

2.3 Solving Radical Equations

Graphically / *Algebraically*

Determine approximate solutions of
radical solutions

Graphing Calculator

Example 1: Solve the following: $7 = \sqrt{12-x} + 4$

Must isolate radical

$$(3)^2 = (\sqrt{12-x})^2$$

$$9 = 12 - x$$

$$x = 3$$

Verify

$$7 = \sqrt{12-3} + 4$$

$$7 = \sqrt{9} + 4$$

$$7 = 7$$

Solve the following graphically: $7 = \sqrt{12-x} + 4$

$$3 = \sqrt{12-x}$$

$$3 = \sqrt{-x+12}$$

$$3 = \sqrt{-(x-12)}$$

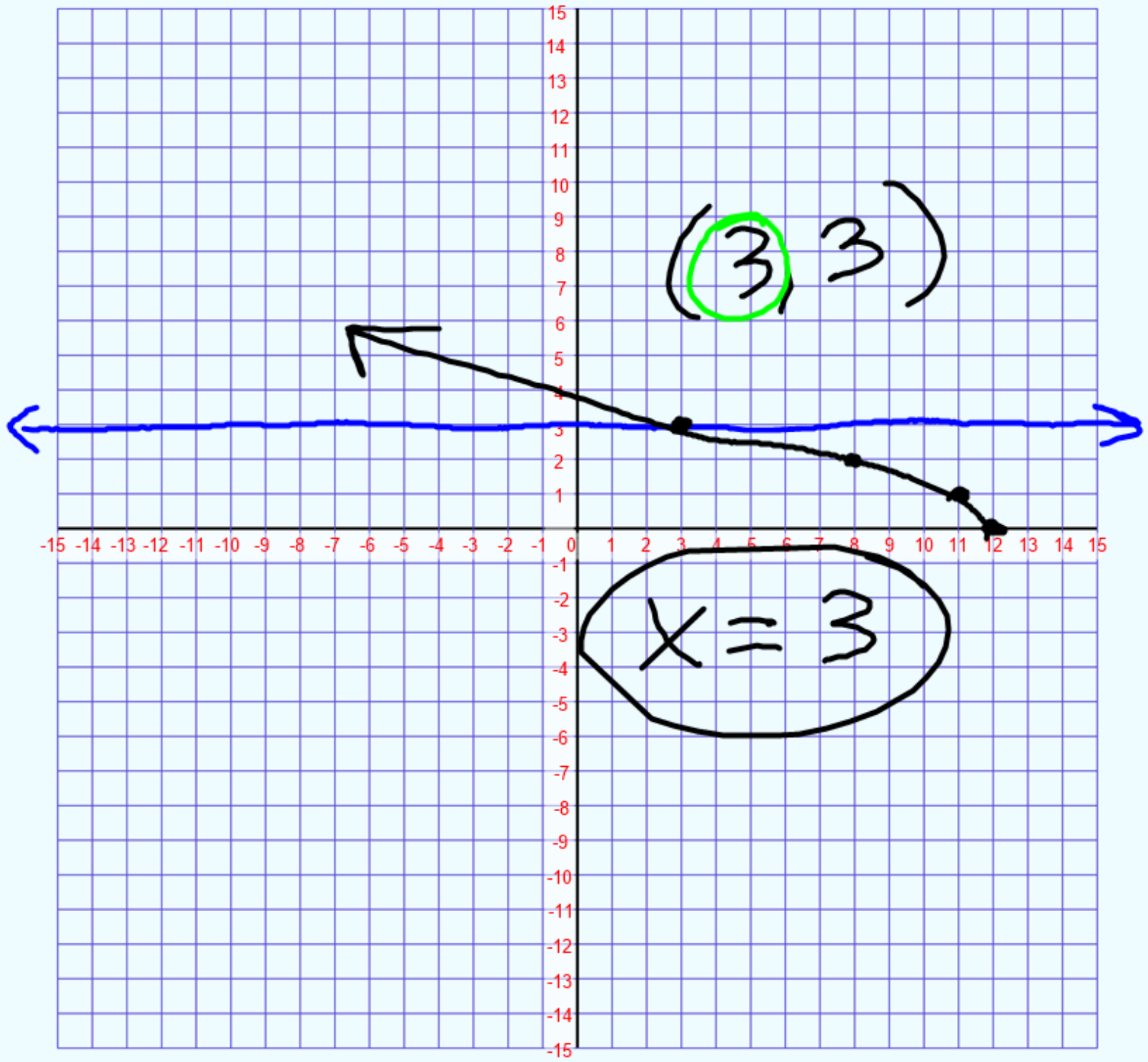
$$b = -1 \quad h = 12$$

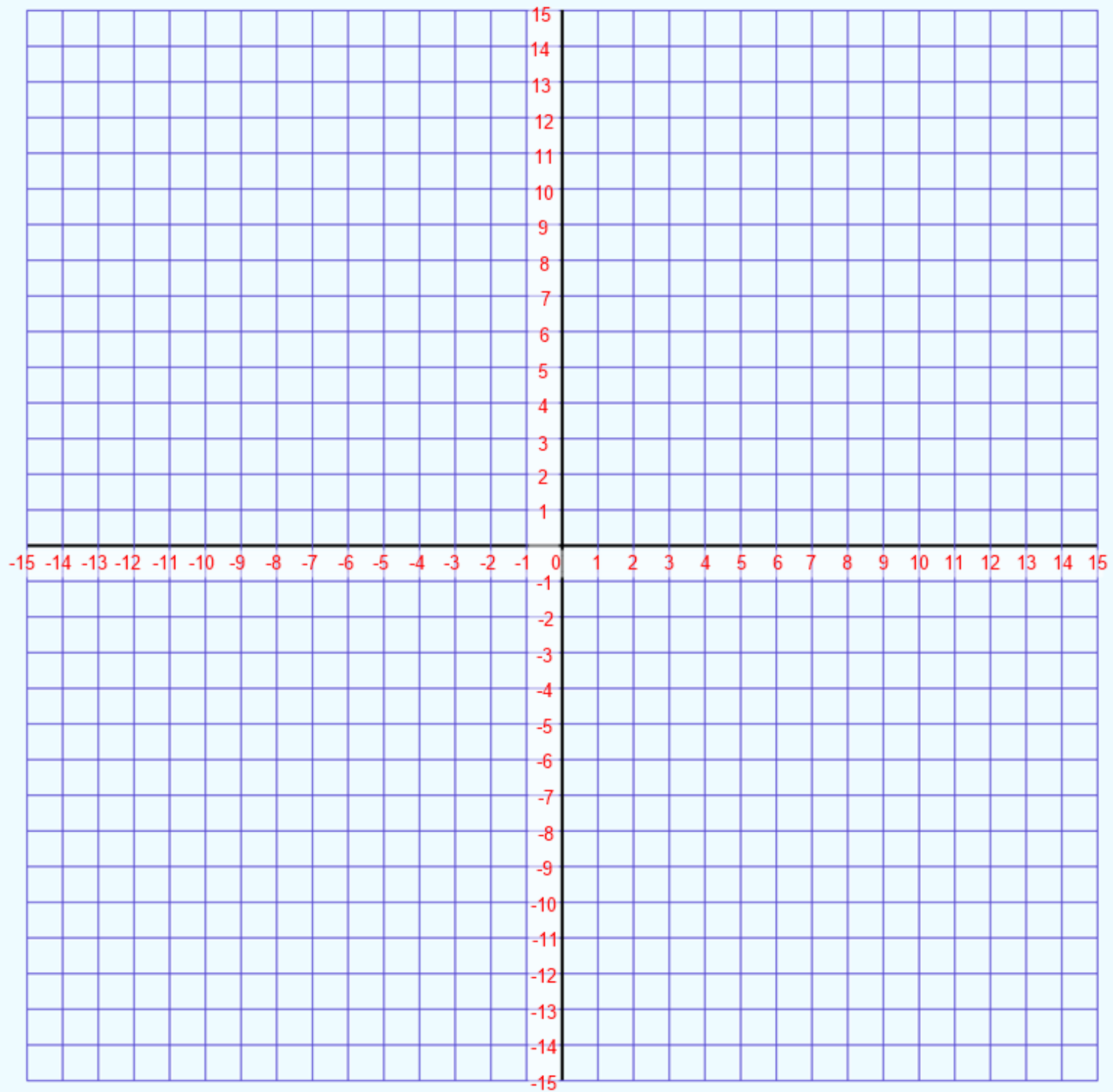
$$\frac{x}{b} + h$$

$$(-x+12, y)$$

x	y
0	0
1	1
4	2
9	3

x	y
12	0
11	1
8	2
3	3





Example 2 : Consider $2\sqrt{x-4} - 3 = 0$

a) Determine the roots algebraically

b) Determine the roots graphically.

$$\begin{aligned} \text{a) } 2\sqrt{x-4} &= 3 \\ (\sqrt{x-4})^2 &= \left(\frac{3}{2}\right)^2 \end{aligned}$$

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

$$x = 4 + \frac{9}{4} = \frac{16}{4} + \frac{9}{4} = \frac{25}{4} = 6.25$$

Verify

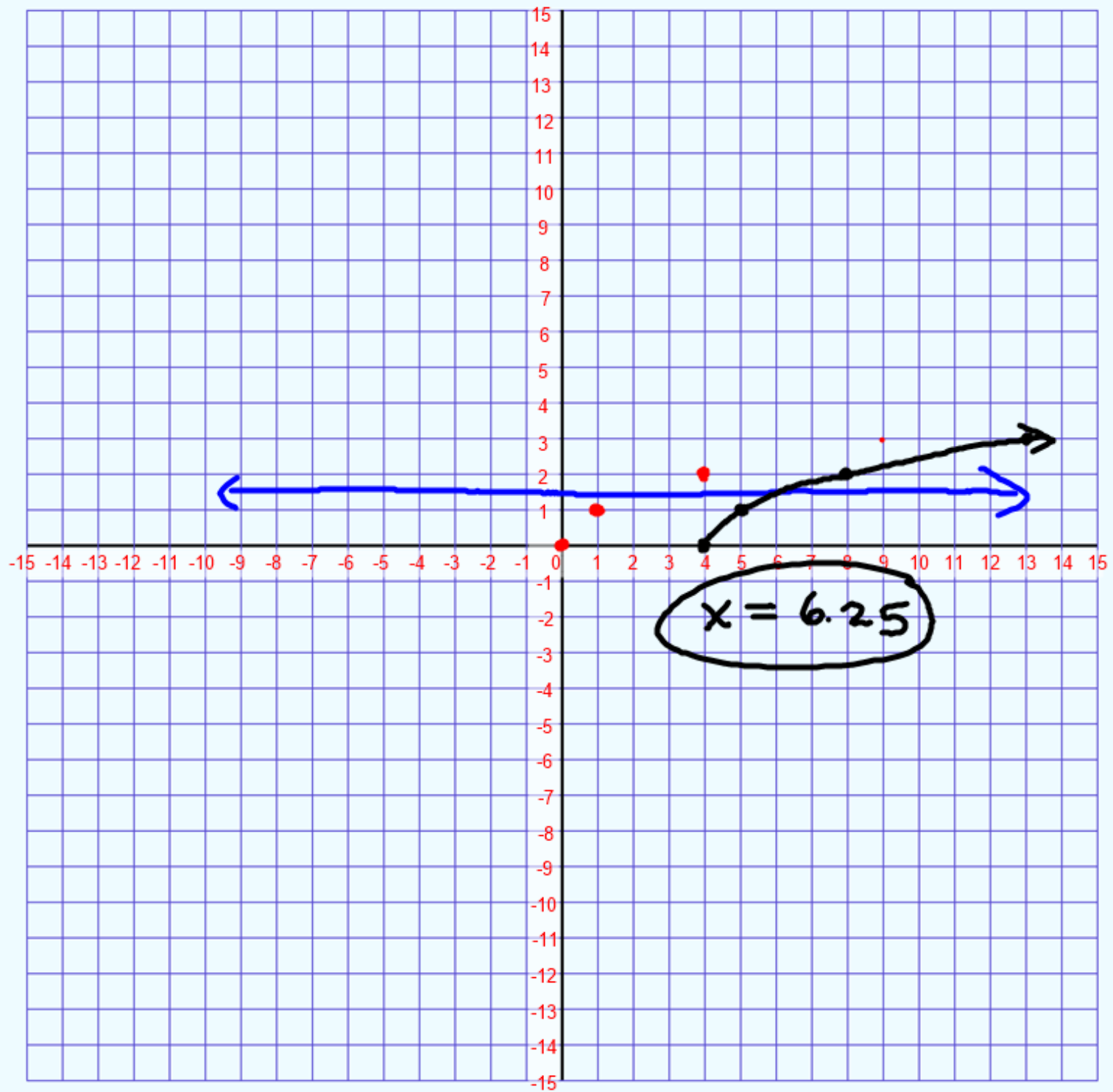
$$2\sqrt{6.25-4} - 3 \stackrel{?}{=} 0$$

$$2\sqrt{\frac{9}{4}} - 3 = 0$$

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

$$0 = 0 \checkmark$$

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



Your Turn

a) Determine the roots of $\sqrt{x+5} - 3 = 0$

b) Determine the roots graphically.

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

$$x+5 = 9$$

$$x = 4$$

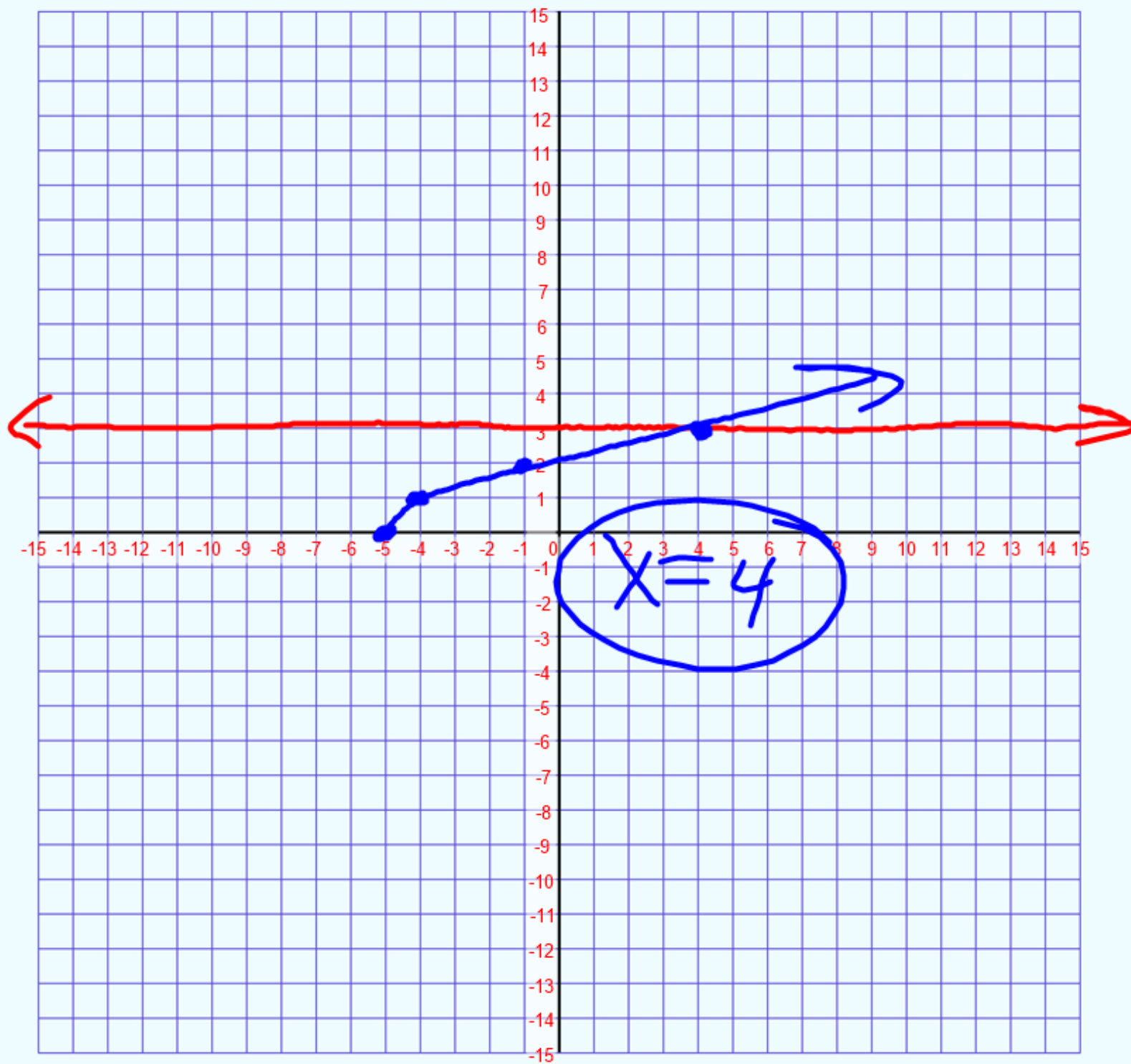
$$\sqrt{x+5} = 3$$

Verify ✓

$$\sqrt{4+5} - 3 = 0$$

$$\sqrt{9} - 3 = 0$$

$$0 = 0$$



Example 3: Solve the equation $3 + \sqrt{x-1} = x$ algebraically. Restrictions: $x \geq +1$

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

$$x-1 = x^2 - 6x + 9$$

$$0 = x^2 - 7x + 10$$

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

~~$x=2$~~ OR $x=5$

Verify

$$3 + \sqrt{2-1} = 2$$

$$3 + 1 \neq 2$$

$$3 + \sqrt{5-1} \stackrel{?}{=} 5$$

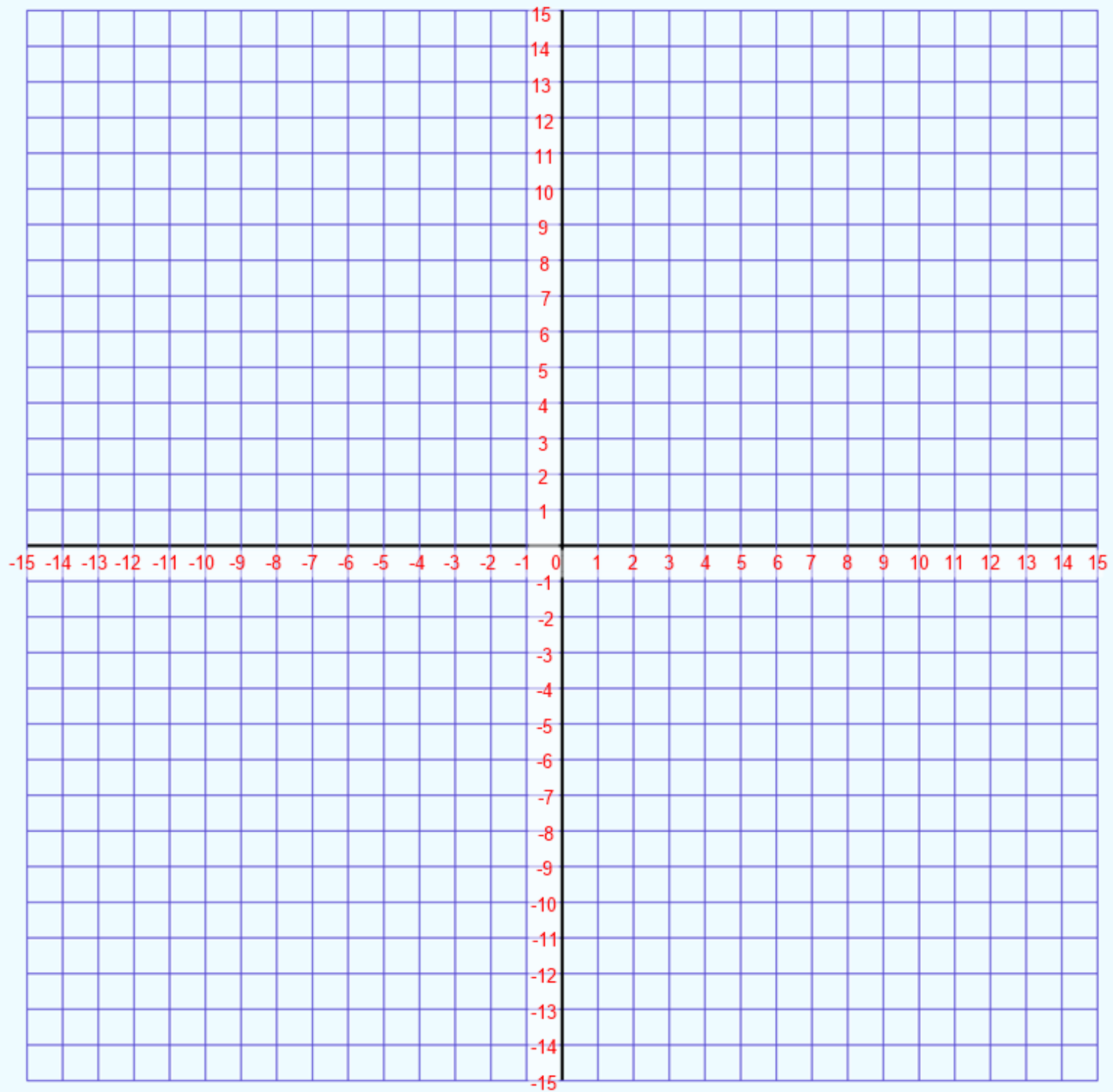
$$3 + 2 = 5 \checkmark$$

Approximate Solutions to Radical Equations

Example 3 :

a) Solve $4 + \sqrt{x + 4} = x - 4$ graphically

b) Verify the solution algebraically.



Assignment,

Note key ideas on page 96

Page 96 questions 1,2,3(calculator), 6,7,
8calculator, 9

Demos