

7. Solve the following equations and check your solutions in each case:

(iv) $\sqrt{3x-5} = x-1$

(v) $\sqrt{2x+5} = x+1$

(vi) $\sqrt{2x^2-7} = x+3$

Square both Sides
(vi)

$$(a+b)^2 = a^2 + 2ab + b^2$$

$$-x^2, -6x, -9$$

$$\sqrt{2x^2-7} = x+3$$

$$2x^2-7 = x^2+6x+9$$

$$x^2-6x-16=0$$

$$(x-8)(x+2)=0$$

$$x=8 \quad \text{or} \quad x=-2$$

check

$$x=8, \quad \sqrt{2(8)^2-7} \stackrel{?}{=} (8)+3$$

$$11 = 11 \quad \checkmark$$

$$x=-2, \quad \sqrt{2(-2)^2-7} \stackrel{?}{=} (-2)+3$$

$$1 = 1 \quad \checkmark$$

8. Solve each of these equations and check each solution:

(iii) $\sqrt{x+7} + \sqrt{x} = 7$

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

(iii) Square

$$(a+b)^2 = a^2 + 2ab + b^2$$

$$+14\sqrt{x}, -7$$

$$\div 14$$

Square

check

$$\sqrt{x+7} = 7-\sqrt{x}$$

$$\cancel{x}+7 = 49-14\sqrt{x}+\cancel{x}$$

$$14\sqrt{x} = 42$$

$$\sqrt{x} = 3$$

$$x=9$$

$$\sqrt{9+7} + \sqrt{9} \stackrel{?}{=} 7$$

$$4+3 = 7 \quad \checkmark \text{ yes.}$$

8. Solve each of these equations and check each solution:

(iii) $\sqrt{x+7} + \sqrt{x} = 7$

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

(iv) Square

$$(a+b)^2 = a^2 + 2ab + b^2$$

$$-x, -2$$

$$\div 2$$

Square

$$(a+b)^2 = a^2 + 2ab + b^2$$

$$-4x, +8$$

check:

$$3x - 2 = (x - 2) + 4\sqrt{x - 2} + 4$$

$$2x - 4 = 4\sqrt{x - 2}$$

$$x - 2 = 2\sqrt{x - 2}$$

$$x^2 - 4x + 4 = 4(x - 2)$$

$$\text{LHS} = 4x - 8$$

$$x^2 - 8x + 12 = 0$$

$$(x - 6)(x - 2) = 0$$

$$\Rightarrow x = 6 \text{ or } x = 2$$

$$x = 6 \quad \frac{\sqrt{3(6)-2}}{4} \stackrel{?}{=} \frac{\sqrt{18-2}}{4} + 2 \quad \checkmark \text{ yes}$$

$$x = 2 \quad \frac{\sqrt{3(2)-2}}{2} = \frac{\sqrt{6-2}}{2} + 2 \quad \checkmark \text{ yes}$$