Topic 6: Polynomial Equations

SAS2 - Question #17

Agilemind website: Exploring "Quadratic Equations" Pages 10 & 11

Topic 6: Polynomial Equations

Agilemind website: Exploring "Quadratic Equations" Pages 10 & 11

Answer to SAS2 - Question #17

Topic 6: Polynomial Equations

Exploring: "Quadratic Equations"

SAS2 - Question #18

18. Fill in the blanks to complete the statement.

A ***complex number*** is a number that can be written in the form a + bi,
where ***a*** and ***b*** are real numbers.

Topic 6: Polynomial Equations

Exploring: "Quadratic Equations"

SAS2 - Question #19 a

Topic 6: Polynomial Equations

Agilemind website: Exploring "Quadratic Equations" Page 12

Answer to SAS2 #19a

Find ALL solutions, real and imaginary, using the Quadratic Formula. Round real answers to the nearest hundredth and simplify imaginary answers.

1. $x^2 - 4x + 29 = 0$

$b^2 - 4ac = -100$

$x = \frac{4 \pm \sqrt{-100}}{2}$

$x = \frac{4 \pm 10i}{2}$

$\boxed{x = 2 \pm 5i}$

2. $4x^2 - 8x = -9$

$4x^2 - 8x + 9 = 0$

$b^2 - 4ac = -80$

$x = \frac{8 \pm \sqrt{-80}}{8}$ $\sqrt{80} = \sqrt{16 \cdot 5}$

$= \frac{8 \pm 4i\sqrt{5}}{8}$

$\boxed{x = \frac{2 \pm i\sqrt{5}}{2} \text{ or } 1 \pm \frac{\sqrt{5}}{2}i}$

discriminate

[dəˈskriməˌnāt]

VERB

1. recognize a distinction; differentiate.

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

What part of the Quadratic Formula will determine whether there are Real Solutions or Imaginary Solutions?

$$b^2 - 4ac$$

This part of the Quadratic Formula is called the DISCRIMINANT

this part of the Quadratic Formula separates the solutions into Real and Imaginary

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

The Quadratic Formula will lead to 2 Imaginary solutions if.......

$$b^2 - 4ac < 0$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

The Quadratic Formula will lead to One Real solution if.......

$$b^2 - 4ac = 0$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

The Quadratic Formula will lead to 2 Real solutions if.......

$$b^2 - 4ac > 0$$

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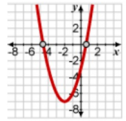
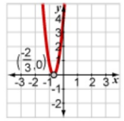
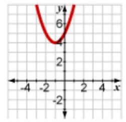
Agilemind website: Exploring "Quadratic Equations" Page 13

SAS2 - Question #20

20. Complete the table to represent the three possibilities for the solutions to quadratic equations.

Discriminant	Number and type of root(s)	Example sketch
$b^2 - 4ac > 0$	Two real roots	
$b^2 - 4ac = 0$	1 real root	
$b^2 - 4ac < 0$	2 Complex (non-real) roots	

$4x^2 + 13x - 6 = 0$

Without using a calculator what do you see in this equation tells us that it must have 2 Real Roots?

$$ax^2 + bx + c = 0$$

$b^2 - 4ac$ will ALWAYS be positive and thus, lead to 2 Real Solutions if....

Either a or c is negative.

On the previous page a was positive and c was negative, therefore, the Quadratic Formula will give us 2 Real Roots.

Hwk #30

Agilemind Workbook and Website

Topic 6: Polynomial Equations
Exploring "Quadratic Equations"

SAS2: questions 21 a-c (Workbook)
and
More Practice 1-4 (Online)

Topic 6: Polynomial Equations

Agilemind website: Exploring "Complex Numbers" Page 1

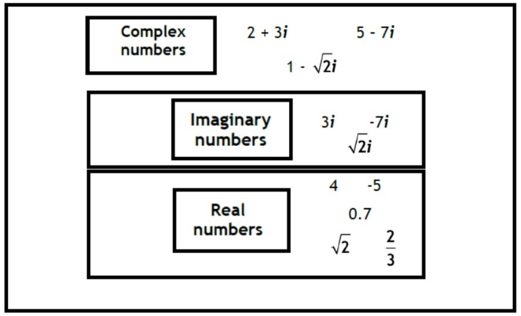
Topic 6: Polynomial Equations

Exploring "Complex Numbers"

SAS3 - Question #1

1. Using the answer choices provided, fill in the boxes in the diagram to label the types of numbers shown.

Complex numbers	Imaginary numbers	Real numbers



Complex Numbers

A Complex Number is a combination of a Real Number and an Imaginary Number:

Standard Form of a Complex Number

$a + bi$

Real Part

Imaginary Part

$\sqrt{-1}$

If $a=0$, then you have an Imaginary Number: bi

If $b=0$, then you have a Real Number: a

Topic 6: Polynomial Equations

Exploring "Complex Numbers"

SAS3 - Question #2

2. Compute $(2+3i)-(5-7i)$

$2-5 \quad 3i - -7i$

$\boxed{-3+10i}$

Adding and Subtracting Complex numbers is just like combining Like-Terms

Topic 6: Polynomial Equations

Exploring "Complex Numbers"

SAS3 - Question #3

Topic 6: Polynomial Equations

Agilemind website: Exploring "Complex Numbers" Page 3

Answers to SAS3 - Question #3