Solving Quadratics by Factoring

Name: _____	Date: _____	Score: _____ / 24

Quick Review

To solve $ax^2 + bx + c = 0$ by factoring: **(1)** move everything to one side so the other side is 0; **(2)** factor; **(3)** use the **Zero Product Property** — if a product is 0, at least one factor is 0 — and set each factor equal to 0; **(4)** solve each factor. A quadratic can have 2, 1 (double root from a perfect square), or 0 real solutions. If you can't factor, use the quadratic formula or completing the square. Factoring is fastest when the numbers are friendly.

PRACTICE

Solve each by factoring.

1. $x^2 - 7x + 12 = 0$ _____

2. $x^2 + 4x - 5 = 0$ _____

3. $x^2 - 9 = 0$ _____

4. $x^2 + 6x + 9 = 0$ _____

5. $x^2 - x - 12 = 0$ _____

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

7. $2x^2 + 5x + 3 = 0$ _____

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

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

10. $x^2 = 25$ _____

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

12. $3x^2 - 12 = 0$ _____

13. $x^2 - 10x + 25 = 0$ _____

14. $x^2 + 7x = 0$ _____

15. $2x^2 - 8 = 0$ _____

16. $x^2 - x - 20 = 0$ _____

17. $6x^2 - x - 1 = 0$ _____

18. $x(x - 3) = 10$ _____

19. $4x^2 - 1 = 0$ _____

20. $x^2 - 2x - 15 = 0$ _____

Word Problems

21. A ball is launched from the ground with height model $h(t) = -16t^2 + 32t$. Besides the launch time, when does it hit the ground again?

_____

22. A rectangular garden has area 40 square feet, and its length is 3 feet more than its width. Find the garden's dimensions.

_____

23. A number puzzle says two consecutive even integers have a product of 48. Find the possible integers.

_____

24. A small business uses the model $P = x^2 - 10x$ for profit, where negative values mean a loss. Find the break-even values where profit is zero.

_____

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Answer Keys

1. $x = 3, 4$
2. $x = -5, 1$
3. $x = \pm 3$
4. $x = -3$
5. $x = 4, -3$
6. $x = -3, 2$
7. $x = -1, -\frac{3}{2}$
8. $x = -4$
9. $x = 0, 4$
10. $x = \pm 5$
11. $x = 2, -4$
12. $x = \pm 2$
13. $x = 5$
14. $x = 0, -7$
15. $x = \pm 2$
16. $x = 5, -4$
17. $x = \frac{1}{2}, -\frac{1}{3}$
18. $x = 5, -2$
19. $x = \pm \frac{1}{2}$
20. $x = 5, -3$
21. $t = 2$ sec
22. $w = 5,\ \ell = 8$
23. 6 and 8 (or $-8, -6$)
24. $x = 0$ or $x = 10$

Step-by-Step Tutor Notes

1. Take it one clear step at a time and keep the original question in mind. $(x-3)(x-4) = 0$. So the answer is $x = 3, 4$.
2. Focus on the main idea of the problem, then simplify carefully. $(x+5)(x-1) = 0$. So the answer is $x = -5, 1$.
3. Focus on the main idea of the problem, then simplify carefully. $(x-3)(x+3) = 0$. So the answer is $x = \pm 3$.
4. Focus on the main idea of the problem, then simplify carefully. $(x+3)^2 = 0$, double root. So the answer is $x = -3$.
5. This is a good place to slow down, check the notation, and simplify cleanly. $(x-4)(x+3) = 0$. So the answer is $x = 4, -3$.
6. Start with the definition the problem is testing, then apply it directly. $(x+3)(x-2) = 0$. So the answer is $x = -3, 2$.
7. Focus on the main idea of the problem, then simplify carefully. $(2x+3)(x+1) = 0$. So the answer is $x = -1, -\frac{3}{2}$.
8. This is a good place to slow down, check the notation, and simplify cleanly. $(x+4)^2 = 0$. So the answer is $x = -4$.
9. Take it one clear step at a time and keep the original question in mind. $x(x-4) = 0$. So the answer is $x = 0, 4$.
10. This is a good place to slow down, check the notation, and simplify cleanly. $x^2 - 25 = (x-5)(x+5) = 0$. So the answer is $x = \pm 5$.
11. Move all to one side: $x^2 + 2x - 8 = 0$. Factor: $(x+4)(x-2) = 0$.
12. Start with the definition the problem is testing, then apply it directly. $x^2 = 4$. So the answer is $x = \pm 2$.
13. Use the clue in the question first, then let the arithmetic finish the job. Perfect square. So the answer is $x = 5$.
14. Start with the definition the problem is testing, then apply it directly. $x(x+7) = 0$. So the answer is $x = 0, -7$.
15. Start with the definition the problem is testing, then apply it directly. $x^2 = 4$. So the answer is $x = \pm 2$.
16. Use the clue in the question first, then let the arithmetic finish the job. $(x-5)(x+4) = 0$. So the answer is $x = 5, -4$.
17. Use the clue in the question first, then let the arithmetic finish the job. $(2x-1)(3x+1) = 0$. So the answer is $x = \frac{1}{2}, -\frac{1}{3}$.
18. Read the table by matching the correct row and column first, then use the count or total that fits the question. $x^2 - 3x - 10 = 0 \Rightarrow (x-5)(x+2) = 0$. This gives $x = 5, -2$.
19. Start with the definition the problem is testing, then apply it directly. $(2x-1)(2x+1) = 0$. So the answer is $x = \pm \frac{1}{2}$.
20. Take it one clear step at a time and keep the original question in mind. $(x-5)(x+3) = 0$. So the answer is $x = 5, -3$.
21. $-16t^2 + 32t = 0 \Rightarrow -16t(t-2) = 0$. So $t = 0$ (start) or $t = 2$. Lands at $t = 2$.
22. $w(w+3) = 40 \Rightarrow w^2 + 3w - 40 = 0 \Rightarrow (w+8)(w-5) = 0$. Positive: $w = 5, \ell = 8$.
23. $n(n+2) = 48 \Rightarrow n^2 + 2n - 48 = 0 \Rightarrow (n+8)(n-6) = 0$. Positive pair: 6 and 8.
24. Name the quantities first so the model is easy to read. $x(x-10) = 0$. Two break-even points.

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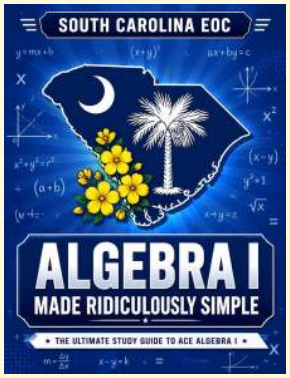

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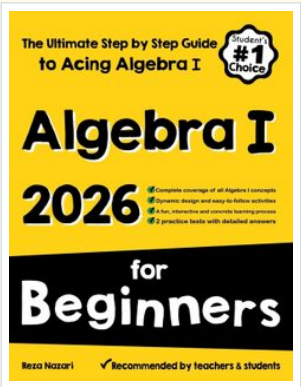

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