

P. 15 کراسن، تقارین

① حل کلا من حسابات التالیه

a)  $3\sqrt{x+3} = 15 \Rightarrow 3\sqrt{x} = 15 - 3 \Rightarrow$

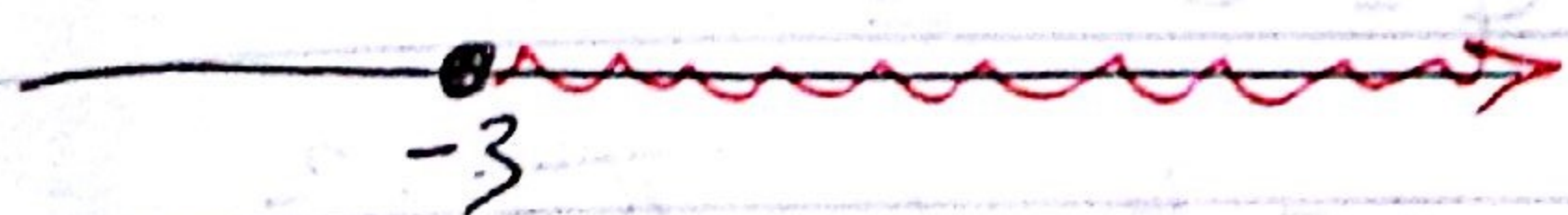
خط اول  $x > 0$

$3\sqrt{x} = 12 \Rightarrow \sqrt{x} = 4 \Rightarrow x = 16 \geq 0$

$\{16\} = \text{e. e}$

b)  $\sqrt{x+3} = 5$

خط اول  $x + 3 \geq 0 \Rightarrow x \geq -3$



$x \in [-3, \infty)$

$(\sqrt{x+3})^2 = (5)^2 \Rightarrow x+3 = 25 \Rightarrow x = 22$

$22 \in [-3, \infty)$

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$\{22\} = \text{e. e}$

c)  $(x+5)^{\frac{2}{3}} = 4$

$[(x+5)^{\frac{2}{3}}]^{\frac{3}{2}} = [4]^{\frac{3}{2}} \Rightarrow x+5 = (\sqrt{4})^3 \Rightarrow$

$\Rightarrow x+5 = 8 \Rightarrow x = 3$

$\{3\} = \text{e. e}$

d)  $(x+1)^{\frac{3}{2}} - 2 = 2$

$(x+1)^{\frac{3}{2}} = 4$

خط اول  $x > 0, x+1 > 0$

$x > -1$

$x \in [-1, \infty)$

$[(x+1)^{\frac{3}{2}}]^{\frac{2}{3}} = [4]^{\frac{2}{3}} \Rightarrow x+1 = 2.52$

$x = 2.52 - 1$

$x = 1.52 \in [-1, \infty)$

$\{1.52\} = \text{e. e}$



$$e) \sqrt{3-4x} - 2 = 0$$

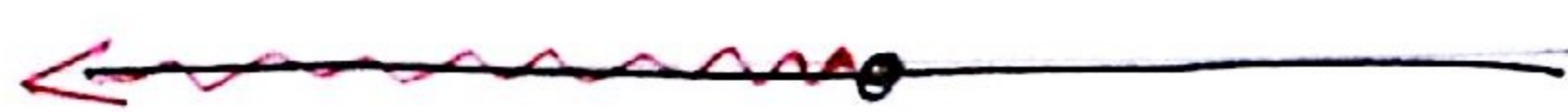
$$\sqrt{3-4x} = 2$$

$$3 \geq 4x$$

$$\Leftrightarrow 3-4x \geq 0 \quad \text{Kl. b.}$$

$$4x \leq 3 \Rightarrow x \leq \frac{3}{4}$$

$$x \in (-\infty, \frac{3}{4}]$$



$\frac{3}{4}$

$$[\sqrt{3-4x}]^2 = [2]^2$$

$$3-4x = 4 \Rightarrow -4x = 4-3$$

$$-4x = +1 \Rightarrow x = \frac{1}{-4} \in (-\infty, \frac{3}{4}]$$

$$\left\{ \frac{-1}{4} \right\} = \text{e. e.}$$

$$f) \frac{2(2x+4)^{\frac{3}{4}}}{2} = \frac{16}{2}$$

$$(2x+4)^{\frac{3}{4}} = 8$$

$$2x+4 \geq 0 \quad \text{Kl. b.}$$

$$2x \geq -4$$

$$x \geq -2$$

$$x \in [-2, \infty)$$

$$\left[ (2x+4)^{\frac{3}{4}} \right]^{\frac{4}{3}} = [8]^{\frac{4}{3}}$$

$-2$

$$2x+4 = 16 \Rightarrow 2x = 16-4 \Rightarrow \frac{2x}{2} = \frac{12}{2}$$

$$\Rightarrow x = 6 \in [-2, \infty)$$

$$\{6\} = \text{e. e.}$$

$$g) (5-3x)^{\frac{3}{2}} + 4 = 3$$

$$(5-3x)^{\frac{3}{2}} = 3-4$$

$$(5-3x)^{\frac{3}{2}} = -1$$

$$\emptyset = \text{e. e.}$$



3) جواباً من أجل  $x$  =

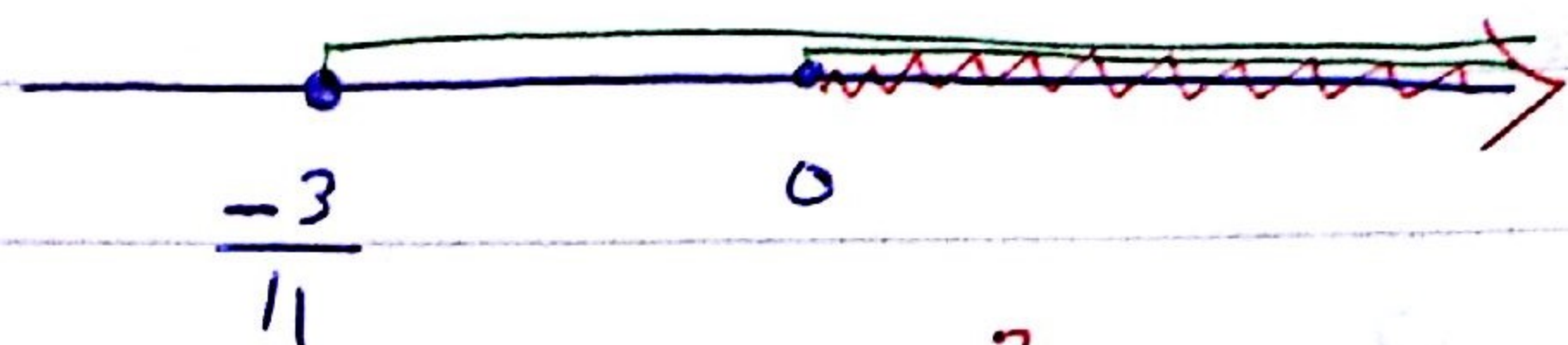
a)  $\sqrt{11x+3} - 2x = 0$

$$\sqrt{11x+3} = 2x$$

$$11x+3 \geq 0 \quad \text{و} \quad x \geq 0$$

$$11x \geq -3$$

$$x \geq \frac{-3}{11} \quad \text{و} \quad x \geq 0$$



$$x \in [0, \infty) \quad \text{و} \quad \text{جواباً من أجل } x =$$

$$[\sqrt{11x+3}]^2 = [2x]^2$$

$$11x+3 = 4x^2 \Rightarrow 4x^2 - 11x - 3 = 0$$

$$x = 3 \in \quad \text{و} \quad x = \frac{1}{4} \notin [0, \infty)$$

$$\{3\} = \text{جواباً من أجل } x =$$

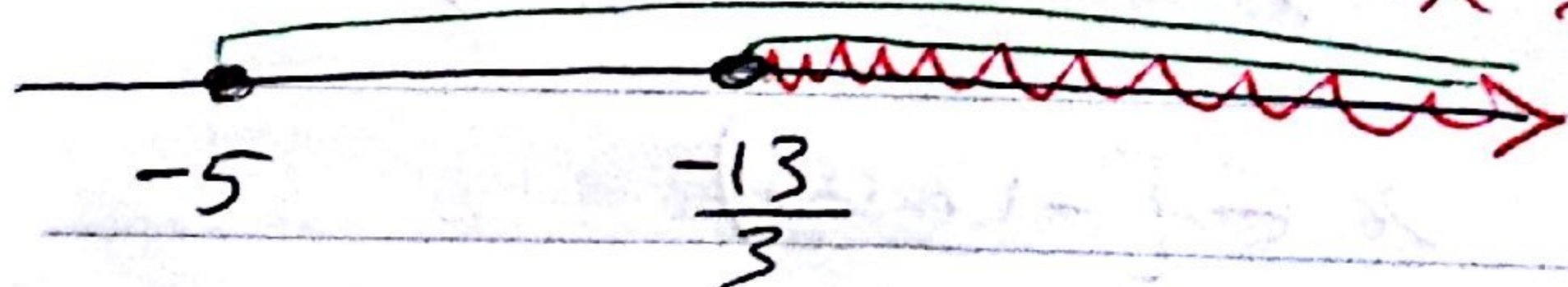
b)  $\sqrt{3x+13} - 5 = x$

$$\sqrt{3x+13} = x+5$$

$$3x+13 \geq 0 \quad \text{و} \quad x+5 \geq 0 \quad \text{و} \quad \text{جواباً من أجل } x =$$

$$x \geq \frac{-13}{3}$$

$$x \geq -5$$



$$x \in \left[\frac{-13}{3}, \infty\right) \quad \text{و} \quad \text{جواباً من أجل } x =$$

$$[\sqrt{3x+13}]^2 = [x+5]^2 \Rightarrow 3x+13 = x^2 + 10x + 25 \Rightarrow$$

$$\Rightarrow x^2 + 7x + 12 = 0 \Rightarrow (x+3)(x+4) = 0$$

$$x = -3 \in$$

$$x = -4 \in$$

$$\{-3, -4\} = \text{جواباً من أجل } x =$$



$$\textcircled{c} \sqrt{-3x-5} = x+3$$

$$-3x-5 \geq 0$$

$$-3x \geq 5$$

$$x \leq \frac{5}{-3}$$

$$x+3 \geq 0$$

$$x \geq -3$$

شروط الحل

-3

$\frac{5}{-3}$

$$x \in [-3, \frac{5}{-3}] \text{ : شروط الحل}$$

$$\left[ \sqrt{-3x-5} \right]^2 = \left[ x+3 \right]^2$$

$$-3x-5 = x^2 + 6x + 9$$

$$x^2 + 6x + 3x + 9 + 5 = 0$$

$$x^2 + 9x + 14 = 0$$

$$(x+2)(x+7) = 0$$

$$x = -2 \in [-3, \frac{5}{-3}] \quad x = -7 \notin [-3, \frac{5}{-3}]$$

$$\{-2\} = \text{e.c}$$

$$\textcircled{d} (x+3)^{\frac{1}{2}} - 1 = x$$

$$(x+3)^{\frac{1}{2}} = x+1$$

$$x+3 \geq 0, \quad x+1 \geq 0 \text{ : شروط الحل}$$

$$x \geq -3$$

$$x \geq -1$$

-3

-1

$$x \in [-1, \infty)$$

$$\left[ (x+3)^{\frac{1}{2}} \right]^2 = (x+1)^2$$

$$x+3 = x^2 + 2x + 1$$

$$x^2 + 2x + 1 - x - 3 = 0$$

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

$$(x+2)(x-1) = 0$$

$$x = -2 \notin$$

$$x = 1 \in [-1, \infty)$$

$$\{1\} = \text{e.c}$$



$$\textcircled{e} \quad x+8 = (x^2+16)^{\frac{1}{2}}$$

شرط اول

$$* x^2+16 > 0 \quad \text{مستورد دوماً}$$

$$* x+8 \geq 0 \Rightarrow x \geq -8 \Rightarrow x \in [-8, +\infty)$$

$$[x+8]^2 = [(x^2+16)^{\frac{1}{2}}]^2 \quad \text{بالترتيب}$$

$$x^2 + 16x + 64 = x^2 + 16$$

$$\cancel{x^2} - \cancel{x^2} + 16x + 64 - 16 = 0$$

$$16x + 48 = 0$$

$$16x = -48$$

$$x = \frac{-48}{16} \Rightarrow x = -3 \in [-8, \infty)$$

$$\{-3\} = 2.5$$

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$$\textcircled{f} \quad \sqrt{10x} - 2\sqrt{5x-25} = 0$$

$$\sqrt{10x} = 2\sqrt{5x-25}$$

شرط اول:

$$10x \geq 0$$

$$\geq 5x - 25 \geq 0$$

$$x \geq 0$$

$$5x \geq 25$$

$$x \geq 5$$



$$x \in [5, \infty)$$

$$[\sqrt{10x}]^2 = [2\sqrt{5x-25}]^2$$

$$10x = 4(5x-25)$$

$$10x = 20x - 100$$

$$10x - 20x = -100$$

$$-10x = -100 \Rightarrow x = \frac{-100}{-10} = 10 \in [5, \infty)$$

$$\{10\} = \text{مجموعه حل}$$



$$(9) (3x+2)^{\frac{1}{2}} - (2x+7)^{\frac{1}{2}} = 0$$

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

بالترتيب

$$3x+2 \geq 0$$

$\Rightarrow$

$$2x+7 \geq 0$$

$$3x \geq -2$$

$$x \geq \frac{-2}{3}$$

$$2x \geq -7$$

$$x \geq \frac{-7}{2}$$



$$\left[ \sqrt{3x+2} \right]^2 = \left[ \sqrt{2x+7} \right]^2 \quad x \in \left[ \frac{-2}{3}, \infty \right)$$

$$3x+2 = 2x+7$$

$$3x-2x = 7-2$$

$$x = 5 \in \left[ \frac{-2}{3}, \infty \right)$$

$\{5\} = \text{e.r.}$

$$(10) \underbrace{(x-9)^{\frac{1}{2}} + 1}_{+} = x^{\frac{1}{2}}$$

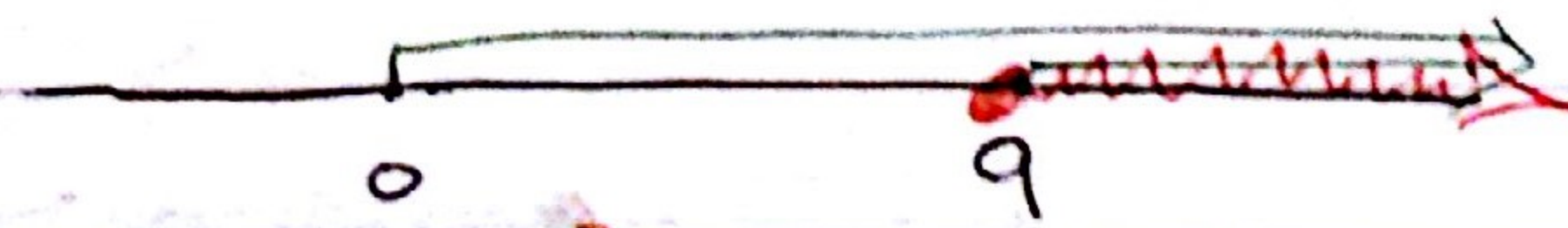
بالترتيب

$$x-9 \geq 0$$

$$x \geq 0$$

$$x \geq 9$$

$$x \in [9, \infty)$$



$$\left[ \sqrt{x-9} + 1 \right]^2 = \left[ \sqrt{x} \right]^2$$

$$x-9 + 2\sqrt{x-9} + 1 = x$$

$$2\sqrt{x-9} = x - x + 9 - 1$$

$$2\sqrt{x-9} = 8$$

$$\sqrt{x-9} = 4$$

$$x-9 = 16$$

بالترتيب

$$x = 16 + 9$$

$$x = 25 \in [9, \infty)$$

$\{25\} = \text{e.r.}$



$$\textcircled{1} \quad (2x+3)^{\frac{3}{4}} - 3 = 5$$

$$(2x+3)^{\frac{3}{4}} = 5 + 3$$

$$(2x+3)^{\frac{3}{4}} = 8$$

uji b<sup>2</sup>

$$2x+3 \geq 0 \Rightarrow 2x \geq -3$$

$$\Rightarrow x \geq -\frac{3}{2} \Rightarrow x \in \left[-\frac{3}{2}, \infty\right)$$



$$\left[ (2x+3)^{\frac{3}{4}} \right]^{\frac{4}{3}} = \left[ 8 \right]^{\frac{4}{3}}$$

$$2x+3 = 16$$

$$2x = 16 - 3 \Rightarrow 2x = 13 \Rightarrow x = \frac{13}{2} \in$$

$$x = \frac{13}{2} \in \left[-\frac{3}{2}, \infty\right) \Rightarrow \left\{ \frac{13}{2} \right\} = \text{r.p}$$

$$\textcircled{2} \quad 2(x-1)^{\frac{4}{3}} + 4 = 36$$

$$2(x-1)^{\frac{4}{3}} = 36 - 4 \Rightarrow \frac{2(x-1)^{\frac{4}{3}}}{2} = \frac{32}{2}$$

$$\Rightarrow (x-1)^{\frac{4}{3}} = 16$$

$$\left[ (x-1)^{\frac{4}{3}} \right]^{\frac{3}{4}} = \left[ 16 \right]^{\frac{3}{4}}$$

$x \in \mathbb{R}$

uji b<sup>2</sup>

$$x-1 = 8 \Rightarrow x = 8 + 1 \Rightarrow x = 9$$

$\{9\} = \text{r.p}$



$$\textcircled{K} (3x+2)^{\frac{1}{2}} = 8(3x+2)^{-\frac{1}{2}}$$

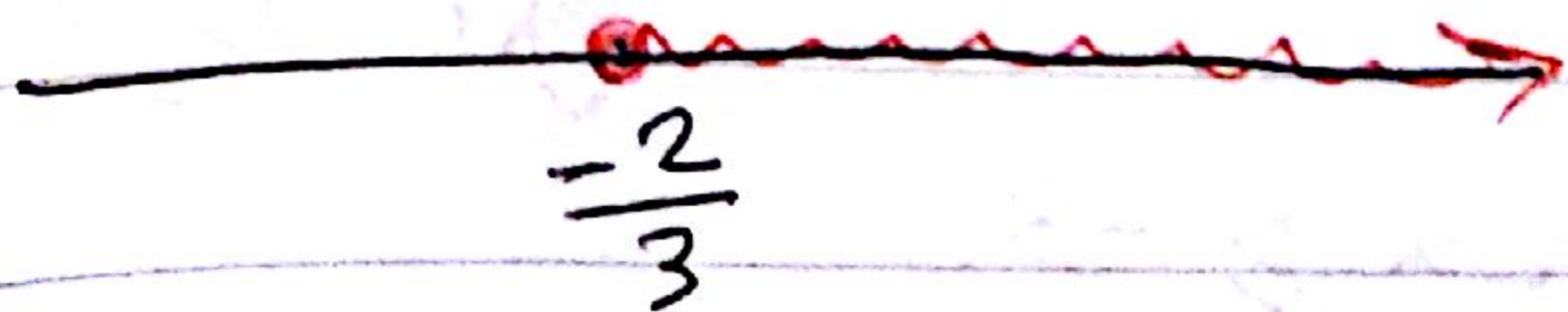
! دس اے

$$3x+2 \geq 0$$

$$3x \geq -2$$

$$x \geq -\frac{2}{3}$$

$$x \in \left[-\frac{2}{3}, \infty\right)$$



$$(3x+2)^{\frac{1}{2}} = \frac{8}{(3x+2)^{\frac{1}{2}}}$$

$$(3x+2)^{\frac{1}{2}} \cdot (3x+2)^{\frac{1}{2}} = 8$$

$$(3x+2)^{\frac{1}{2} + \frac{1}{2}} = 8$$

$$3x+2 = 8 \Rightarrow 3x = 8 - 2$$

$$3x = 6$$

$$x = 2 \in \left[-\frac{2}{3}, \infty\right)$$

$$\{2\} = \text{e. r}$$

$$\textcircled{L} (2x+1)^{\frac{1}{3}} = (3x+2)^{\frac{1}{3}}$$

$x \in \mathbb{R}$  = دس اے

$$\left[(2x+1)^{\frac{1}{3}}\right]^3 = \left[(3x+2)^{\frac{1}{3}}\right]^3$$

$$2x+1 = 3x+2$$

$$2x - 3x = 2 - 1$$

$$-x = 1 \Rightarrow x = -1$$

$$\{-1\} = \text{e. r}$$



$$\textcircled{m} (2x-1)^{\frac{1}{3}} = (x+1)^{\frac{1}{6}} \leftarrow \text{د.د.}$$

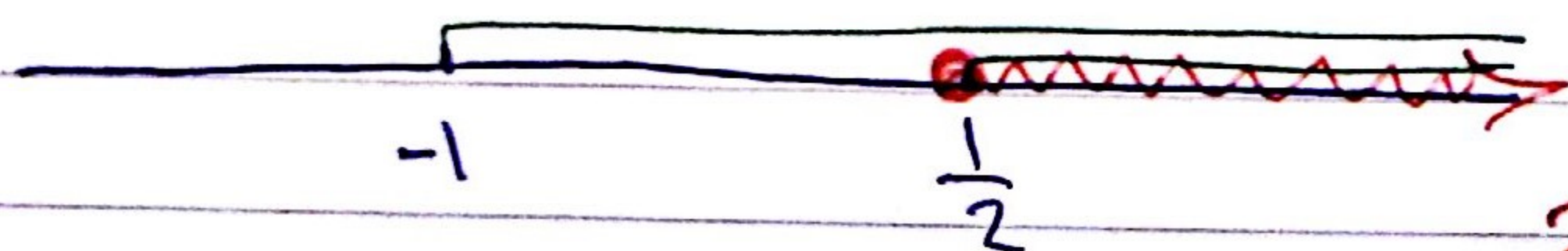
نکته

$$x+1 \geq 0 \quad \text{و} \quad 2x-1 \geq 0$$

$$x \geq -1$$

$$2x \geq 1$$

$$x \geq \frac{1}{2}$$



$$x \in \left[\frac{1}{2}, \infty\right)$$

$$\left[(2x-1)^{\frac{1}{3}}\right]^6 = \left[(x+1)^{\frac{1}{6}}\right]^6$$

$$(2x-1)^2 = x+1$$

$$4x^2 - 4x + 1 = x + 1$$

$$4x^2 - 4x - x + 1 - 1 = 0 \Rightarrow 4x^2 - 5x = 0 \Rightarrow$$

$$x(4x-5) = 0$$

$$x = 0 \quad \text{or} \quad 4x - 5 = 0$$

$$x = 0 \notin \left[\frac{1}{2}, \infty\right)$$

$$4x = 5 \Rightarrow x = \frac{5}{4} \in \left[\frac{1}{2}, \infty\right)$$

$$\left\{\frac{5}{4}\right\} = \text{e.c}$$

$$\textcircled{n} (x+5)^{\frac{1}{2}} - (5-2x)^{\frac{1}{4}} = 0 \Rightarrow (x+5)^{\frac{1}{2}} = (5-2x)^{\frac{1}{4}}$$

$$x+5 \geq 0$$

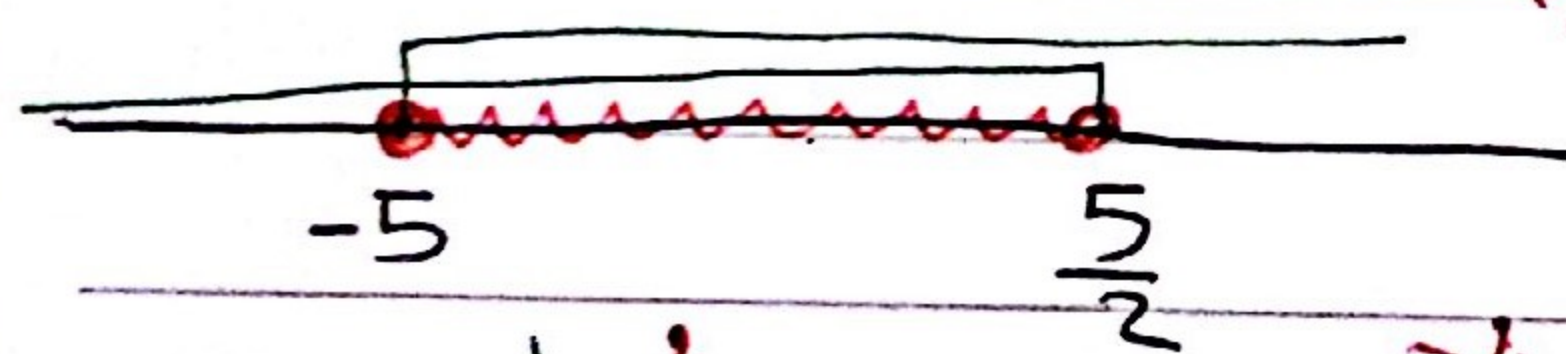
$$5-2x \geq 0$$

نکته

$$x \geq -5$$

$$-2x \geq -5$$

$$x \leq \frac{5}{2}$$



$$x \in \left[-5, \frac{5}{2}\right]$$

$$\left[(x+5)^{\frac{1}{2}}\right]^4 = \left[(5-2x)^{\frac{1}{4}}\right]^4 \Rightarrow (x+5)^2 = 5-2x \Rightarrow$$

$$\Rightarrow x^2 + 10x + 25 + 2x - 5 = 0 \Rightarrow x^2 + 12x + 20 = 0 \Rightarrow$$

$$(x+2)(x+10) = 0$$

$$x = -2 \in$$

$$x = -10 \notin \left[-5, \frac{5}{2}\right]$$

$$\{-2\} = \text{e.c}$$