Coreq Support for Section 5.1a

Topic 1: Using Transformations to Graph Functions

Topic 2: Properties of Exponents
(Video: Exponents)

For Chapter 5, it will be important to know the properties of exponents and to be able to rewrite and evaluate expressions that contain exponents. Here is the list of properties of exponents first introduced in the 1020 notes for section 1.1a.

Product Rule for Exponents
If m and n are positive integers and a is a real number, then
$$a^m \cdot a^n = a^{m+n}.$$

Power Rule for Exponents
If m and n are positive integers and a is a real number, then
$$\left(a^m\right)^n = a^{mn}.$$

Power of a Product Rule
If n is a positive integer and a and b are real numbers, then
$$\left(ab\right)^n = a^n \cdot b^n.$$

Power of a Quotient Rule
If n is a positive integer, a and b are real numbers, and $b \neq 0$, then
$$\left(\frac{a}{b}\right)^n = \frac{a^n}{b^n}.$$

Quotient Rule for Exponents
If m and n are positive integers, a is a real number, and $a \neq 0$, then
$$\frac{a^m}{a^n} = a^{m-n}.$$

Zero Exponent Rule
If b is a real number such that $b \neq 0$, then $b^0 = 1$.

Topic 3: Evaluating Expressions with Negative Exponents
(Video: Negative Exponents)

If a is a real number other than 0 and n is an integer, then
$$a^{-n} = \frac{1}{a^n}.$$

Topic 4: Rational Exponents
(Video: Rational Exponents 0:00 – 16:30)

Definition of $a^{\frac{1}{n}}$ **:** If n is an integer greater than 1 and $\sqrt[n]{a}$ is a real number, then $a^{\frac{1}{n}} = \sqrt[n]{a}$.

Definition of $a^{\frac{m}{n}}$ **:** If m and n are integers greater than 1 with $\dfrac{m}{n}$ in lowest terms, then

$a^{\frac{m}{n}} = \sqrt[n]{a^m} = \left(\sqrt[n]{a}\right)^m$ as long as $\sqrt[n]{a}$ is a real number.

Topic 5: Rewriting an Expression in the Form b^u

When solving an equation where the variable is an exponent, it is sometimes useful to rewrite one or both sides of the equation using a different base. For example, 8^x can be rewritten as 2^{3x} .