For example, the main a period of a function  $y = \sin x$  and  $y = \cos x$  is the number  $2\pi$ , but the main a period of a function  $y = \tan x$  and  $y = \cot x$  is the number  $\pi$ .

So, I am finding the period of the function  $y = 2\cos(6x + \frac{\pi}{4})$ ;

$$T_1 = \frac{2\pi}{6} = \frac{\pi}{3}$$

Or I am finding the period of the function  $y = 4\tan(\frac{x}{4} + \frac{\pi}{6})$ ;

$$T_1 = \frac{\pi}{\frac{1}{4}} = 4\pi$$

Or I am finding the period of the function  $y = 2\cos\frac{x}{3} + 3\tan\frac{x}{8}$ :

1. I am finding the period of the function  $y = 2\cos\frac{x}{3}$ :

$$T_1 = \frac{2\pi}{\frac{1}{3}} = 6\pi;$$

2. I find the period of the function  $y = 3\tan\frac{x}{8}$ :

$$T_2 = \frac{\pi}{\frac{1}{8}} = 8\pi;$$

3. I find the least common multiple of numbers  $6\pi$  and  $8\pi$  or periods  $T_1$  and  $T_2$ :

$\text{LCM}(6\pi; 8\pi) = 24\pi$ . This is the period of the function  $y = 2\cos\frac{x}{3} + 3\tan\frac{x}{8}$ .