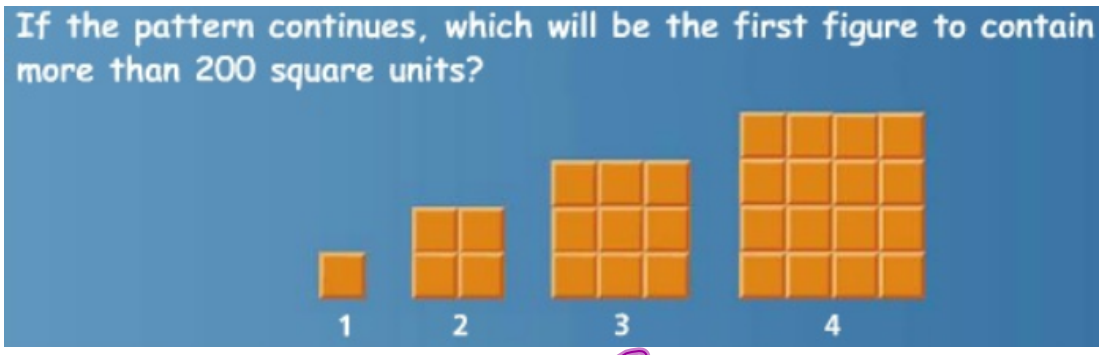
Algebra 1

Chapter 1

Section 1-3

If the pattern continues, which will be the first figure to contain more than 200 square units?



blocks: 1 4 9 16

$1 \cdot 1 = 1^2$ $2 \cdot 2 = 2^2$ $3 \cdot 3 = 3^2$ $4 \cdot 4 = 4^2$

$12^2 = 12 \cdot 12 = 144$

$14^2 = 14 \cdot 14 = 196$

$15^2 = 15 \cdot 15 = 225$ 15 blocks

$$\begin{array}{r} {}^{1}14 \\ \times\ 14 \\ \hline 56 \\ 140 \\ \hline 196 \end{array}$$

Radicals

A radical is an expression that includes two parts: the radical symbol and the radicand.

↳ under radical

Examples: $\overline{3}$ or $\sqrt{x}$

Square Roots and Perfect Squares

number a is the square root of number b if:

number b is a perfect square if:

$a \cdot a = b$

Square Roots and Perfect Squares

the number 3 is the square root of the number 9

$3 = \sqrt{9}$

the number 9 is a perfect square

$3 \cdot 3 = 9$

Simplifying Square Roots

Simplify $\sqrt{81}$.

$\sqrt{81} = 9$

Simplify $\sqrt{900}$.

$9 \rightarrow \sqrt{9} = 3$

$\times 100 \rightarrow \sqrt{100} = 10$

30

Simplifying Square Roots

$\sqrt{\frac{25}{81}} = \frac{\sqrt{25}}{\sqrt{81}}$

$\frac{5}{9}$

$\sqrt{\frac{1}{144}} = \frac{\sqrt{1}}{\sqrt{144}}$

$\frac{1}{12}$

Number Sets
...and subsets

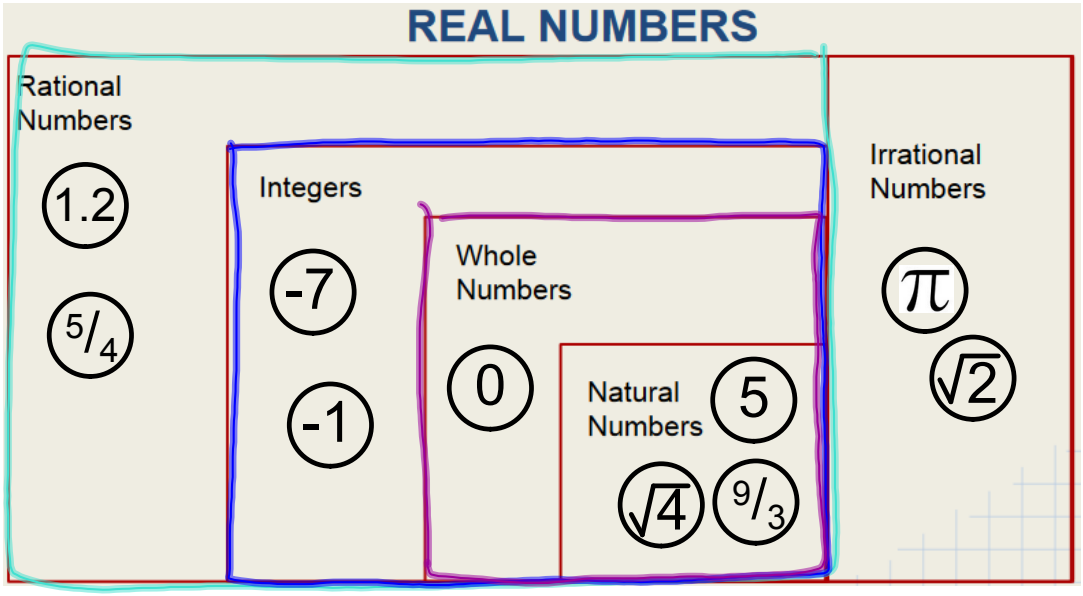
Rational Numbers
Any number that can be written as a fraction with whole numbers

Irrational Numbers
Number is not rational, it can not be written as a fraction

Integers
A rational number whose denominator is one

Whole Numbers
All non-negative integers, the counting numbers and zero

Natural Numbers
All positive integers, the counting numbers



Inequalities

>.....Greater than

<.....Less than

≥.....Greater than or equal to

≤.....Less than or equal to

Inequalities

Order the following terms from least to greatest using a string of inequalities.

>.....Greater than
<.....Less than
≥.....Greater than or equal to
≤.....Less than or equal to

$-2 < {}^{8}/_{4} \leq {}^{10}/_{5} < 7 < 11$

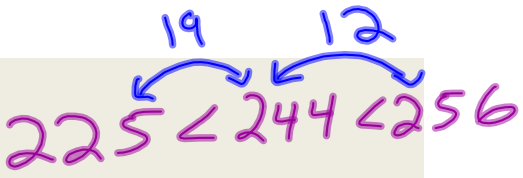
Inequalities

Order the following terms from greatest to least using a string of inequalities.

>.....Greater than
<.....Less than
≥.....Greater than or equal to
≤.....Less than or equal to

$100 > 9^2 > 80 > 3^2 > 8 \geq 2^3$

Estimating Square Roots



Estimate $\sqrt{244}$: ≈ 15.6

$121 < 125 < 144$

Estimate $\sqrt{125}$: ≈ 11