(1) Solve the trigonometric equation

$$\cos\theta+\sec\theta=\frac{5}{2},\quad 0°\le\theta<360°.$$

(2) Prove the validity of the trigonometric identity

$$\sqrt{2+2\cos 2\theta}\equiv a\cos\theta$$ state a

(3) Prove that $\dfrac{1+\tan^2 x}{1-\tan^2 x}\equiv a\sec 2x$ state a

(4) Use your answer to Question 3 to solve the equation

$$\frac{1+\tan^2 x}{1-\tan^2 x}+2=0$$

$0\le x<2\pi$

Give your answers in terms of π

(5) Prove that $\dfrac{1+\cot^2\theta}{\cot\theta}\equiv a\,\mathrm{cosec}\,2\theta$ state a

(6) $$6\sec^2 2x+5\tan 2x=12,\ 0\le\theta<\pi.$$

Find the solutions of the above trigonometric equation, giving the answers in radians correct to two decimal places.

(7) Solve the trigonometric equation

$$4-4\cos 2\theta=\mathrm{cosec}\,\theta,\ 0\le\theta<2\pi,$$

giving the answers in terms of π.

(8) Prove that $\tan\theta+\cot\theta\equiv a\,\mathrm{cosec}\,2\theta$ $\theta\neq\frac{k\pi}{2},\ k\in\mathbb{Z}$

State a

(9) Use your answer to Question 8 to

find, in terms of π, the solutions of the equation

$$\tan\theta+\cot\theta=4,\ 0\le\theta<2\pi,$$

giving the answers in terms of π.