

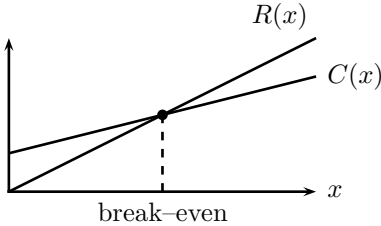
<p>COPYRIGHT &amp; LICENSE</p> <p><i>Copyright © 2010 Jason Underdown Some rights reserved.</i></p> <p>MATH 1090 – BUSINESS ALGEBRA</p>	<p>REVIEW</p> <p><i>Thou Shalt Not Distribute Powers or Radicals</i></p> <p>MATH 1090 – BUSINESS ALGEBRA</p>
<p>REVIEW</p> <p><i>Thou Shalt Not Split a Denominator</i></p> <p>MATH 1090 – BUSINESS ALGEBRA</p>	<p>REVIEW</p> <p><i>Thou Shalt Not Cancel Terms in a Fraction</i></p> <p>MATH 1090 – BUSINESS ALGEBRA</p>
<p>1.1 DEFINITION</p> <p><i>algebraic expression</i></p> <p>MATH 1090 – BUSINESS ALGEBRA</p>	<p>1.1 DEFINITION</p> <p><i>terms &amp; factors</i></p> <p>MATH 1090 – BUSINESS ALGEBRA</p>
<p>1.1 DEFINITION</p> <p><i>equation</i></p> <p>MATH 1090 – BUSINESS ALGEBRA</p>	<p>1.1 DEFINITION</p> <p><i>identity</i></p> <p>MATH 1090 – BUSINESS ALGEBRA</p>
<p>1.1 DEFINITION</p> <p><i>linear equation</i></p> <p>MATH 1090 – BUSINESS ALGEBRA</p>	<p>1.1 DEFINITION</p> <p><i>polynomial</i></p> <p>MATH 1090 – BUSINESS ALGEBRA</p>

<p>Thou shalt not distribute powers or radicals.</p> $(a \pm b)^n \neq a^n \pm b^n$ $\sqrt[n]{a \pm b} \neq \sqrt[n]{a} \pm \sqrt[n]{b}$ $\sqrt[n]{a^n \pm b^n} \neq a \pm b$ <p>Lest I smite thee with a failing grade!</p>	<p>These flashcards and the accompanying L<sup>A</sup>T<sub>E</sub>X source code are licensed under a Creative Commons Attribution–NonCommercial–ShareAlike 3.0 License. For more information, see <a href="http://creativecommons.org">creativecommons.org</a>. You can contact the author at:</p> <p style="text-align: center;">jasonu at math utah edu</p>
<p>Thou shalt not cancel terms in a fraction. Only factors may be cancelled, thus thou must factor first!</p> $\frac{a+b}{a+c} \neq \frac{1+b}{1+c}$ $\frac{a+b}{ac} \neq \frac{1+b}{c}$ <p>This is an algebraic abomination.</p>	<p>Thou shalt not split a denominator. (This is distributing a -1 power in disguise.)</p> $\frac{1}{a+b} \neq \frac{1}{a} + \frac{1}{b}$ <p>Do not succumb to such temptation.</p>
<p>A <b>term</b> is any algebraic expression participating in addition or subtraction.</p> <p>A <b>factor</b> is any algebraic expression participating in multiplication or division.</p>	<p>An expression obtained by performing additions, subtractions, multiplications, divisions, powers or extractions of roots with one or more real numbers or variables is called an <b>algebraic expression</b>.</p> <p>Think of it as a fragment of a complete mathematical statement, and as such, it can only be simplified but not solved for the variable(s).</p>
<p>An <b>identity</b> is a special type of equation which is always true for all values of its variables. It tells you how to rewrite an expression in a different but equivalent way.</p> <p>For example, the “difference of two squares” formula is an identity.</p> $x^2 - a^2 = (x + a)(x - a)$	<p>An <b>equation</b> is a mathematical statement that equates two algebraic expressions. An equation <i>must</i> have an equal sign.</p> <p>We typically solve equations for a particular variable. For example, <math>3x - 4 = 2</math>.</p>
<p>A <b>polynomial</b> is a special algebraic expression of the form:</p> $a_n x^n + a_{n-1} x^{n-1} + \dots + a_1 x + a_0$ <p>Where each <math>a_i</math> is a real number. For example</p> $x^3 - 3x^2 + 3x - 1$ <p>is a polynomial.</p>	<p>A <b>linear equation</b> is an equation that can be written in the form</p> $ax + b = c$ <p>where <math>a \neq 0</math> and <math>a, b, c \in \mathbb{R}</math>.</p>

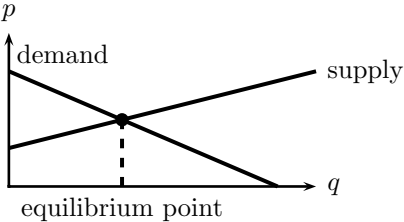
<p>1.1 DEFINITION</p> <p><i>rational equation</i></p> <p>MATH 1090 – BUSINESS ALGEBRA</p>	<p>1.1 DEFINITION</p> <p><i>domain &amp; range</i></p> <p>MATH 1090 – BUSINESS ALGEBRA</p>
<p>1.1 ALGORITHM</p> <p><i>determining the domain</i></p> <p>MATH 1090 – BUSINESS ALGEBRA</p>	<p>1.2 DEFINITION</p> <p><i>linear inequality</i></p> <p>MATH 1090 – BUSINESS ALGEBRA</p>
<p>1.2 DEFINITION</p> <p><i>caveat when solving linear inequalities</i></p> <p>MATH 1090 – BUSINESS ALGEBRA</p>	<p>1.3 DEFINITION</p> <p><i>linear equation in two variables</i></p> <p>MATH 1090 – BUSINESS ALGEBRA</p>
<p>1.3 DEFINITION</p> <p><i>input variable</i></p> <p>MATH 1090 – BUSINESS ALGEBRA</p>	<p>1.3 DEFINITION</p> <p><i>output variable</i></p> <p>MATH 1090 – BUSINESS ALGEBRA</p>
<p>1.3 DEFINITION</p> <p><i>y-intercept</i></p> <p>MATH 1090 – BUSINESS ALGEBRA</p>	<p>1.3 DEFINITION</p> <p><i>x-intercept</i></p> <p>MATH 1090 – BUSINESS ALGEBRA</p>

<p>The <b>domain</b> of a function is the set of allowable inputs.</p> <p>The <b>range</b> of a function is the set of values which correspond to at least one value in the domain.</p>	<p>An <b>rational equation</b> is an equation that contains rational expressions, which are fractions which have polynomials in the numerator and/or denominator.</p> <p>When solving a rational equation it is important to determine the domain, and exclude any values from the solution set which are not in the domain.</p>
<p>A <b>linear inequality</b> is an inequality that can be written in the form</p> $ax + b \leq c$ <p>where <math>a \neq 0</math> and <math>a, b, c \in \mathbb{R}</math>. The inequality symbol may be any one of <math>&lt;, &gt;, \leq, \geq</math>.</p>	<p>If the domain is unspecified, then it includes all real numbers (<math>\mathbb{R}</math>) except</p> <ol style="list-style-type: none"> <li>1. Values that make the denominator 0, and</li> <li>2. Values that result in an even root of a negative number, e.g. <math>\sqrt{-5}</math> or <math>\sqrt[4]{-2}</math>.</li> </ol>
<p>A <b>linear equation in two variables</b> is any equation that can be written in the form</p> $y = ax + b$ <p>where <math>a, b \in \mathbb{R}</math>.</p>	<p>We solve linear inequalities in the same manner as solving linear equations. We can</p> <ol style="list-style-type: none"> <li>1. Add (or subtract) any quantity to both sides of the inequality, and</li> <li>2. Multiply (or divide) both sides of the inequality by any nonzero value.</li> </ol> <p><i>However, when multiplying by a negative number, we must flip the inequality.</i></p>
<p>The <b>output variable</b> or <b>dependent variable</b> is the variable that is graphed on the vertical axis in a Cartesian coordinate system. It is often denoted by <math>y</math>.</p>	<p>The <b>input variable</b> or <b>independent variable</b> is the variable that is graphed on the horizontal axis in a Cartesian coordinate system. It is often denoted by <math>x</math>.</p>
<p>The point on a line that crosses the <math>x</math>-axis. To find the <math>x</math>-intercept, set the equation of a line equal to zero and solve for <math>x</math>, i.e. solve</p> $mx + b = 0$	<p>The point on a line that crosses the <math>y</math>-axis. When an equation of a line is written</p> $y = mx + b$ <p>it is the <math>b</math> value.</p>

<p>1.3 DEFINITION</p> <p><i>slope of a line</i></p> <p>MATH 1090 – BUSINESS ALGEBRA</p>	<p>1.3 DEFINITION</p> <p><i>parallel lines</i></p> <p>MATH 1090 – BUSINESS ALGEBRA</p>
<p>1.3 DEFINITION</p> <p><i>perpendicular lines</i></p> <p>MATH 1090 – BUSINESS ALGEBRA</p>	<p>1.3 DEFINITION</p> <p><i>slope–intercept form</i></p> <p>MATH 1090 – BUSINESS ALGEBRA</p>
<p>1.3 DEFINITION</p> <p><i>point–slope form</i></p> <p>MATH 1090 – BUSINESS ALGEBRA</p>	<p>1.4 DEFINITION</p> <p><i>system of equations</i></p> <p>MATH 1090 – BUSINESS ALGEBRA</p>
<p>1.4 DEFINITION</p> <p><i>solution set</i></p> <p>MATH 1090 – BUSINESS ALGEBRA</p>	<p>1.5 DEFINITION</p> <p><i>revenue &amp; cost</i></p> <p>MATH 1090 – BUSINESS ALGEBRA</p>
<p>1.5 DEFINITION</p> <p><i>profit</i></p> <p>MATH 1090 – BUSINESS ALGEBRA</p>	<p>1.5 DEFINITION</p> <p><i>break–even point</i></p> <p>MATH 1090 – BUSINESS ALGEBRA</p>

<p>Two lines are <b>parallel</b> if and only if they have the <i>same slope</i>.</p>	<p>The <b>slope of a line</b> is found from two points, <math>(x_1, y_1)</math> and <math>(x_2, y_2)</math></p> $m = \frac{y_2 - y_1}{x_2 - x_1}$ <p>Remember it as “rise over run.”</p>
<p>The equation of a line is in <b>slope–intercept form</b> if it looks like</p> $y = mx + b$ <p>Where <math>m</math>, the slope of the line, and <math>b</math>, the <math>y</math>–intercept of the line are constants.</p>	<p>If a line has slope <math>m</math>, then any line that is <b>perpendicular</b> will have slope</p> $m_{\perp} = \frac{-1}{m}$ <p>Where the symbol <math>m_{\perp}</math> is read “<math>m</math> perp.” Remember the perpendicular slope is “the negative reciprocal.”</p>
<p>A <b>system of equations</b> is a set of two or more equations in two or more unknowns (variables).</p>	<p>The equation of a line is in <b>point–slope form</b> if it looks like</p> $y - y_1 = m(x - x_1)$ <p>where <math>m</math> is the slope of the line, and <math>(x_1, y_1)</math> is a point on the line.</p>
<p><b>Revenue</b> is the amount of money earned in a business, usually denoted <math>R(x)</math>.</p> <p><b>Cost</b> is the amount of money spent to produce and sell a product or service, usually denoted <math>C(x)</math>. There are two types: <b>fixed</b> and <b>variable</b>.</p>	<p>The <b>solution set</b> of a system is the set of all points that lie on <i>all</i> lines in the system. That is, the set of all pairs <math>(x, y)</math> that satisfy <i>all</i> equations simultaneously. The solution set may:</p> <ol style="list-style-type: none"> <li>1. be empty (no solution—parallel lines)</li> <li>2. contain one point (unique solution—crossing lines)</li> <li>3. contain an infinite number of points (infinitely many solutions—colinear lines)</li> </ol>
<p>The point where costs and revenue are equal. Also the point where <math>P(x) = 0</math>.</p> 	<p><b>Profit</b> is revenue minus costs.</p> $P(x) = R(x) - C(x)$

<p>1.5 DEFINITION</p> <p><i>marginal</i></p> <p>MATH 1090 – BUSINESS ALGEBRA</p>	<p>1.5 DEFINITION</p> <p><i>supply equation</i></p> <p>MATH 1090 – BUSINESS ALGEBRA</p>
<p>1.5 DEFINITION</p> <p><i>demand equation</i></p> <p>MATH 1090 – BUSINESS ALGEBRA</p>	<p>1.5 DEFINITION</p> <p><i>equilibrium point</i></p> <p>MATH 1090 – BUSINESS ALGEBRA</p>
<p>1.6 DEFINITION</p> <p><i>linear inequality in two variables</i></p> <p>MATH 1090 – BUSINESS ALGEBRA</p>	<p>DEFINITION</p> <p>MATH 1090 – BUSINESS ALGEBRA</p>
<p>DEFINITION</p> <p>MATH 1090 – BUSINESS ALGEBRA</p>	<p>DEFINITION</p> <p>MATH 1090 – BUSINESS ALGEBRA</p>
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<p>The <b>supply equation</b> relates <math>p</math> and <math>q</math> and explains how willing producers are to supply product at various prices.</p>	<p><b>Marginal</b> is an adjective that describes how much something changes for one more unit sold.</p> <p>For example, we could ask for marginal profit, which would indicate how much profit changed for one more unit sold. Marginal profit is the slope of the profit function.</p>
<p>The point where supply and demand are equal.</p> 	<p>The <b>demand equation</b> relates <math>p</math> and <math>q</math> and explains how much of a product consumers will buy at various prices.</p>
	<p>An inequality that can be written in the form</p> $ax + by \leq c$ <p>where <math>a, b, c \in \mathbb{R}</math> and the inequality can be any of <math>&lt;, &gt;, \leq, \geq</math>.</p>