

Algebra 2 Homework

Name Key

4.3/4.4 Solve Quadratic Equations & Functions by Factoring

SOLVE- Find all the *ROOTS* of the following *EQUATIONS*:

1. $z^2 - 3z - 54 = 0$

$(z-9)(z+6) = 0$

$z-9=0 \quad z+6=0$

$z=9 \quad z=-6$

2. $3c^2 + 12 = -15c$

$3c^2 + 15c + 12 = 0$

$3(c^2 + 5c + 4) = 0$

$3(c+1)(c+4) = 0$

$3 \neq 0 \quad c+1=0 \quad c+4=0$

$c=-1 \quad c=-4$

3. $2m^2 = 14m$

$2m^2 - 14m = 0$

$2m(m-7) = 0$

 $z \neq 0$

$m=0 \quad m-7=0$

$m=0 \quad m=7$

4. $2x^2 + 7x - 15 = 0$

$a \cdot c = -30$

$b = 7$

$2x^2 + 10x - 3x - 15 = 0 \quad 10, -3$

$(2x^2 + 10x) + (-3x - 15) = 0$

$2x(x+5) + -3(x+5) = 0$

$(x+5)(2x-3) = 0$

$x+5=0$

$x=-5$

$2x-3=0$

$2x=3$

$x = \frac{3}{2}$

5. $5x^2 - 3x + 3 = -2x^2 + 3$

$7x^2 - 3x = 0$

$x(7x-3) = 0$

$x=0 \quad 7x-3=0$

$7x=3$

$x = \frac{3}{7}$

6. $11x^2 = 44$

$11x^2 - 44 = 0$

$11(x^2 - 4) = 0$

$11(x+2)(x-2) = 0$

$11 \neq 0 \quad x+2=0 \quad x-2=0$

$x=-2$

$x=2$

SOLVE- Find all the ZEROS of the following FUNCTIONS.
List the x-intercept(s), too.

7. $y = 12x^2 - 39x + 9$

$0 = 12x^2 - 39x + 9$

$0 = 3(4x^2 - 13x + 3)$ $ac = 12$
 $ac = 12$
 $b = -13$
 $-12, -1$

$4x^2 - 12x - 1x + 3$

$(4x^2 - 12x) + (-1x + 3)$

$4x(x - 3) + -1(x - 3)$

$(x - 3)(4x - 1)$

$0 = 3(x - 3)(4x - 1)$
 $x - 3 = 0$ $4x - 1 = 0$

Zeros: $x = 3, x = \frac{1}{4}$

x-intercepts: $(3, 0)$ $(\frac{1}{4}, 0)$

8. $g(x) = 4x^2 - 25$

$0 = 4x^2 - 25$

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

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

$2x = -5$ $2x = 5$

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

Zeros: $x = -\frac{5}{2}, x = \frac{5}{2}$

x-intercepts: $(-\frac{5}{2}, 0)$ $(\frac{5}{2}, 0)$

9. $y = 4x^2 - 12x + 8$

$0 = 4x^2 - 12x + 8$

$0 = 4(x^2 - 3x + 2)$

$0 = 4(x - 2)(x - 1)$

$4 \neq 0$ $x - 2 = 0$ $x - 1 = 0$

$x = 2$ $x = 1$

Zeros: $x = 2, x = 1$

x-intercepts: $(2, 0)$ $(1, 0)$

10. $f(x) = 2x^2 - 3x - 9$

$0 = 2x^2 - 3x - 9$ $ac = -18, b = -3$
 $-6, 3$

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

$0 = (2x^2 - 6x) + (3x - 9)$

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

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

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

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

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

Zeros: $x = 3, x = -\frac{3}{2}$

x-intercepts: $(3, 0)$ $(-\frac{3}{2}, 0)$

11. $f(x) = 9x^2 + 24x + 16$

$0 = 9x^2 + 24x + 16$

*perfect square trinomial

$0 = (3x + 4)(3x + 4)$

$3x + 4 = 0$ $3x + 4 = 0$

$3x = -4$ $3x = -4$

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

Zeros: $x = -\frac{4}{3}$ Double zero

x-intercepts: $(-\frac{4}{3}, 0)$

12. $y = 3x^2 + 6x - 9$

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

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

$0 = 3(x + 3)(x - 1)$

$3 \neq 0$ $x + 3 = 0$ $x - 1 = 0$

$x = -3$ $x = 1$

Zeros: $x = -3, x = 1$

x-intercepts: $(-3, 0)$ $(1, 0)$

Name: _____
Date: _____

Key

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Show all work to receive full credit. Mark answers clearly. Good luck!

Simplify each radical expression.

1. $\sqrt{45}$
 $\sqrt{9} \sqrt{5}$
 $3\sqrt{5}$

2. $\sqrt{72}$
 $\sqrt{36} \sqrt{2}$
 $6\sqrt{2}$

3. $\sqrt{\frac{81}{36}}$
 $\frac{9}{6}$
 $\frac{3}{2}$

4. $\sqrt{\frac{40}{49}}$
 $\frac{2\sqrt{10}}{7}$

Solve each radical equation.

6. $x^2 - 100 = 0$

$x^2 = 100$
 $x = \pm \sqrt{100}$
 $x = \pm 10$

7. $x^2 - 20 = 0$

$x^2 = 20$
 $x = \pm \sqrt{4} \sqrt{5}$
 $x = \pm 2\sqrt{5}$

8. $9x^2 - 7 = 21$

$9x^2 = 28$
 $x^2 = \frac{28}{9}$
 $x = \pm \sqrt{\frac{28}{9}} = \frac{\pm \sqrt{4} \sqrt{7}}{3}$
 $= \frac{\pm 2\sqrt{7}}{3}$

9. $5x^2 - 12 = 4x^2 + 4$

$x^2 = 16$
 $x = \pm \sqrt{16}$
 $x = \pm 4$

10. $(x+1)^2 = 49$

$x+1 = \pm \sqrt{49}$
 $x+1 = 7$
 $x = 6$
 $x+1 = -7$
 $x = -8$

11. $(x-3)^2 = 27$

$x-3 = \pm \sqrt{27}$
 $x-3 = \pm \sqrt{9} \sqrt{3}$
 $x-3 = \pm 3\sqrt{3}$
 $x = 3 \pm 3\sqrt{3}$

12. $3(x+4)^2 - 12 = 0$

$3(x+4)^2 = 12$
 $(x+4)^2 = 4$
 $x+4 = \pm \sqrt{4}$
 $x+4 = 2$
 $x = -2$
 $x+4 = -2$
 $x = -6$

