

5.2C Solving Quadratic Equations by Factoring Part II

- 5) The product of two consecutive odd integers is 99. Find the integers.

a) Write the equation that you are trying to solve. $x(x+2) = 99$

- b) Solve the equation by factoring.

The integers could be:

-11 and -9

9 and 11

$$x^2 + 2x - 99 = 0$$

$$(x+11)(x-9) = 0$$

$$x = -11 \text{ OR } x = 9$$

- 6) The height of a rocket launched upward from a 160-foot cliff is modeled by $h = -16t^2 + 48t + 160$, where h is the height in feet and t is the time in seconds. The rocket landed in a tree, 28 feet off the ground.

a) Write the equation that you are trying to solve. $28 = -16t^2 + 48t + 160$

- b) Solve the equation by factoring.

$$16t^2 - 48t - 160 = 0$$

$$16(t^2 - 3t - 10) = 0$$

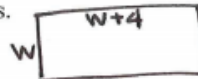
$$16(t+2)(t-5) = 0$$

$$t = -2 \text{ (NEG)} \quad t = 5$$

The rocket would
land in the tree
5 seconds after
it was launched.

- 7) The length of a rectangle exceeds its width by 4 inches. Find the dimensions of the rectangle this describes. Its area is 96 square inches.

- a) Draw a picture.



- b) Write the equation that you are trying to solve.

$$A = l \times w$$

$$96 = w(w+4)$$

- c) Solve the equation by factoring.

$$0 = w^2 + 4w - 96$$

$$0 = (w+12)(w-8)$$

$$w = -12 \text{ (NEG)} \quad w = 8$$

width = 8 inches

length = $8 + 4 = 12$ inches

- 8) Robert threw a rock off a bridge into the river. The distance from the rock to the river is modeled by the equation $h = -16t^2 - 16t + 60$, where h is the height in feet and t is the time in seconds. Find how long it took the rock to hit the surface of the water.

a) Write the equation that you are trying to solve. $0 = -16t^2 - 16t + 60$

- b) Solve the equation by factoring.

$$0 = -4(4t^2 + 4t - 15)$$

$$0 = -4(2t-3)(2t+5)$$

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

$$t = -\frac{5}{2} \text{ (NEG)}$$

The rock hit the water
1.5 sec after Robert
threw it.

13. $x^2 - 13x = -40$

$$x^2 - 13x + 40 = 0$$

$$(x-8)(x-5) = 0$$

$$x = 8, 5$$

✓ Verify your solution(s):

$$(8)^2 - 13(8) = -40 \checkmark$$

$$64 - 104 = -40 \checkmark$$

$$(5)^2 - 13(5) = -40 \checkmark$$

$$25 - 65 = -40 \checkmark$$

16. $5x^2 + 11x = -2$

$$5x^2 + 11x + 2 = 0$$

$$(5x+1)(x+2) = 0$$

$$x = -\frac{1}{5}, -2$$

✓ Verify your solution(s):

$$5\left(-\frac{1}{5}\right)^2 + 11\left(-\frac{1}{5}\right) + 2 = 0$$

$$5 \cdot \frac{1}{25} - \frac{11}{5} + \frac{10}{5} = 0 \checkmark$$

$$5(-2)^2 + 11(-2) = -2 \checkmark$$

$$20 - 22 + 2 = 0 \checkmark$$

14. $3x^2 + 10x + 8 = 0$

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

$$x = -\frac{4}{3}, -2$$

✓ Verify your solution(s):

$$3\left(-\frac{4}{3}\right)^2 + 10\left(-\frac{4}{3}\right) + 8 = 0$$

$$\frac{3 \cdot 16}{9} - \frac{40}{3} + \frac{24}{3} = 0 \checkmark$$

$$\frac{16}{3} - \frac{40}{3} + \frac{24}{3} = 0 \checkmark$$

$$3(-2)^2 + 10(-2) + 8 = 0 \checkmark$$

17. $2x^2 - 15x = 8$

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

$$(2x+1)(x-8) = 0$$

$$x = -\frac{1}{2}, 8$$

✓ Verify your solution(s):

$$2\left(-\frac{1}{2}\right)^2 - 15\left(-\frac{1}{2}\right) - 8 = 0$$

$$2\left(\frac{1}{4}\right) + \frac{15}{2} - \frac{16}{2} = 0 \checkmark$$

$$2(8)^2 - 15(8) - 8 = 0 \checkmark$$

$$128 - 120 - 8 = 0 \checkmark$$

15. $8x^2 + 6x - 5 = 0$

$$(4x+5)(2x-1) = 0$$

$$x = -\frac{5}{4}, \frac{1}{2}$$

✓ Verify your solution(s):

$$8\left(-\frac{5}{4}\right)^2 + 6\left(-\frac{5}{4}\right) - 5 = 0$$

$$8 \cdot \frac{25}{16} - \frac{15}{2} - 5 = 0 \checkmark$$

$$\frac{25}{2} - \frac{15}{2} - 5 = 0 \checkmark$$

$$8\left(\frac{1}{2}\right)^2 + 6\left(\frac{1}{2}\right) - 5 = 0$$

$$8\left(\frac{1}{4}\right) + 3 - 5 = 0 \checkmark$$

$$2 + 3 - 5 = 0 \checkmark$$

Section 5.2B