

1. $4x^2 - 5x = 21$

$4x^2 - 5x - 21 = 0$
 $(4x^2 - 12x) + (7x - 21) = 0$
 $4x(x-3) + 7(x-3) = 0$
 $(x-3)(4x+7) = 0$

$x-3=0$ $4x+7=0$
 $x=3$ $x=-7/4$

3. $3x^2 + 15x = 0$

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

5. $4x^2 - 9 = 0$

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

Solve using Square Roots:

7. $\frac{3x^2}{3} = \frac{27}{3}$

$x^2 = 9$
 $x = \pm 3$

Solve using Completing the Square:

9. $x^2 + 5x = 6$

$x^2 + 5x + \frac{25}{4} = 6 + \frac{25}{4}$
 $(x + \frac{5}{2})^2 = \frac{49}{4}$
 $x + \frac{5}{2} = \pm \frac{7}{2}$
 $x = 6$
 $x = -1$

Solve using the Quadratic Formula:

11. $x^2 + 2x = 3$

$x^2 + 2x - 3 = 0$
 $\frac{-2 \pm \sqrt{4 - 4(1)(-3)}}{2(1)} = \frac{-2 \pm 4}{2}$
 $x = 1$ $x = -3$

13. $16x^2 - 8x = -1$

$16x^2 - 8x + 1 = 0$
 $\frac{8 \pm \sqrt{64 - 4(16)(1)}}{2(16)} = \frac{8 \pm 0}{32} = \frac{1}{4}$

State the value of the discriminant for each equation. Then determine the number of real solutions of the equation.
 $b^2 - 4ac$

15. $12x^2 + 5x = 4$

$12x^2 + 5x - 4$ $(5)^2 - 4(12)(-4) = 217$ 2 real solutions

16. $2x^2 + 3x = -4$

$2x^2 + 3x + 4$ $(3)^2 - 4(2)(4) = -23$ no real solutions

17. $4x^2 - 4x + 4 = 3$

$4x^2 - 4x + 1$ $(-4)^2 - 4(4)(1) = 0$ 1 real solution

2. $9x^2 - 12x + 4 = 0$

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

$3x-2=0$ $3x-2=0$
 $x=2/3$ $x=2/3$

Double root
1 solution
 $x=2/3$

4. $2x^2 + 6x = 80$

$2x^2 + 6x - 80 = 0$

$2(x^2 + 3x - 40) = 0$
 $2[(x^2 + 8x) + (5x - 40)] = 0$
 $2[x(x+8) - 5(x+8)] = 0$
 $2(x-5)(x+8) = 0$

$2 \neq 0$ $x-5=0$ $x+8=0$
 $x=5$ $x=-8$

6. $x^2 - 5x + 6 = 0$

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

8. $5x^2 - 8 = 117$

$5x^2 = 125$

$x^2 = 25$

$x = \pm 5$

10. $x^2 - 3x + 2 = 0$

$x^2 - 3x + \frac{9}{4} = -2 + \frac{9}{4}$

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

$x - \frac{3}{2} = \pm \frac{1}{2}$

$x = 2$
 $x = 1$

12. $x^2 - 6x - 2 = 0$

$\frac{6 \pm \sqrt{36 - 4(1)(-2)}}{2(1)} = \frac{6 \pm 2\sqrt{11}}{2} = 3 \pm \sqrt{11}$

14. $-4x^2 + 19x = 21$

$-4x^2 + 19x - 21 = 0$

$\frac{-19 \pm \sqrt{361 - 4(-4)(-21)}}{2(-4)} = \frac{-19 \pm 5}{-8}$

$\frac{7}{4}, 3$