

DO NOW

Solve: $2x^2 - x = 15$

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

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

$$2x+5=0 \text{ OR } x-3=0$$

$$2x = -5 \quad x = 3$$

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

$$\left\{-\frac{5}{2}, 3\right\}$$

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8.3 Word Problems

Recall: Consecutive Integer Problems

Consecutive integers $\rightarrow x, x+1, x+2 \dots$

Consecutive even integers $\rightarrow x, x+2, x+4 \dots$

Consecutive odd integers $\rightarrow x, x+2, x+4 \dots$

Area Formulas

$$A_{\square} = lw$$

$$A_{\square} = s^2$$

$$A_{\Delta} = \frac{1}{2}bh$$

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1. The product of an integer and 7 less than 3 times the integer is 20. Find the integer.

let $x = \text{integer}$

$$x(3x-7) = 20$$

$$3x^2 - 7x = 20$$

$$3x^2 - 7x - 20 = 0$$

$$(3x+5)(x-4) = 0$$

$$3x+5=0 \text{ OR } x-4=0$$

$$3x = -5$$

$$x = 4$$

$$x = -\frac{5}{3}$$

reject
not an
integer

The integer is 4.

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2. The smaller of two positive integers is 3 less than the larger. If twice the square of the larger is increased by three times the smaller, the result is 56. Find the smaller integer.

let $x = \text{larger \#}$

$x-3 = \text{smaller \#}$

$$2x^2 + 3(x-3) = 56$$

$$2x^2 + 3x - 9 = 56$$

$$2x^2 + 3x - 9 - 56 = 0$$

$$2x^2 + 3x - 65 = 0$$

$$(2x+13)(x-5) = 0$$

$$2x+13=0 \text{ OR } x-5=0$$

$$2x = -13$$

$$x = 5$$

$$x = -\frac{13}{2}$$

reject
not an
integer

$$\begin{array}{r} x-3 \\ 5-3 \\ 2 \end{array}$$

The smaller integer is 2.

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3. Find three consecutive integers such that the product of the second and the third, decreased by 4 times the second, is 5 more than 5 times the first.

let $x = 1^{\text{st}}$ consecutive integer

$x+1 = 2^{\text{nd}}$

$x+2 = 3^{\text{rd}}$

FOIL $\rightarrow (x+1)(x+2) - 4(x+1) = 5x + 5$

$$x^2 + 2x + x + 2 - 4x - 4 = 5x + 5$$

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

$$x^2 - 6x - 7 = 0$$

$$(x-7)(x+1) = 0$$

$$x-7=0 \text{ OR } x+1=0$$

$$x = 7 \quad x = -1$$

$$x+1=8 \quad x+1=0$$

$$x+2=9 \quad x+2=1$$

7, 8, 9 OR -1, 0, 1

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4. The length of a rectangle is 2 cm more than 3 times the width. The area is 16 cm^2 . Find the length and width.

let $x = \text{width}$

$3x+2 = \text{length}$

$lw = A$

$$x(3x+2) = 16$$

$$3x^2 + 2x = 16$$

$$3x^2 + 2x - 16 = 0$$

$$(3x+8)(x-2) = 0$$

$$3x+8=0 \text{ OR } x-2=0$$

$$3x = -8$$

$$x = 2$$

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

reject
negative

$$\begin{array}{r} A = 16 \text{ cm}^2 \\ x \\ 3x+2 \end{array}$$

$$\begin{array}{r} 3x+2 \\ 3(2)+2 \\ 6+2 \\ 8 \end{array}$$

length = 8 cm
width = 2 cm

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5. Jose throws a ball into the air with an initial velocity of 48 feet per second, from a height of 5 feet above the ground. If the function $h(t) = -16t^2 + 48t + 5$ represents the height, $h(t)$, in feet, and t , the time in seconds, after how many seconds is the ball at a height of 37 feet? FIND t

$$h(t) = 37$$

$$h(t) = -16t^2 + 48t + 5$$

$$37 = -16t^2 + 48t + 5$$

$$16t^2 - 48t + 37 - 5 = 0$$

$$16t^2 - 48t + 32 = 0$$

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

$$16(t-2)(t-1) = 0$$

$$16 \neq 0 \quad t-2=0 \text{ or } t-1=0$$

$$t=2 \quad t=1$$

1 second
or
2 seconds

HOMEWORK

Worksheet - HW 8.3 - Word Problems