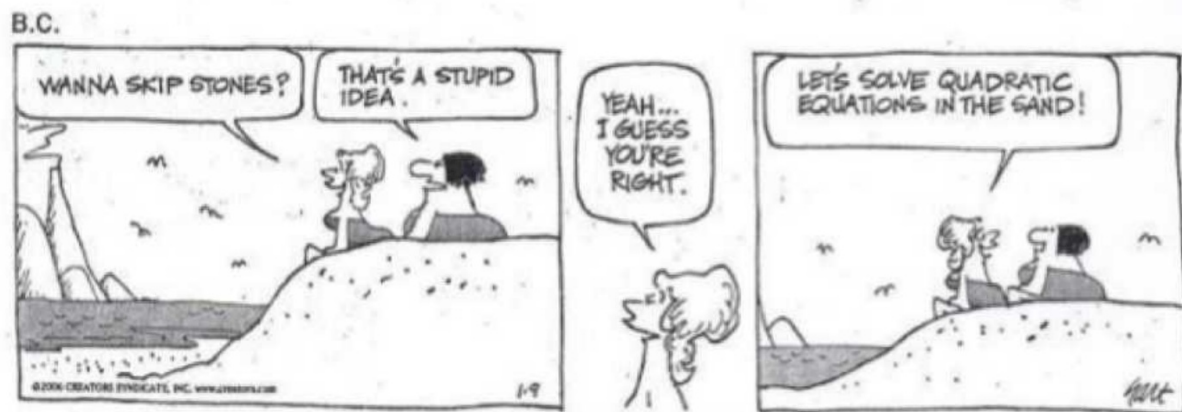


1.3/1.4 Solving Quadratic Equations by Factoring



*See printout.

HW:

Recall that Quadratic Equations Come in 3 Forms...

- Standard Form: $0 = ax^2 + bx + c$
- Vertex Form: $0 = a(x-h)^2 + k$
- Intercept Form: $0 = a(x-p)(x-q)$

4 Methods of Solving Quadratic Equations

1. factoring
2. completing the square (CTS)
3. square root
4. quadratic formula

Solving By Factoring

*Use solving by factoring when given a factorable standard form equation.

ex: Solve. (Find the roots of the equation.)

a) $x^2 - x - 30 = 0$

$$(x - 6)(x + 5) = 0$$

$$x = 6 \quad x = -5$$

zero product
property
 $a \cdot 0 = 0$

$$b) -2x^2 + 34x = 0$$

$$\underbrace{-2x}_{-2x=0} \underbrace{(x-17)}_{x-17=0} = 0$$
$$\boxed{x=17, 0}$$

$$c) x^2 = 64$$

$$x^2 - 64 = 0$$
$$(x-8)(x+8) = 0$$
$$\boxed{x = \pm 8}$$

$$d) 4x^2 + 4x + 1 = 0$$

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

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

$$2x+1=0$$

$x = -\frac{1}{2}$ multiplicity of 2

↓
mult. of 2

$$e) 4x^2 - 17x - 15 = 0$$

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

↓ ↓

$-3/4$	5
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$$f) 7x^2 - 42 = -35x$$

$$7x^2 + 35x - 42 = 0$$

$$7(x^2 + 5x - 6) = 0$$

$$7(x+6)(x-1) = 0$$



$$g) x(x-4) = -4$$

$$x^2 - 4x = -4$$

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

$$(x-2)^2 = 0$$

$$x = 2, \text{ mult. of } 2$$

Real Zeros

x-intercepts

ex: Find the real zeros of the function.

a) $f(x) = 14x^2 - 21x$

$$0 = 14x^2 - 21x$$

$$0 = 7x(2x - 3)$$

$$x = 0, \frac{3}{2}$$

$$7x = 0$$
$$x = 0$$

$$2x - 3 = 0$$
$$x = \frac{3}{2}$$

b) $y = 16x^2 - 2x - 5$

$$0 = (8x - 5)(2x + 1)$$

$$x = \frac{5}{8}, -\frac{1}{2}$$

$$8x - 5 = 0$$

ex: What is the difference between zeros, roots and solutions?



solutions = roots
(equations or functions)

zeros: where a function = 0
(functions)

ex: Write a quadratic function in standard form with integral coefficients given the zeros.

↳ integers

a) (9,0) & (-3,0)

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

$$y = x^2 - 6x - 27$$

b) $x=0.5$ multiplicity of 2

$\frac{1}{2}$

$$y = (2x-1)(2x-1)$$

$$y = 4x^2 - 4x + 1$$