

Step 3. Check the roots.

$$2x^2 + 4 = 6x + x^2$$

$$2(3 + \sqrt{5})^2 + 4 = 6(3 + \sqrt{5}) + (3 + \sqrt{5})^2$$

$$2(9 + 6\sqrt{5} + 5) + 4 = 18 + 6\sqrt{5} + 9 + 6\sqrt{5} + 5$$

$$18 + 12\sqrt{5} + 10 + 4 = 18 + 12\sqrt{5} + 9 + 5$$

$$32 + 12\sqrt{5} = 32 + 12\sqrt{5}$$

and,

$$2x^2 + 4 = 6x + x^2$$

$$2(3 - \sqrt{5})^2 + 4 = 6(3 - \sqrt{5}) + (3 - \sqrt{5})^2$$

$$2(9 - 6\sqrt{5} + 5) + 4 = 18 - 6\sqrt{5} + 9 - 6\sqrt{5} + 5$$

$$18 - 12\sqrt{5} + 10 + 4 = 18 - 12\sqrt{5} + 9 + 5$$

$$32 - 12\sqrt{5} = 32 - 12\sqrt{5}$$

Thus, the roots check.