Chapter 2 Intercepts, Zeros, and Solutions

Course Number

Instructor

Date

Section 2.1 Modeling with Linear Equations

Objective: In this lesson you learned how to solve and use linear equations, including those involving fractions, and how to write and use mathematical models to solve real-life problems.

Important Vocabulary	Define each term or concept.
Equation	
Extraneous	
Mathematical modeling	
Formulas	
Fitting a line to data	

I. Equations and Solutions of Equations (Pages 156–157)

What you should learn
How to solve equations involving fractional expressions

To solve an equation in x means to . . .

The values of x for which the equation is true are called its _____.

An identity equation is . . .

A conditional equation is . . .

A **linear equation in one variable x** is an equation that can be written in the standard form _____ , where a and b are real numbers with $a \neq$ _____.

Example 1: Solve $5(x + 3) = 35$.

To solve an equation involving fractional expressions, . . .

When is it possible to introduce an extraneous solution?

If a contradictory statement such as $9 = 0$ is obtained while solving an equation, then the equation has _____.

Example 2: Solve: (a) $\frac{5x}{7} = \frac{9}{14}$ (b) $\frac{1}{x+1} + \frac{5x}{x^2-1} = \frac{4}{x-1}$

II. Using Mathematical Models to Solve Problems

(Pages 157–159)

What you should learn
How to write and use mathematical models to solve real-life problems

A good approach to mathematical modeling is to use two stages. Begin by . . .

Then, after assigning labels to the quantities in the verbal model, . . .

When trying to construct a verbal model, it is helpful to look for a _____, that is, either an implicit or explicit statement that two algebraic expressions are equal.

Example 3: Describe a strategy for solving and then solve the following problem: Tuition payments make up 67% of a college student's annual income. If the student pays $8375 for tuition in a single year, what is her annual income?

III. Common Formulas (Pages 160–161)

What you should learn
How to use common formulas to solve real-life problems

Complete the following list of common formulas for basic geometric figures.

Perimeter/Circumference

Square with side length s: $P =$ _____

Rectangle with width w and length l: $P =$ _____

Triangle with sides a, b, and c: $P =$ _____

Circle with radius r: $C =$ _____

Area

Square with side length s: $A =$ _____

Rectangle with width w and length l: $A =$ _____

Triangle with base b and height h: $A =$ _____

Circle with radius r: $A =$ _____

Volume

Cube with side length s: $V =$ _____

Rectangular solid with width w, length l, and height h: $V =$ _____

Circular cylinder with radius r and height h $V =$ _____

Sphere with radius r: $V =$ _____

Complete the following list of miscellaneous common formulas.

Temperature

where F = degrees Fahrenheit and C = degrees Celsius

$F =$ _____

Simple Interest

where I = interest, P = principal, r = annual interest rate, and t = time in years

$I =$ _____

Compound Interest

where A = balance, P = principal, r = annual interest rate,
n = compoundings per year, and t = time in years

$A =$ _____

Distance

where d = distance traveled, r = rate, and t = time

$d =$ _____

IV. Fitting a Line to Data (Pages 161–163)

What you should learn
How to use scatter plots and a graphing utility to find linear models for data

To fit a line to data represented in a scatter plot, . . .

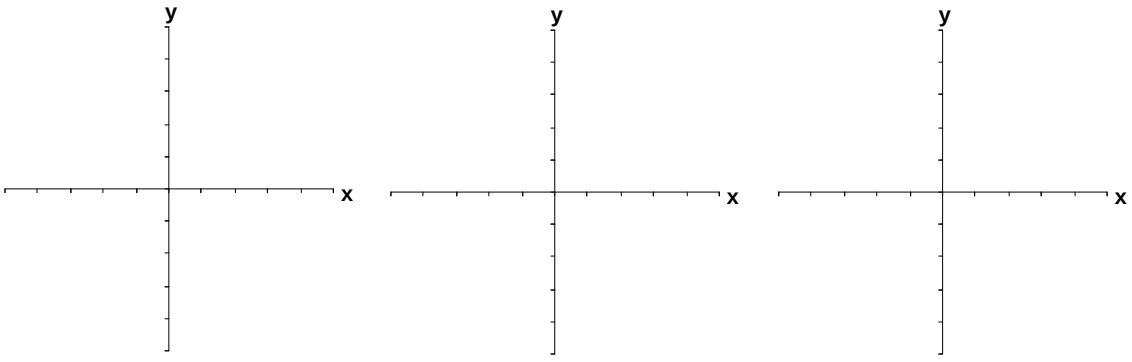
To measure how well a linear model fits the data used to find the model, . . .

The correlation coefficient r of a set of data varies between _____ and _____. The closer $|r|$ is to 1, the better . . .

Example 4: The numbers of U.S. Air Force personnel p on active duty for the years 1995 through 1999 are shown in the table. Use the regression capabilities of a graphing utility to find a linear model for the data. Let t represent the year with $t = 5$ corresponding to 1995.

Year	1995	1996	1997	1998	1999
p	400	389	379	363	358

(Source: U.S. Department of Defense)



Homework Assignment

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