Key

Solving Quadratics by Factoring

Objective: To find quadratic solutions (roots, zeros, etc) by factoring, rather than graphing.

Example: Find the solutions of the equation $y = x^2 + 3x - 10$ by factoring.

Step 1: Set the quadratic equation equal to 0.

Step 2: Factor the left side.

Step 3: Set each factor equal to 0 and solve for x.

Step 4: Write your answer using curly braces.

Your Turn! Solve the quadratics by factoring.

1. $x^2 + 4x + 3 = 0$

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

$x+3=0$ $\quad x+1=0$

$-3 \quad -3 \quad -1 \quad -1$

$x=-3 \quad x=-1$

$x=\{-3,-1\}$

2. $x^2 + 11x + 24 = 0$

$(x+8)(x+3)=0$

$x+8=0 \quad x+3=0$

$-8 \quad -8 \quad -3 \quad -3$

$x=-8 \quad x=-3$

$x=\{-8,-3\}$

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

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

$x+2=0 \quad x-1=0$

$-2 \quad -2 \quad +1 \quad +1$

$x=-2 \quad x=1$

$x=\{-2,1\}$

4. $x^2 + 6x - 27 = 0$

$(x+9)(x-3)=0$

$x+9=0 \quad x-3=0$

$-9 \quad -9 \quad +3 \quad +3$

$x=-9 \quad x=3$

$x=\{-9,3\}$

5. $x^2 - 10x + 21 = 0$

$(x-7)(x-3)=0$

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

$+7 \quad +7 \quad +3 \quad +3$

$x=7 \quad x=3$

$x=\{3,7\}$

6. $x^2 - x - 20 = 0$

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

$x-5=0 \quad x+4=0$

$+5 \quad +5 \quad -4 \quad -4$

$x=5 \quad x=-4$

$x=\{-4,5\}$

7. $x^2 + 10x + 25 = 0$

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

$x+5=0$

$-5 \quad -5$

$x=-5$

8. $x^2 - 8x + 16 = 0$

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

$x-4=0$

$+4 \quad +4$

$x=4$

9. $x^2 - 8x = 0$

$x(x-8)=0$

$x=0 \quad x-8=0$

$+8 \quad +8$

$x=8$

10. $3x^2 + 15x = 0$

$3x(x+5)=0$

$\frac{3x}{3}=\frac{0}{3} \quad x+5=0$

$x=0 \quad -5 \quad -5$

$x=-5$

$x=\{-5,0\}$

11. $6x^2 - 12x = 0$

$6x(x-2)=0$

$\frac{6x}{6}=\frac{0}{6}$ $\quad x=0$

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

$X=\{0,2\}$

12. $8x^2 - 6x = 0$

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

$\frac{2x}{2}=\frac{0}{2}$ $\quad x=0$

$4x-3=0$ $+3\ +3$ $\quad \frac{4x}{4}=\frac{3}{4}$

$X=\{0,\frac{3}{4}\}$

13. $x^2 - 64 = 0$

$(x+8)(x-8)=0$

$x+8=0$ $-8\ -8$ $\quad x=-8$

$X=\pm 8$

$x-8=0$ $+8\ +8$ $\quad x=8$

14. $x^2 - 25 = 0$

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

$x+5=0$ $-5\ -5$ $\quad x=-5$

$x-5=0$ $+5\ +5$ $\quad x=5$

$X=\pm 5$

15. $4x^2 - 81 = 0$

$(2x+9)(2x-9)=0$

$2x+9=0$ $-9\ -9$ $\quad \frac{2x}{2}=\frac{-9}{2}$

$2x-9=0$ $+9\ +9$ $\quad \frac{2x}{2}=\frac{9}{2}$

$X=\pm\frac{9}{2}$

16. $9x^2 - 49 = 0$

$(3x+7)(3x-7)=0$

$3x+7=0$ $-7\ -7$ $\quad \frac{3x}{3}=\frac{-7}{3}$

$3x-7=0$ $+7\ +7$ $\quad \frac{3x}{3}=\frac{7}{3}$

$X=\pm\frac{7}{3}$

EQUATIONS NOT IN STANDARD FORM...

You must MOVE-FACTOR-SOLVE!

17. $x^2 + 4x = 21$

$-21\ \ -21$

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

$(x+7)(x-3)=0$

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

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

$X=\{-7,3\}$

18. $x^2 - 45 = 4x$

$-4x\ \ -4x$

$x^2-4x-45=0$

$(x-9)(x+5)=0$

$x-9=0$ $+9\ +9$ $\quad x=9$

$x+5=0$ $-5\ -5$ $\quad x=-5$

$X=\{-5,9\}$

19. $x^2 - 5x - 64 = 7x$

$-7x\ \ -7x$

$x^2-12x-64=0$

$(x-16)(x+4)=0$

$x-16=0$ $+16\ +16$ $\quad x=16$

$x+4=0$ $-4\ -4$ $\quad x=-4$

$X=\{-4,16\}$

20. $x^2 - 10x + 49 = 4x + 1$

$-4x\ \ -(\ -4x-1)$

$x^2-14x+48=0$

$(x-6)(x-8)=0$

$x-6=0$ $+6\ +6$ $\quad x=6$

$x-8=0$ $+8\ +8$ $\quad x=8$

$X=\{6,8\}$

21. $4x^2 = 28x$

$-28x\ \ -28x$

$4x^2-28x=0$

$4x(x-7)=0$

$\frac{4x}{4}=\frac{0}{4}$ $\quad x=0$

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

$X=\{0,7\}$

22. $11x^2 = x^2 + 8x$

$-x^2\ -x^2\ \ -8x$

$10x^2-8x=0$

$2x(5x-4)=0$

$\frac{2x}{2}=\frac{0}{2}$ $\quad x=0$

$5x-4=0$ $+4\ +4$ $\quad \frac{5x}{5}=\frac{4}{5}$

$X=\{0,\frac{4}{5}\}$

23. $x^2 = 36$

$-36\ \ -36$

x^2-36

$(x+6)(x-6)=0$

$x+6=0$ $-6\ -6$ $\quad x=-6$

$x-6=0$ $+6\ +6$ $\quad x=6$

$X=\pm 6$

24. $16x^2 = 9$

$-9\ \ -9$

$16x^2-9=0$

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

$4x+3=0$ $-3\ -3$ $\quad \frac{4x}{4}=\frac{-3}{4}$

$4x-3=0$ $+3\ +3$ $\quad \frac{4x}{4}=\frac{3}{4}$

$X=\pm\frac{3}{4}$