

$$1/(tg5x + tg2x) - 1/(ctg5x + ctg2x) = tg3x$$

$$1/(sin5x/cos5x + sin2x/cos2x) - 1/(cos5x/sin5x + cos2x/sin2x) = tg3x$$

$$1/((sin5x*cos2x + sin2x*cos5x)/cos2x*cos5x) - 1/((cos5x*cos2x + cos2x*sin5x)/sin5x*sin2x) = tg3x$$

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

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

$$cos7x/sin7x = sin3x/cos3x$$

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

$$(cos7x*cos3x - sin3x*sin7x)/cos3x*sin7x = 0$$

$$cos10x/cos3x*sin7x = 0$$

$$cos10x = 0$$

$$10x = P/2 + Pn$$

$$x = P/20 + Pn/10$$

$$cos3x \neq 0 \quad x \neq P/6 + Pk/3$$

$$cos5x \neq 0 \quad x \neq P/10 + Pk/5$$

$$cos2x \neq 0 \quad x \neq P/4 + Pk/2$$

$$sin5x \neq 0 \quad x \neq Pk/5$$

$$sin2x \neq 0 \quad x \neq Pk/2$$

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

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

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

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

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

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

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

$$4k - 2n = -1 \text{ нет решений}$$

$$P/20 + Pn/10 = P/4 + Pk/2$$

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

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

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

$$5k - n = -2$$

$$k_1 = -1$$

$$n_1 = -3$$

$$k = -1 + (-1)^*t$$

$$n = -3 - 5t$$

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

$$P/20 + Pn/10 \neq Pk/5$$

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

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

$$Pk/2 = P/20 + Pn/10$$

$$10k = 1 + 2n$$

$$10k - 2n = 1 \text{ нет решений}$$

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