

R 2.5

$$\text{Solve } 20x^3 - 125x = 0$$

$$\text{GCF } 5x(4x^2 - 25) = 0$$

$$5x(2x+5)(2x-5) = 0$$

$$\frac{5x}{5} = 0 \quad \frac{2x+5}{5} = 0 \quad \frac{2x-5}{5} = 0$$

$$x = 0 \quad \frac{2x}{2} = \frac{-5}{2} \quad \frac{2x}{2} = \frac{5}{2}$$

$$x = -\frac{5}{2} \quad x = \frac{5}{2}$$

$$x^3 + 2x^2 + 3x + 6 = 0$$

1-6
2-3

$$(x^2 + 3)(x + 2) = 0$$

~~$$x^2 + 3 = 0 \quad x + 2 = 0$$

$$\sqrt{x^2} = \sqrt{-3} \quad x = -2$$

$$x = \pm i\sqrt{3}$$~~

$$x^3 + 2x^2 + 3x + 6 = 0$$

$$(x^3 + 2x^2) + (3x + 6) = 0$$

$$x^2(x+2) + 3(x+2) = 0$$

$$(x+2)(x^2+3) = 0$$

$$x+2=0 \quad x^2+3=0$$

$$x = -2$$

$$x^6 + 3x^3 + 2 = 0$$

$$(x^3 + 2)(x^3 + 1) = 0$$

$$x^3 + 2 = 0$$

$$x^3 + 1 = 0$$

$$\sqrt[3]{x^3} = \sqrt[3]{-2}$$

$$\sqrt[3]{x^3} = \sqrt[3]{-1}$$

$$x = \sqrt[3]{-2}$$

$$x = -1$$

$$x = -\sqrt[3]{2}$$

$$\sqrt{5-x} + 3 = 0$$

Isolate

$$(\sqrt{5-x})^2 = (3)^2$$

Square
Both
Sides

$$5-x = 9$$

$$-x = 4$$

$$x = -4$$

Check

$$6x - 7\sqrt{x} - 3 = 0$$

$$(2\sqrt{x} - 3)(3\sqrt{x} + 1) = 0$$

$$2\sqrt{x} - 3 = 0 \quad 3\sqrt{x} + 1 = 0$$

$$(2\sqrt{x})^2 = (3)^2 \quad (3\sqrt{x})^2 = (-1)^2$$

$$\frac{4x}{4} = \frac{9}{4}$$

$$\frac{9x}{9} = \frac{1}{9}$$

$$x = \frac{9}{4}$$

$$x = \frac{1}{9}$$

Check

$$6x - 7\sqrt{x} - 3 = 0$$

$$6\left(\frac{9}{4}\right) - 7\sqrt{\frac{9}{4}} - 3 = 0$$

$$\frac{27}{2} - 7\left(\frac{3}{2}\right) - \frac{6}{2} = 0$$

$$\frac{27}{2} - \frac{21}{2} - \frac{6}{2} = 0$$

$$0 = 0$$

$$6\left(\frac{1}{9}\right) - 7\sqrt{\frac{1}{9}} - 3 = 0$$

$$\frac{2}{3} - \frac{7}{3} - \frac{9}{3} = 0$$

$$-\frac{14}{3} \neq 0$$

$$(x+3)^{\frac{4}{3}} = 16$$

$$\left((x+3)^{\frac{4}{3}} \right)^{\frac{3}{4}} = \left(16 \right)^{\frac{3}{4}}$$

$$x+3 = 8$$

$$x = 5$$

$$\begin{aligned} & \sqrt[4]{16^3} \\ & \sqrt[4]{(2^4)^3} \\ & \sqrt[4]{2^{12}} \\ & 2^3 \\ & 8 \end{aligned}$$