

$$1/(\operatorname{tg}5x + \operatorname{tg}2x) - 1/(\operatorname{ctg}5x + \operatorname{ctg}2x) = \operatorname{tg}3x$$

$$1/(\sin5x/\cos5x + \sin2x/\cos2x) - 1/(\cos5x/\sin5x + \cos2x/\sin2x) = \operatorname{tg}3x$$

$$1/((\sin5x \cdot \cos2x + \sin2x \cdot \cos5x)/\cos2x \cdot \cos5x) - 1/((\cos5x \cdot \cos2x + \cos2x \cdot \sin5x)/\sin5x \cdot \sin2x) = \operatorname{tg}3x$$

$$1/(\sin7x/\cos2x \cdot \cos5x) - 1/(\sin7x/\sin5x \cdot \sin2x) = \sin3x/\cos3x$$

$$(\cos2x \cdot \cos5x - \sin5x \cdot \sin2x)/\sin7x = \sin3x/\cos3x$$

$$\cos7x/\sin7x = \sin3x/\cos3x$$

$$\cos7x/\sin7x - \sin3x/\cos3x = 0$$

$$(\cos7x \cdot \cos3x - \sin3x \cdot \sin7x) / \cos3x \cdot \sin7x = 0$$

$$\cos10x/\cos3x \cdot \sin7x = 0$$

$$\cos10x = 0$$

$$10x = \pi/2 + \pi n$$

$$x = \pi/20 + \pi n/10$$

$$\cos3x \neq 0 \quad x \neq \pi/6 + \pi k/3$$

$$\cos5x \neq 0 \quad x \neq \pi/10 + \pi k/5$$

$$\cos2x \neq 0 \quad x \neq \pi/4 + \pi k/2$$

$$\sin5x \neq 0 \quad x \neq \pi k/5$$

$$\sin2x \neq 0 \quad x \neq \pi k/2$$

$$1/20 + n/10 \neq 1/6 + k/3$$

$$3/60 + 3n/30 \neq 10/60 + 10k/30$$

$$7/6 + 20k/6 \neq 6n/6$$

$$7 + 20k \neq 6n$$

$$6n - 20k \neq 7 \text{ нет решений}$$

$$1/20 + 2n/20 = 2/20 + 4k/20$$

$$1 + 2n = 2 + 4k$$

$$4k - 2n = -1 \text{ нет решений}$$

$$\pi/20 + \pi n/10 = \pi/4 + \pi k/2$$

$$1/20 + 2n/20 = 5/20 + 10k/20$$

$$1 + 2n = 5 + 10k$$

$$10k - 2n = -4$$

$$5k - n = -2$$

$$k = -1$$

$$n = -3$$

$$k = -1 + (-1) \cdot t$$

$$n = -3 - 5t$$

$$n \neq -3 - 5t$$

$$\pi/20 + \pi n/10 \neq \pi k/5$$

$$1 + 2n \neq 4k$$

$$4k - 2n \neq 1 \text{ нет решений}$$

$$\pi k/2 = \pi/20 + \pi n/10$$

$$10k = 1 + 2n$$

$$10k - 2n = 1 \text{ нет решений}$$

Ответ $x = \pi/20 + \pi n/10$,
 $n \neq -3 - 5t$