

3.72

4. a.

$$\sin^2 x + \sin^2 2x = \sin^2 3x$$

$$\sin^2 2x = \sin^2 3x - \sin^2 x = (\sin 3x - \sin x)(\sin 3x + \sin x)$$

$$\sin^2 2x = 2 \sin x \cos 2x \cdot 2 \sin 2x \cos x$$

$$\sin^2 2x - 4 \sin x \cos 2x \sin 2x \cos x = 0$$

$$\sin 2x (\sin 2x - 4 \sin x \cos 2x \cos x) = 0$$

$$\sin 2x (\sin 2x - 2 \sin 2x \cos 2x)$$

$$\sin 2x [\sin 2x (1 - 2 \cos 2x)] = 0$$

$$\sin 2x = 0$$

$$2x = \pi k$$

$$x = \frac{\pi}{2} k$$

$$(k = 0, \pm 1, \dots)$$

$$1 - 2 \cos 2x = 0$$

$$\frac{1}{2} = \cos 2x$$

$$2x = \pm \frac{\pi}{3} + 2\pi k$$

$$x = \pm \frac{\pi}{6} + \pi k$$