Mathematical Formulas

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CHAPTER R – Review

SECTION R.4 - Polynomials

Special Products

Difference of Two Squares $(x-a)(x+a)=x^2-a^2$

Squares of Binomials,
Or Perfect Squares $(x+a)^2=x^2+2ax+a^2$
$(x-a)^2=x^2-2ax+a^2$

Cubes of Binomials,
Or Perfect Cubes $(x+a)^3=x^3+3ax^2+3a^2x+a^3$
$(x-a)^3=x^3-3ax^2+3a^2x-a^3$

Difference of Two Cubes $(x-a)(x^2+ax+a^2)=x^3-a^3$

Sum of Two Cubes $(x+a)(x^2-ax+a^2)=x^3+a^3$

SECTION R.5 – Factoring Polynomials

Special Formulas

Difference of Two Squares $x^2-a^2=(x-a)(x+a)$

Perfect Squares $x^2+2ax+a^2=(x+a)^2$
$x^2-2ax+a^2=(x-a)^2$

Sum of Two Cubes $x^3+a^3=(x+a)(x^2-ax+a^2)$

Difference of Two Cubes $x^3-a^3=(x-a)(x^2+ax+a^2)$

CHAPTER 1 – Equations and Inequalities

SECTION 1.2 – Quadratic Equations

Quadratic Equation in Standard Form
Or Second-Degree Equation $ax^2+bx+c=0$

Quadratic Formula $x=\frac{-b\pm\sqrt{b^2-4ac}}{2a}$

SECTION 1.3 – Quadratic Equations in the Complex Number System

Powers of *i*

$$i^1 = i = \sqrt{-1}$$
$$i^2 = -1$$
$$i^3 = i^2 \cdot i = -1 \cdot i = -i$$
$$i^4 = i^2 \cdot i^2 = (-1)(-1) = 1$$

SECTION 1.6 – Equations and Inequalities Involving Absolute Value

Equations Involving Absolute Value $|u| = a$ is equivalent to $u = a$ or $u = -a$

Inequalities Involving Absolute Value

$|u| < a$ is equivalent to $-a < u < a$
$|u| \leq a$ is equivalent to $-a \leq u \leq a$

Also written as:

$|u| < a$ is equivalent to $-a < u$ and $u < a$
$|u| \leq a$ is equivalent to $-a \leq u$ and $u \leq a$

Inequalities Involving Absolute Value

$|u| > a$ is equivalent to $u < -a$ or $u > a$
$|u| \geq a$ is equivalent to $u \leq -a$ or $u \geq a$

CHAPTER 2 – Graphs

SECTION 2.1 – Rectangular Coordinates

Distance Formula $d(P_1, P_2) = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

Midpoint Formula $M = (x, y) = \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$

SECTION 2.3 – Circles

Standard Form of an Equation of a Circle $(x - h)^2 + (y - k)^2 = r^2$

Standard Form of an Equation of a Circle With Center at Origin $x^2 + y^2 = r^2$

Standard Form of an Equation of a Circle With Center at Origin and Radius *r* = 1 Called the Unit Circle $x^2 + y^2 = 1$

General Form of an Equation of a Circle $x^2 + y^2 + ax + by + c = 0$