Properties

Properties of Real Numbers

	Let a, b, and c be real numbers.	
	Addition	**Multiplication**
Closure Property (p. 3)	$a + b$ is a real number.	ab is a real number.
Commutative Property (p. 3)	$a + b = b + a$	$ab = ba$
Associative Property (p. 3)	$(a + b) + c = a + (b + c)$	$(ab)c = a(bc)$
Identity Property (p. 3)	$a + 0 = a, 0 + a = a$	$a \cdot 1 = a, 1 \cdot a = a$
Inverse Property (p. 3)	$a + (-a) = 0$	$a \cdot \frac{1}{a} = 1, a \neq 0$
Distributive Property (p. 3)	The distributive property involves both addition and multiplication: $a(b + c) = ab + ac$	
Zero Product Property (p. 253)	Let A and B be real numbers or algebraic expressions. If $AB = 0$, then $A = 0$ or $B = 0$.	

Properties of Matrices

	Let A, B, and C be matrices, and let k be a scalar.
Associative Property of Addition (p. 188)	$(A + B) + C = A + (B + C)$
Commutative Property of Addition (p. 188)	$A + B = B + A$
Distributive Property of Addition (p. 188)	$k(A + B) = kA + kB$
Distributive Property of Subtraction (p. 188)	$k(A - B) = kA - kB$
Associative Property of Matrix Multiplication (p. 197)	$(AB)C = A(BC)$
Left Distributive Property of Matrix Multiplication (p. 197)	$A(B + C) = AB + AC$
Right Distributive Property of Matrix Multiplication (p. 197)	$(A + B)C = AC + BC$
Associative Property of Scalar Multiplication (p. 197)	$k(AB) = (kA)B = A(kB)$
Multiplicative Identity (p. 210)	An $n \times n$ matrix with 1's on the main diagonal and 0's elsewhere is an identity matrix, denoted I. For any $n \times n$ matrix A, $AI = IA = A$.
Inverse Matrices (p. 210)	If the determinant of an $n \times n$ matrix A is nonzero, then A has an inverse, denoted A^{-1}, such that $AA^{-1} = A^{-1}A = I$.

Properties of Exponents

	Let a and b be real numbers, and let m and n be integers.
Product of Powers Property (p. 330)	$a^m \cdot a^n = a^{m+n}$
Power of a Power Property (p. 330)	$(a^m)^n = a^{mn}$
Power of a Product Property (p. 330)	$(ab)^m = a^m b^m$
Negative Exponent Property (p. 330)	$a^{-m} = \frac{1}{a^m}, a \neq 0$
Zero Exponent Property (p. 330)	$a^0 = 1, a \neq 0$
Quotient of Powers Property (p. 330)	$\frac{a^m}{a^n} = a^{m-n}, a \neq 0$
Power of a Quotient Property (p. 330)	$\left(\frac{a}{b}\right)^m = \frac{a^m}{b^m}, b \neq 0$

TABLES