BECA/Huson/Algebra 2: Complex Numbers & Rational Exponents Name: Solution
12 March 2024

3.20 PreTest: Solving quadratics, complex numbers, radicals and exponents

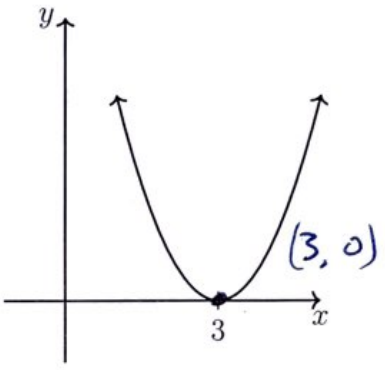
Do Not Use a Calculator A2.REI.4 Solve quadratic equations

1. Given the function $f(x) = (x-3)^2$. How many solutions are there to $f(x) = 0$? Mark and label it on the graph.

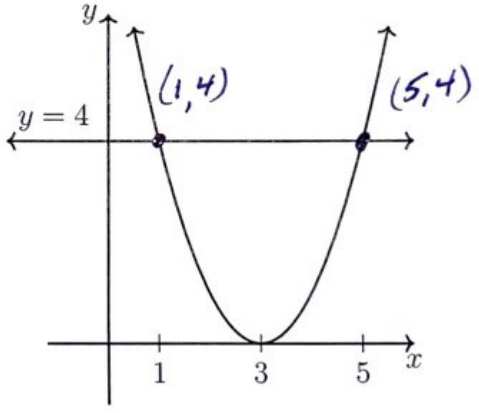
check

$[(3)-3]^2 = 0$?

$0^2 = 0$ ✓



2. How many solutions are there to $(x-3)^2 = 4$? Mark and label them on the graph.



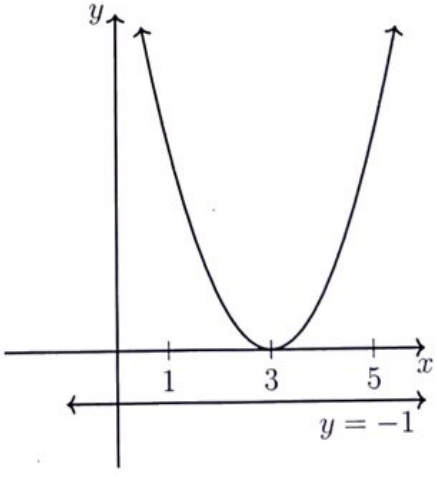
$(x-3)^2 = 4$

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

$x-3 = \pm 2$

$x = 3 \pm 2 = 1, 4$

3. How many, if any, solutions are there to $(x-3)^2 = -1$? Mark and label it on the graph.



$(x-3)^2 = -1$

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

$x-3 = \pm i$

$x = 3 \pm i$

NO SOLUTION

4. Given the quadratic equation, complete the square to determine the number of solutions:

$$x^2 + 6x + 7 = 0$$

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

$(x+3)^2 = 2$

(a) Find $\frac{b}{2} =$ 3

(b) Find $\left(\frac{b}{2}\right)^2 =$ 9

(c) Rewrite the equation, adding or subtracting to both sides to complete the square.

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

$(x+3)^2 = 2$ $\quad x+3 = \pm\sqrt{2}$

(d) How many solutions does the equation have? 2

5. $$x^2 + 12x + 42 = 0$$

$x^2 + 12x + 36 = -6$

$(x+6)^2 = -6$

$x+6 = \pm\sqrt{-6} = \pm i\sqrt{6}$

(a) Find $\frac{b}{2} =$ 6

(b) Find $\left(\frac{b}{2}\right)^2 =$ 36

(c) Rewrite the equation, adding or subtracting to both sides to complete the square.

$x^2 + 12x + 36 = -6$ $\quad x = -6 \pm i\sqrt{6}$

(d) How many solutions does the equation have? 0

6. $$x^2 + 14x + 49 = 0$$

$(x+7)^2 = 0$

$\sqrt{(x+7)^2} = \pm\sqrt{0} = 0$ $\quad x+7=0$ $\quad x=-7$

(a) Find $\frac{b}{2} =$ 7

(b) Find $\left(\frac{b}{2}\right)^2 =$ 49

(c) Rewrite the equation, adding or subtracting to both sides to complete the square.

$x^2 + 14x + 49 = 0$

(d) How many solutions does the equation have?

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7. Square both sides of the equation and solve for x.

(a) $\sqrt{x+9} = 4$

$x+9 = 16$

$x = 7$

(b) Check your solution.

$\sqrt{(7)+9} = 4$?

$\sqrt{16} = 4$ ✓

8. Cube both sides of the equation and solve for x.

(a) $\sqrt[3]{x-3} = 3$

$x-3 = 3^3 = 3\cdot 3\cdot 3 = 27$

$x = 30$

(b) Check your solution.

$\sqrt[3]{(30)-3} = 3$?

$\sqrt[3]{27} = 3$ ✓

9. Solve for x and check.

(a) $\sqrt{2x+1} - 7 = -2$

$+7 \quad +7$

$\sqrt{2x+1} = 5$

$2x+1 = 25$

$2x = 24$

$x = 12$

(b) Check your solution.

$\sqrt{2(12)+1} - 7 = -2$?

$\sqrt{24+1} - 7 = -2$

$\sqrt{25} - 7 = -2$

$5 - 7 = -2$ ✓