

Precalculus Review

University of Hawaii at Manoa

Fall 2019 Math 241

This covers the basic elements in Precalculus which should be aid to help you in Math 241

Why do I need to care about Math 241?

Depending on your major(s) Math 241 is going to be "important". For example, if you are required to take Physics 170, you are going to need Math 242 as a cor-requisite. In order to take Math 242, you need to take Math 241 and get a C or above.

Here are some of the classes that require Math 241 as a prereq.

- Physics 170
- ICS 141 Discrete Mathematics I

1 Algebra

Exponents

- Multiplying Exponents

If the exponent value have the same base but different exponent you can add the numerical value in the exponent

Example

$$x^2x^4 = x^6$$

$$4x^45x^2 = 20x^6$$

- Dividing Exponents

If the bases are the same but with different exponent, you can subtract the two exponents.

Example

$$\frac{x^4}{x^2} = x^2$$

Fractions

- adding/subtracting

Example

$$\frac{4}{8} + \frac{3}{6} - \frac{1}{24} =$$

Process

Check if the denominator (the bottom part of the fraction) are the same and if not change the denominator so that they "common denominators"

Warning

When you change the denominator do not forget to change the numerator
Then you do the math operations

$$\frac{12}{24} + \frac{12}{24} - \frac{1}{24} = \frac{23}{24}$$

- multiplying fractions

Unlike addition, there is no need to change the denominator

Just multiply the numerator with the numerator and the denominator with the denominator

Then you can reduce the final outcome if the directions of the problem requires you to

Example

$$\frac{2}{24} * \frac{3}{5} = \frac{6}{120} \text{ Reduced form } \frac{1}{40}$$

- dividing fractions You take the reciprocal of the dividend (flip the numerator and the denominator) and then multiply the two fractions

Example

$$\frac{2}{6} \div \frac{4}{5} =$$

Flip the

$$\frac{2}{6} \times \frac{5}{4} = \frac{10}{24}$$

reduced form of the answer: $\frac{5}{12}$

2 Trigonometry

Basic Trig Functions

- $\sin(x)$
- $\cos(x)$
- $\tan(x)$
- $\sec(x)$
- $\csc(x)$
- $\cot(x)$

Basic Trig Identities

Quotient Identity

$$\tan(x) = \frac{\sin(x)}{\cos(x)}$$

$$\cot(x) = \frac{\cos(x)}{\sin(x)}$$

Reciprocal Identity

- $\csc(x) = \frac{1}{\sin(x)}$
- $\sec(x) = \frac{1}{\cos(x)}$
- $\cot(x) = \frac{1}{\tan(x)}$
- $\sin(x) = \frac{1}{\csc(x)}$
- $\cos(x) = \frac{1}{\sec(x)}$
- $\tan(x) = \frac{1}{\cot(x)}$

Pythagorean Identity

- $\sin^2(x) + \cos^2(x) = 1$
- $\sin^2(x) = 1 - \cos^2(x)$
- $\cos^2(x) = 1 - \sin^2(x)$
- $\tan^2(x) + 1 = \sec^2(x)$
- $\sec^2(x) - 1 = \tan^2(x)$

Double Angle Trig

- $\sin(2\theta) = 2\sin(\theta)\cos(\theta)$
- $\cos(2\theta) = \cos^2(\theta) - \sin^2(\theta)$
- $\cos(2\theta) = 2\cos^2(\theta) - 1$