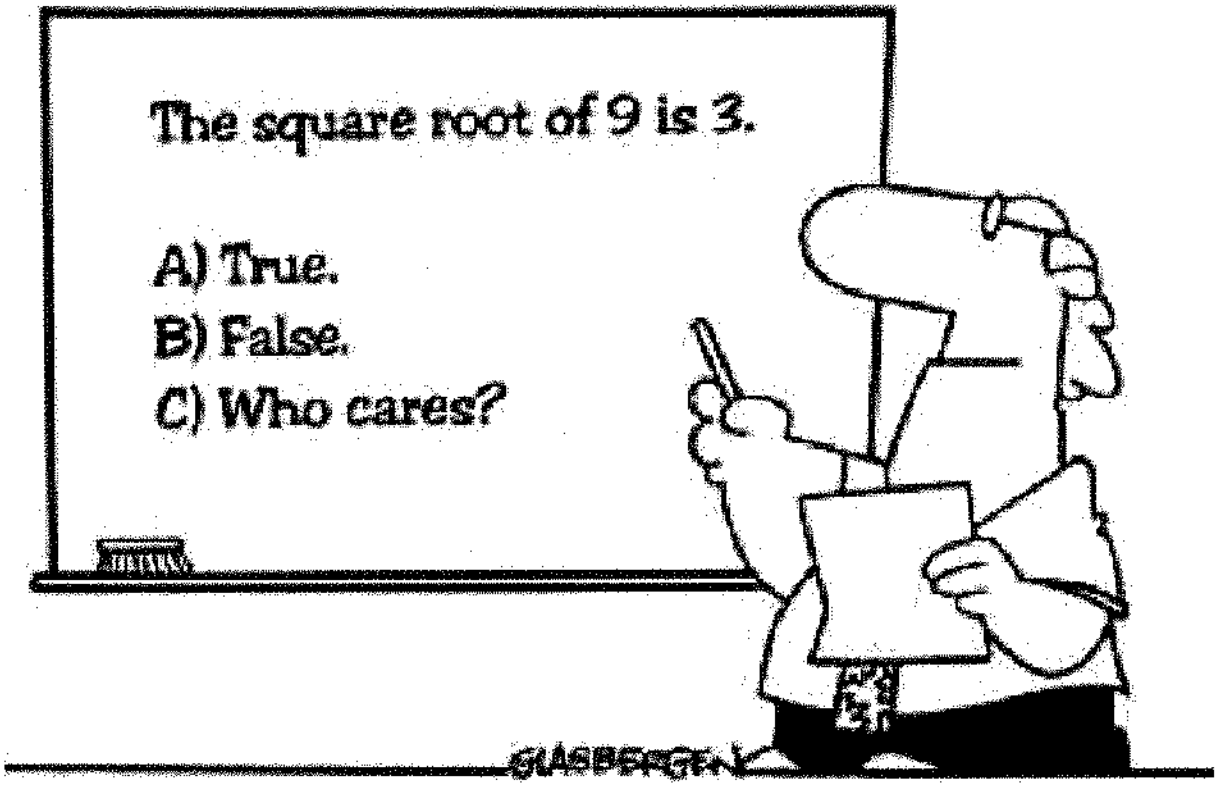
Square Root Review
Solving By Factoring

Notes
Day 2



Many students actually look forward to Mr. Atwadder's math tests.

Real Zeros

① Replace f(x) or y with "0"

② Solve it.

ex: Find the real zeros of the function.

Solve for the variable.

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

GCF: $7x$

$0 = 14x^2 - 21x$

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

$\frac{7x}{7} = \frac{0}{7}$ | $2x-3=0$, $+3\ +3$, $\frac{2x}{2} = \frac{3}{2}$

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

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

$0 = 16x^2 - 2x - 5$

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

$8x-5=0$, $+5\ +5$, $\frac{8x}{8} = \frac{5}{8}$ | $2x+1=0$, $-1\ -1$, $\frac{2x}{2} = \frac{-1}{2}$

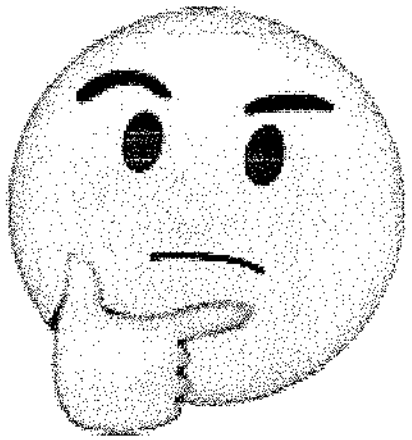
$x = \frac{5}{8}$ | $x = -\frac{1}{2}$

-80

$16x \cdot +8$ $\quad$ $16x \cdot -10$

$2x+1$ $\quad$ $8x-5$

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



Roots / Solutions : come from equations

Synonyms
(mean the same)

_____ = 0

Zeros : come from functions

$f(x) =$ _____

$y =$ _____

$g(x) =$ _____

$f(x)$

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

↖ integers (no fractions)

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

$x=9$ $x=-3$

$(x-9)=0$ $(x+3)=0$

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

$f(x)=x^2+3x-9x-27$

$f(x)=x^2-6x-27$ ← standard form

ax^2+bx+c (descending order)

b) x=4, -4

$x=4$ $x=-4$

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

$f(x)=(x-4)(x+4)$

$f(x)=x^2+4x-4x-16$

$f(x)=x^2-16$

① Build factors (work backwards)

② multiply together all factors

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

c) (-1/3,0) & (5/2,0)

$x = -\frac{1}{3}$ | $x = \frac{5}{2}$

clear the denominator

$3 \cdot x = -\frac{1}{3} \cdot \frac{3}{1}$ | $2 \cdot x = \frac{5}{2} \cdot \frac{2}{1}$

$3x = -1$ | $2x = 5$

$(3x+1) = 0$ | $(2x-5) = 0$

$f(x) = (3x+1)(2x-5)$ Foil

$f(x) = 6x^2 - 15x + 2x - 5$

$\boxed{f(x) = 6x^2 - 13x - 5}$

d) x=0.5 multiplicity of 2

occurs twice

$x = 0.5$ $x = 0.5$

$2 \cdot x = \frac{1}{2} \cdot 2$ $x = \frac{1}{2}$

$2x = 1$ $2x = 1$

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

$f(x) = (2x-1)(2x-1)$ Foil

$\boxed{f(x) = 4x^2 - 4x + 1}$

e) $x = 0, 5$

$x = 0$ $\quad$ $x = 5$

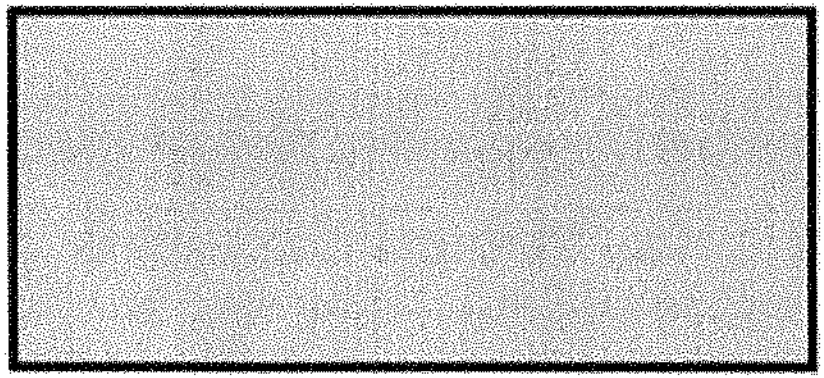
$(x - 5) = 0$

$f(x) = x(x-5)$

$\boxed{f(x) = x^2 - 5x}$

ex: Find x.

a) Area of rectangle = 36



(1) Set up an area equation

(2) Solve

(3) Eliminate extraneous (bad) solutions.

square/rect: $A = l \cdot w$

$36 = (x+5)x$

$36 = x^2 + 5x$

$-36 \quad -36$

$0 = x^2 + 5x - 36$

$0 = (x+9)(x-4)$

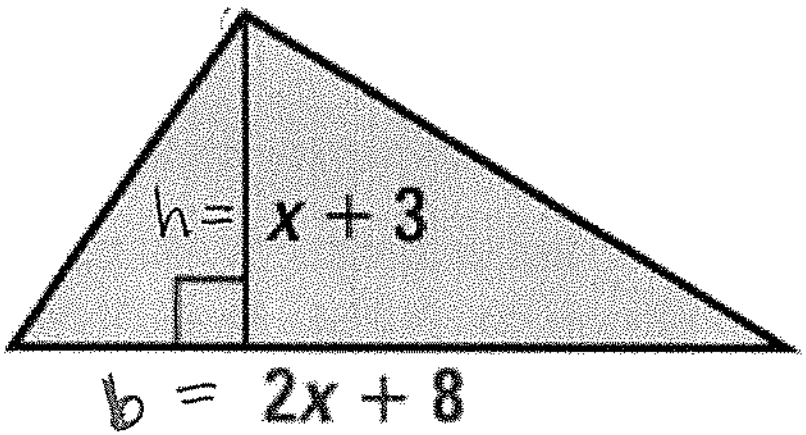
$x+9=0$ | $x-4=0$

$x = -9$ | $x = 4$

extraneous

ex: Find x.

b) Area of triangle = 42



base ↙ height ↙

Triangle: $A = \frac{1}{2}bh$

$42 = \frac{1}{2}[(2x+8)(x+3)]$ Foil

$42 = \frac{1}{2}(2x^2+6x+8x+24)$

$42 = \frac{1}{2}(2x^2+14x+24)$

$42 = x^2+7x+12$

$-42 \quad -42$

$0 = x^2+7x-30$

$0 = (x+10)(x-3)$

$x+10=0$ | $x-3=0$

$x=-10$ | $x=3$

extraneous

REVIEW

ex: Simplify.

a) $-\sqrt{121}$

$11 \quad 11$

$\boxed{-11}$

b) $\sqrt{75}$

$\sqrt{25 \cdot 3}$

$\sqrt{25} \cdot \sqrt{3}$

$\boxed{5\sqrt{3}}$

$25 \overline{)75}$

3

or

$5 \overline{)75}$

$5 \overline{)15}$

3

$\sqrt{5 \cdot 5} \, 3$

$\boxed{5\sqrt{3}}$

$5 \overline{)75}$

15

$5 \overline{)75}$

5

25

REVIEW

ex: Simplify.

c) $6\sqrt{45}$

$9 \mid 45$
5

$6\sqrt{9} \cdot \sqrt{5}$

$6 \cdot 3 \cdot \sqrt{5}$

$18\sqrt{5}$

$1^2 = 1$

d) $\sqrt{0.25} = \sqrt{\frac{1}{4}} = \frac{\sqrt{1}}{\sqrt{4}} = \frac{1}{2}$

$0.25 = \frac{25}{100} = \frac{1}{4}$

tenths, hundredths

Reduce it

$\sqrt{\frac{25}{100}} = \frac{\sqrt{25}}{\sqrt{100}} = \frac{5}{10}$

REVIEW

ex: Simplify.

e) $\sqrt{-9}$

↖ can't do "yet"

$\sqrt{9} = 3$

$3^2 = 9$

$3^2 \neq -9$

f) $\sqrt{\frac{3}{5}} = \frac{\sqrt{3}}{\sqrt{5}} \cdot \frac{\sqrt{5}}{\sqrt{5}} = \frac{\sqrt{15}}{\sqrt{25}} = \boxed{\frac{\sqrt{15}}{5}}$

$5\overline{)15}$
3

cube root

$\frac{\sqrt[3]{3}}{\sqrt[3]{2}}$

Three

$2^3 = 8$

side note:

$\frac{\sqrt[3]{2\cdot 2}}{\sqrt[3]{2^2}} = \frac{\sqrt[3]{3\cdot 2\cdot 2}}{\sqrt[3]{2\cdot 2\cdot 2}}$

$\sqrt[3]{2\cdot 2}$

$= \boxed{\frac{\sqrt[3]{12}}{2}}$

REVIEW

ex: Simplify.

g) $\dfrac{5}{(3-\sqrt{2})} \cdot \dfrac{(3+\sqrt{2})}{(3+\sqrt{2})} = \dfrac{15+5\sqrt{2}}{9+3\sqrt{2}-3\sqrt{2}-\sqrt{4}}$

Add

FOIL

$= \dfrac{15+5\sqrt{2}}{7}$

$= \star \dfrac{15}{7} + \dfrac{5\sqrt{2}}{7}$ or