Subgroups of Complex Numbers

Identify the subgroup of Complex numbers a number belongs to.

Link to section in textbook

Now, watch this video to review the different sets of Complex numbers. First, try to define the following subgroups of the Complex Numbers. You should include examples for each (you may even want to take a sneak peak at the problems at the bottom of the page and use some of these as examples!) and descriptions of how to tell what the smallest set the number belongs to.

- Nonreal Complex:
- Pure Imaginary:
- Not a Complex Number:

The Real Numbers are just a part of the Complex Numbers, so we still have the subgroups from Objective 1. Now we will look at how all of these subgroups are related. Like before, try to classify the following numbers based on these definitions.

Exercise 1 *Choose all of the following numbers that are* ***Pure Imaginary*** *numbers.*

Select All Correct Answers:

(a) $-\frac{21}{7}+i$

(b) $-\frac{7}{21}$

(c) $\frac{21}{7}$

(d) $\frac{\pi}{4}$

(e) $\frac{4}{\pi}i$ ✓

(f) $\frac{0}{\pi}$

Learning outcomes: Understand the different sets of numbers along with the properties of these sets.

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(g) $\frac{\pi}{0}i$

(h) $-\sqrt{4}$

(i) $\sqrt{-4}$ ✓

(j) $\sqrt{21}$

(k) $\sqrt{-21}$ ✓

Hint: *Think about what it could mean to be Pure Imaginary as opposed to Complex.*

Exercise 2 *Choose all of the following numbers that are* ***Nonreal Complex*** *numbers.*

Select All Correct Answers:

(a) $-\frac{21}{7}+i$ ✓

(b) $-\frac{7}{21}$

(c) $\frac{21}{7}$

(d) $\frac{\pi}{4}$

(e) $\frac{4}{\pi}i$ ✓

(f) $\frac{0}{\pi}$

(g) $\frac{\pi}{0}i$

(h) $-\sqrt{4}$

(i) $\sqrt{-4}$ ✓

(j) $\sqrt{21}$

(k) $\sqrt{-21}$ ✓

Hint: *Think about what it could mean to be "nonreal" and still be Complex.*

Exercise 3 *Choose all of the following numbers that are* ***Complex*** *numbers.*

Select All Correct Answers:

(a) $-\frac{21}{7} + i$ ✓

(b) $-\frac{7}{21}$ ✓

(c) $\frac{21}{7}$ ✓

(d) $\frac{\pi}{4}$ ✓

(e) $\frac{4}{\pi}i$ ✓

(f) $\frac{0}{\pi}$ ✓

(g) $\frac{\pi}{0}i$

(h) $-\sqrt{4}$ ✓

(i) $\sqrt{-4}$ ✓

(j) $\sqrt{21}$ ✓

(k) $\sqrt{-21}$ ✓

Hint: *What does it mean to be a Complex number? What numbers are* ***not*** *Complex?*

Exercise 4 *Choose all of the following numbers that are* ***Not a Complex*** *numbers.*

Select All Correct Answers:

(a) $-\frac{21}{7} + i$

(b) $-\frac{7}{21}$

(c) $\frac{21}{7}$

(d) $\frac{\pi}{4}$

(e) $\frac{4}{\pi}i$

(f) $\frac{0}{\pi}$

(g) $\frac{\pi}{0}i$ ✓

(h) $-\sqrt{4}$

(i) $\sqrt{-4}$

(j) $\sqrt{21}$

(k) $\sqrt{-21}$

Hint: *What does it mean to be a Complex number? What numbers are* ***not*** *Complex?*

Like Objective 1, remember to reduce first, then decide the smallest subgroup the number belongs to!

Note: This part of the homework will change each time you click "Another". You can keep clicking "Another" to practice seeing these more difficult numbers to classify.

Exercise 5 *Which of the following is the* ***smallest*** *set of Complex numbers that* $\frac{0}{3\,\pi} + 7\,i$ *belongs to?*

To work around current Xronos issues, input the corresponding number for the correct set.
Rational - 0
Irrational - 1
Nonreal Complex - 2
Pure Imaginary - 3
Not a Complex Number - 4

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Hint: *Remember that the only way (we know) to not be Complex is to divide be 0. Otherwise, all other numbers are Complex.*

Exercise 6 *Which of the following is the* ***smallest*** *set of Complex numbers that* $\frac{-9}{2\,\pi} + 3\,i^2$ *belongs to?*

To work around current Xronos issues, input the corresponding number for the correct set.
Rational - 0
Irrational - 1
Nonreal Complex - 2
Pure Imaginary - 3
Not a Complex Number - 4

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Hint: *Remember that the only way (we know) to not be Complex is to divide be 0. Otherwise, all other numbers are Complex.*

Exercise 7 *Which of the following is the* ***smallest*** *set of Complex numbers that* $\frac{13\,\pi}{0} + 14\,i$ *belongs to?*

To work around current Xronos issues, input the corresponding number for the correct set.
Rational - 0
Irrational - 1
Nonreal Complex - 2
Pure Imaginary - 3
Not a Complex Number - 4

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Hint: *Remember that the only way (we know) to not be Complex is to divide be 0. Otherwise, all other numbers are Complex.*
