Print Name_____ Period_____ Date_____

5.1 Radicals and Rational Exponents

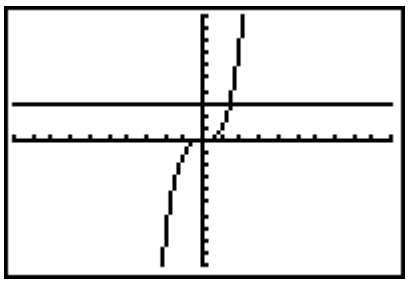
❑ Objectives:

- Define and apply rational and irrational exponents.
- Simplify expressions containing radicals or rational exponents.

❑ 5.1a nth Roots

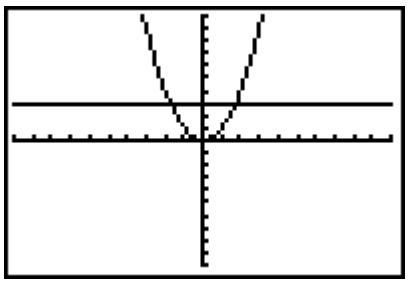
- Recall: when c > 0, the square root of c is _____
- _____.
- Depending on whether n is even or odd and whether c is positive or negative, $x^n = c$ may have _____.

n odd

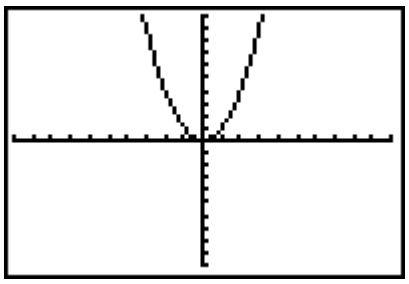


n even

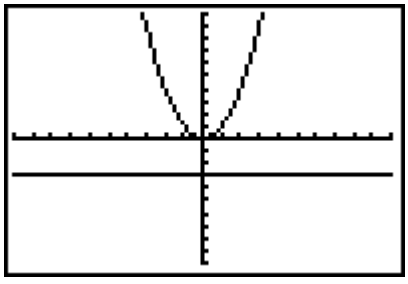
c > 0



c = 0



c < 0



- Let c be a real number and n a positive integer. The nth root of c is denoted by either of the symbols

  and is defined to be:

  - The solution of _____
  - The nonnegative solution of _____

- Examples: Operations on roots

- Examples: Evaluating nth roots with calculators

- Caution: When using exponent notation to evaluate nth roots with a calculator, be sure to use _____
- _____

❑ 5.1b Rational Exponents

- Rational exponents of the form 1/n are called nth roots.
- Rational exponents can also be of the form _____
- _____
- Definition of rational exponents:

  $c^{m/n}$ is defined to be the number _____

  or in radical notation: _____

❑ 5.1c Laws of Exponents

- Let c and d be nonnegative real numbers and let m and n be rational numbers:
  - 1.
  - 2.
  - 3.
  - 4.
  - 5.
  - 6.

  If c and d are not equal to 1, then
    - $c^m = c^n$ if m = n
    - $c^m = d^m$ if c = d
- Examples: Simplifying expressions with rational exponents

❑ 5.1d Rationalizing the Denominator

- When rationalizing a denominator which contains an expression, a suitable radical fraction with a value of 1 is

_____

- Examples: Rationalizing the denominator

❑ 5.1e Irrational Exponents

- Examples:

- The laws of exponents are valid for _____