SOLVING EQUATIONS BY USING THE ZERO PRODUCT RULE

SESSION 10
4.8(EX. 1-3,7,8)
PP. 388-393

Quadratic equation

- Definition: Quadratic equation in one variable is an equation that can be written in the form:
  $ax^2 + b x + c = 0 \qquad a \neq 0$
- & a , b , c are real numbers

Write into the standard form

- Check if these equations are quadratic:
- 1) $-4x^2 + 4x = 1$
- 2) $x(x-2) = 3$
- 3) $(x-4)(x+4) = 0$

Using the product rule to solve the equation

The zero product rule:

If a product $a \cdot b = 0$ than $a=0$ or $b=0$

So if let say:

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

$x-4=0$ or $x+4=0$

$x=4$ or $x=-4$

Ex.1. $2x^2-5x = 12$

- First smplify:$2x^2-5x -12=0$
- AC product $2 \cdot (-12)=-24$
- Sum; -5 (what is the strategy to find the numbers).
- Numbers are: -8, 5

$$2x^2-5x = 12$$

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

- $2x^2-8x+3x-12=0$
- $(2x^2-8x)+(3x-12)=0$
- $2x(x-4)+3(x-4)=0$
- $(X-4)(2x+3)=0$ (0 pr rule)
- $X-4=0$ or $2x+3=0$
- $X=4$ $x=-3/2$ (-1.5)

Ex.2. $6x^2+8x=0$

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- $2x(3x+4)=0$
- $X=0$ or $3x+4=0$
- $3x=-4$
- $x=-4/3$
- Check the answer.

Ex.3. $9x(4x+2)-10x=8x+25$

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- $36x^2+18x-10x=8x+25$
- $36x^2+8x= 8x+25$
- $36x^2+8x- 8x-25=0$
- $36x^2-25=0$
- $(6x)^2-5^2=0$
- $(6x-5)(6x+5)=0$
- $X=5/6$ or $x=-5/6$

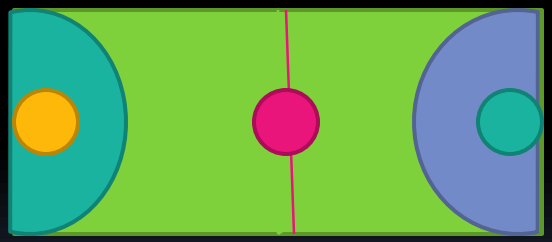
Ex.7.The product of two consecutive odd integers is 35. Find integers.

- First odd integer x
- Second odd integer will be x+2
- Product: $x(x+2)=35$
- Solve it for x. & find the consecutive numbers.

Application using the quadratic equation

- The length of a basketball court is 6ft less than 2 times the width. If the total area is 4700 ft ², find the dimensions of the court.

- w



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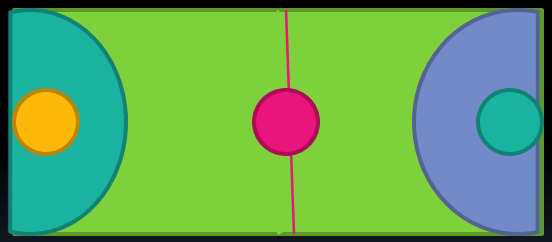

2w-6

$A=L \cdot W$ $4700= (w-6) \cdot w$ Solve it for w that find the L $w=50$ ($w=-47$)

$ax^2+bx+c=0$ where ax^2+bx+c is a perfect square

- $4x^2+8x+4= 0$

$4x^2+8x+4$

$4x^2+8x+4=0$

Factor first

- Method 1:
- $4(x^2+2x+1)=0$
- $4(x+1)^2=0$
- $X+1=0$
- $X=-1$

Use the formula first

- $4x^2+8x+4=0$
- $(2x+2)^2=0$
- $2x+2=0$
- $2(x+1)=0$
- $x+1=0$
- $X=-1$

Solve equations by using the zero product rule

- $x^2-2x-24=0$

$x^2-2x-24=0$

- $x^2-2x-24=0$
- $(x-6)(x+4)=0$
- $x-6=0$ or $x+4=0$
- So: $x=6$ or $x=-4$

- Using AC rule to factor
- Pr. -24, sum -2
- Numbers: -6, 4
- Use zero product rule

$$9x^2-12x=0$$

$9x^2-12x=0$

- $9x^2-12x=0$
- $3x(3x-4)=0$
- $3x=0$ or $3x-4=0$
- $X=0$ or $x=4/3$
- Check:
- $9\cdot 0^2-12\cdot 0=0$
- $9\cdot(4/3)^2-12\cdot(4/3)=0$
- $0=0$

- List the strategies to factor:
- Look for common factor
- Look for the number of terms (2 terms, 3 terms etc
- Look for formulas
- If a trinomial and the formulas don't work use AC method.
- Factor completely
- Check by multiplying

$$3x(2x-1)-x=2x(x-2)+25$$

Simplify First

- $3x(2x-1)-x=2x(x-2)+25$
- $6x^2-3x-x = 2x^2-4x+25$
- $6x^2-4x = 2x^2-4x+25$
- $6x^2-2x^2-4x+4x-25=0$
- $4x^2-25=0$
- $(2x-5)(2x+5)=0$
- $X=5/2$ or $x=-5/2$ (2.5)

Solving higher-degree polynomial equation

- $z^3+3z^2-4z-12=0$

Solving higher-degree polynomial equation

$z^3+3z^2-4z-12=0$

$(z^3+3z^2)-(4z+12)=0$ (group)

$z^2(z+3)-4(z+3)=0$

$(z+3)(z^2-4)=0$

$(z+3)(z-2)(z+2)=0$

$Z=-3;\ z=2;\ z=-2$

HW #10

Summarizing of the session

Solving equations by zero product rule

- * Simplify the equation in the standard form
- $ax^2+bx+c=0$
- Factor completely

Apply the product rule by equaling to zero each factor and solving the equations that you get.

- For the higher degree equations the rules work almost the same.