solve the following equation in the given interval :
sec2x = 3cos2x + cos(90-2x) ; - 90 < x < 90

Collecting everything on the left

$sec2x - 3cos2x - \cos(90 - x) = 0$

Using the definitions of the trigonometric functions

$sec2x = \frac{1}{cos2x}$

Using the complementary identities

$\cos(90 - 2x) = sin2x$

$\frac{1}{cos2x} - 3cos2x - \sin2x = 0$

Dividing by $cos2x$

$\frac{1}{cos^2 2x} - 3 - \frac{sin2x}{cos2x} = 0$

Using the Pythagorean identities

$sin^2 2x + cos^2 2x = 1$

$\frac{sin^2 2x + cos^2 2x}{cos^2 2x} - \frac{sin2x}{cos2x} - 3 = 0$

Using the definitions of the trigonometric functions

$tan2x = \frac{sin2x}{cos2x}$

$tan^2 2x + 1 - tan2x - 3 = 0$

$tan^2 2x - tan2x - 2 = 0$

This is quadratic equation for $tan2x$

Solving

$tan2x = \frac{1 \pm \sqrt{1^2 - 4 \times 1 \times (-2)}}{2 \times 1} = \frac{1 \pm 3}{2}$, so

$tan2x = 2$ and $tan2x = -1$, where $-180^0 < 2x < 180^0$, then

$2x = 63.43^0, 2x = -116.57^0, 2x = -45^0$ so

Answer: $x = 31.72^0$, $x = -58.28^0$, $x = -22.5^0$