



tee jay zajac

Selected Works



I am a designer based in beautiful Charleston, South Carolina.

AIGA professional member since 2012.

Bachelors of Science in Graphic Design Communication
from Jefferson University (formerly Philadelphia University).

When not staring at a monitor agonizing over design I enjoy running, reading,
DJing, and talking about music to absurd lengths.

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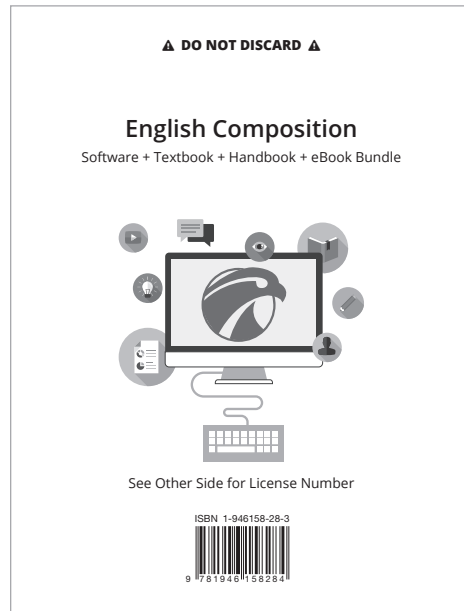
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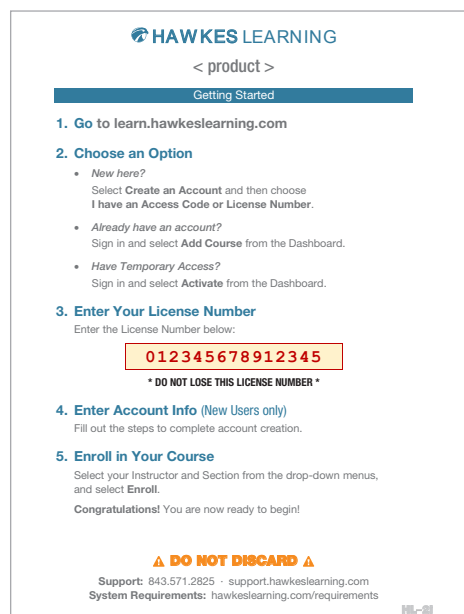
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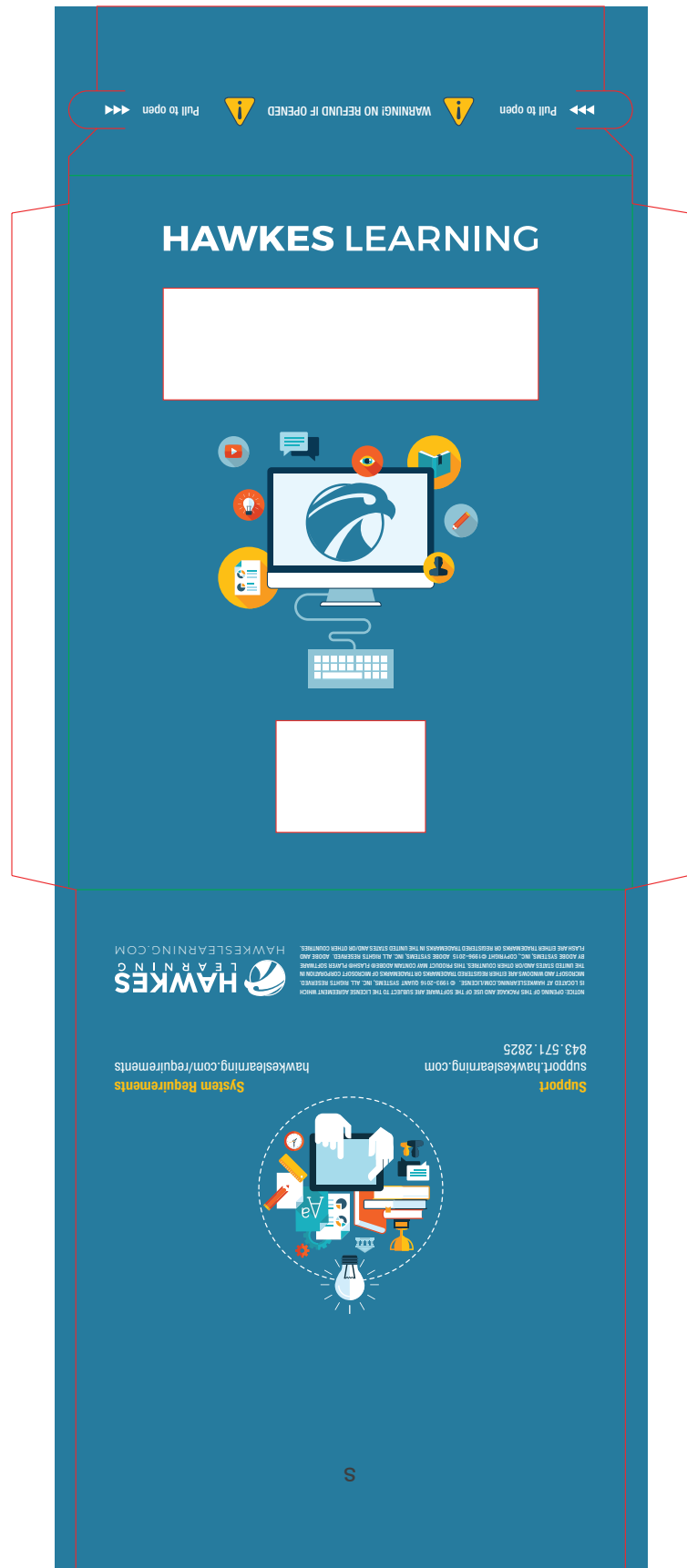
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Textbook

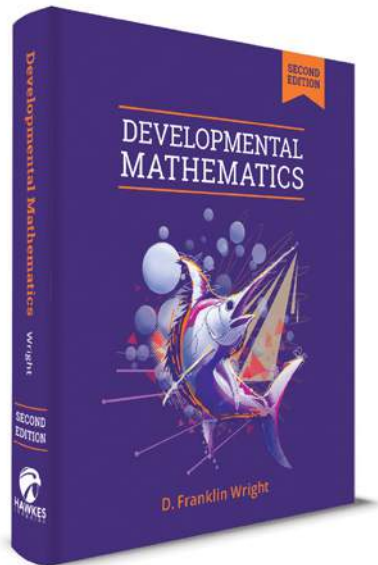
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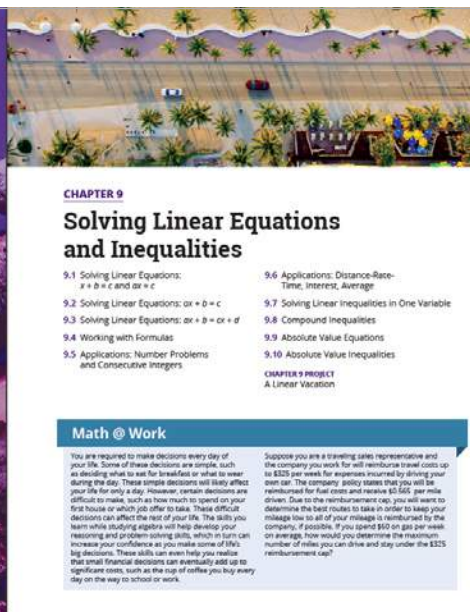
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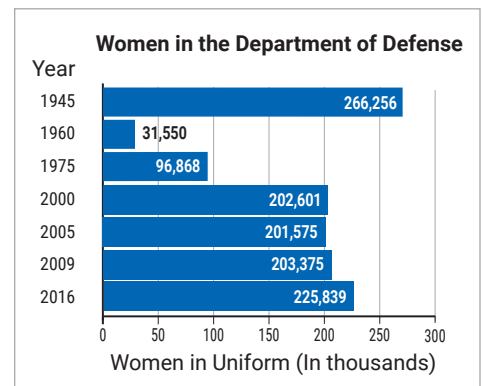
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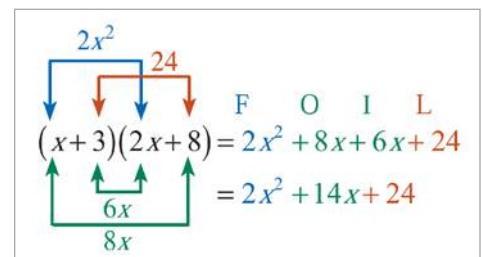


Chapter 9 Opening Spread

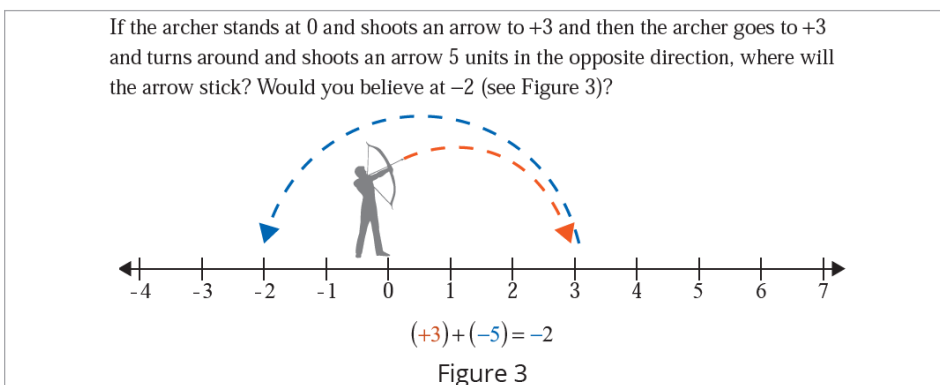


Section 10.3 Bar Graph

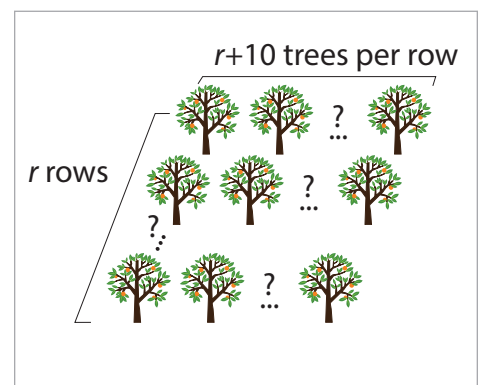
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Section 12.6 Foil Graphic



Excerpt from Section 8.2



Section 13.7 Orange Grove Graphic

226 Chapter 3 Decimal Numbers

3.1 Introduction to Decimal Numbers

A Reading and Writing Decimal Numbers

Decimal notation uses a place value system and a decimal point, with whole numbers written to the left and fractions written to the right of the decimal point. Numbers written in decimal notation are said to be **decimal numbers** (or simply **decimals**). The values of several places in the decimal system are shown in Figures 1.

Figure 1

Figure 2: A grid representing 1/10 shaded. It says '1/10 = 0.1 shaded'.

Figure 3: A grid representing 45/100 shaded. It says '45/100 = 0.45 shaded'.

3.1 Introduction to Decimal Numbers 227

Familiar decimal numbers involve dollars and cents. For example, you might pay \$40.25 for a new shirt or \$3.50 for a taco. These numbers are mixed numbers and can be written as follows:

$\$40\frac{25}{100} = \40.25 Read "forty-five dollars and twenty-five cents."

$\$3\frac{50}{100} = \3.50 Read "three dollars and fifty cents."

In general, decimal numbers are read (and written) according to the following convention:

To Read or Write a Decimal Number

1. Read (or write) the whole number.
2. Read (or write) the word "and" in place of the decimal point.
3. Read (or write) the fraction part as a whole number. Then, name the fraction part with the name of the place of the last digit on the right.

PROCEDURE

Example 1 Reading and Writing Decimal Numbers

Write the mixed number $40\frac{25}{100}$ in decimal notation and in words.

Solution

$40\frac{25}{100}$ in decimal notation is 40.25.

forty-eight and six tenths in words

And indicate the decimal point: the digit 6 is in the tenths position.

Now work margin exercise 1.

Example 2 Reading and Writing Decimal Numbers

Write the mixed number $12\frac{75}{1000}$ in decimal notation and in words.

Solution

$12\frac{75}{1000}$ in decimal notation is 12.075.

twelve and seventy-five thousandths in words

And indicate the decimal point: the digit 5 is in the thousandths position.

Now work margin exercise 2.

Section 5.1 Opening Spread

324 Chapter 4 Ratios, Proportions, and Percents

4.3 Exercises

Concept Check

1. If 83 out of 100 pieces of paper are shaded, then the shaded pieces of paper make up _____ % of the total.
2. Percent is the ratio of a number to _____.
3. To change a decimal number to a percent, move the decimal point _____ places to the _____.
4. To change a percent to a decimal number, move the decimal point _____ places to the _____.

True/False. Determine whether each statement is true or false. If a statement is false, explain how it can be changed so the statement will be true. (Note: There may be more than one acceptable change.)

1. If a decimal number is less than 1, then the equivalent percent will be less than 100%.
2. It is not possible to have a percent greater than 100%.
3. A decimal number that is between 0.01 and 0.10 is between 10% and 100%.
4. To change from a percent to a decimal, simply omit the percent sign.

Practice

Find the percent of each square that is shaded.

- 1.
- 2.
- 3.
- 4.

4.3 Exercises 325

- 5.
- 6.

Change each fraction to a percent. See Example 1.

9. $\frac{20}{100}$	13. $\frac{15}{100}$	17. $\frac{13.4}{100}$	21. $\frac{0.5}{100}$
10. $\frac{80}{100}$	14. $\frac{53}{100}$	18. $\frac{99.9}{100}$	22. $\frac{0.2}{100}$
11. $\frac{9}{100}$	15. $\frac{125}{100}$	19. $\frac{0.48}{100}$	23. $\frac{14}{100}$
12. $\frac{7}{100}$	16. $\frac{336}{100}$	20. $\frac{0.53}{100}$	24. $\frac{1.62}{100}$

Change each decimal number to a percent. See Example 2.

25. 0.02	28. 0.52	35. 0.005	40. 1.75
26. 0.09	31. 0.40	36. 0.004	41. 2.3
27. 0.1	32. 0.60	37. 0.128	42. 6.7
28. 0.7	33. 0.025	38. 0.368	43. 2
29. 0.56	34. 0.035	39. 1.12	44. 25

Change each percent to a decimal number. See Example 3.

45. 2%	50. 75%	55. 120%	60. 10.1%
46. 7%	51. 20%	56. 150%	61. 0.26%
47. 18%	52. 30%	57. 6.5%	62. 0.32%
48. 42%	53. 125%	58. 2.5%	63. 1.37%
49. 25%	54. 170%	59. 17.3%	64. 2.44%

Section 4.3 Exercises Opening Spread

a.
Beginning Positions

b.
Positions after 6 hours

c.
Positions after 12 hours

Section 2.1 Example 9 Satellite Orbit Graphic

428 Chapter 5 Measurement

Chapter 5 Project

Metric Cooking

An activity to demonstrate the use of metric to US conversions in real life.

Your grandma lives outside of the country and has emailed you her famous apple pie recipe to use as an upcoming party. As you start to bake the pie in the city of the party, you realize grandma's recipe is written using only metric units. Looking through the supplies in your kitchen, you find a scale that measures weight in ounces and some measuring spoons that measure volume in $\frac{1}{2}$, $\frac{1}{4}$, and $\frac{1}{8}$ of a teaspoon and 1 whole tablespoon. In order to successfully bake the pie in time for the party, you must quickly convert the metric measurements to US measurements. You start with the pie crust ingredients.

Pie Crust		Apple Filling	
Ingredient	Metric Measurement	US Measurement	US Measurement
Flour	350 g	—	—
Vegetable Shortening	90 g	—	—
Unsalted Butter	30 g	—	—
Cold Water	60 ml	—	—
Salt	5 ml	—	—
Apples	1 kg	—	—
Sugar	100 g	—	—
Cinnamon	2.5 ml	—	—
Salt	0.5 ml	—	—
Nutmeg	0.5 ml	—	—
Butter	25 g	—	—

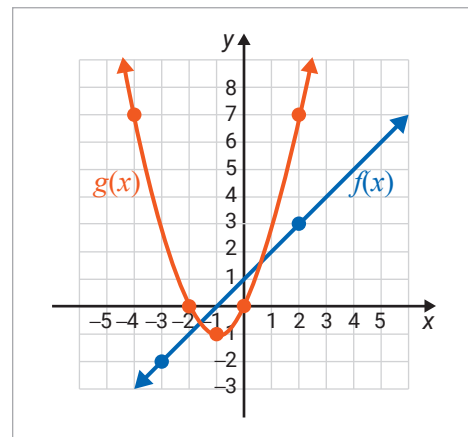
1. Fill in the third column of the pie crust table by converting the measurements of each ingredient using the correct conversion factors. Use 1 ml = 0.068 drop and 1 ml = 0.203 tsp. (Note: dry stands for tablespoons and tsp stands for teaspoons.)
2. The recipe requires the oven to be preheated to 230 °C, but your oven measures degrees in Fahrenheit. What temperature should you preheat your oven to? **449 °F**

While the oven is preheating, you begin to prepare the ingredients for the apple filling.

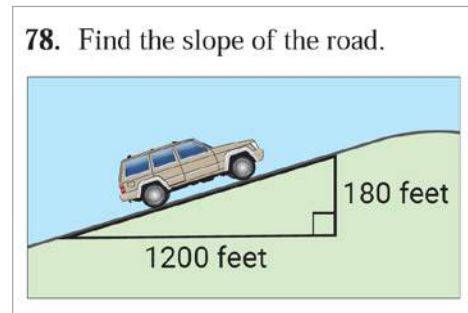
In addition to the visual recipe, your grandma has listed several variations on the recipe that depend on the taste of the apples. For brand apples, you should add 20 ml of lemon juice to the filling. For sour apples, you should increase the sugar to 140 g.

3. You taste the apples and decide you need to increase the sugar to 140 g. You have already added 100 g. How many more ounces of sugar do you need to add to reach 140 g? **1.4 oz**
4. You notice that the recipe requires a pie pan with a diameter of 23 cm. After measuring the pie pan you discover it is 9 inches in diameter. Is the pie pan the right size for the apple pie? What is its diameter in inches? Round to the nearest whole number. **Yes, 9 inches**

Chapter 5 Project



Section 17.1 Exercise Graph



Section 10.3 Graphic

Calculus with Early Transcendentals

Textbook

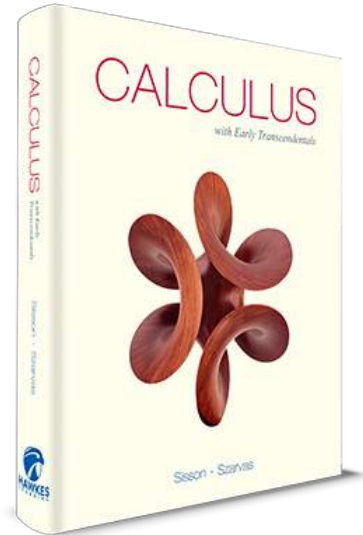
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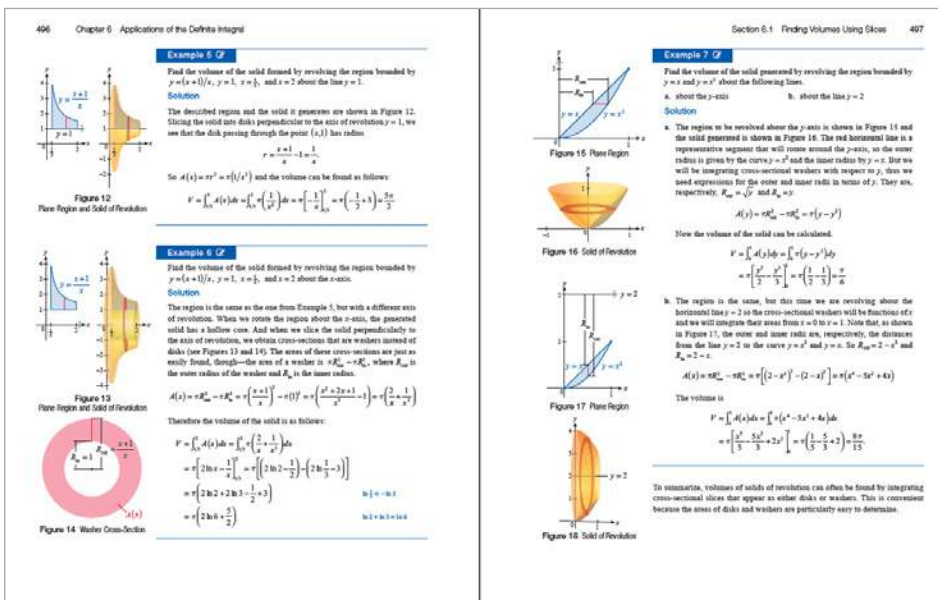
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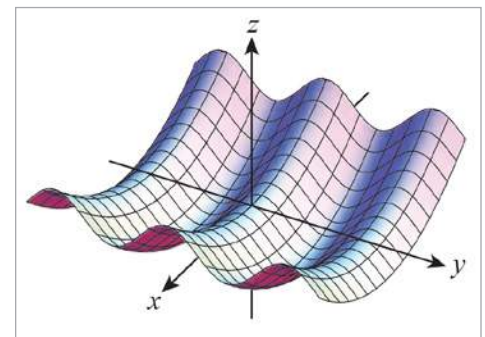
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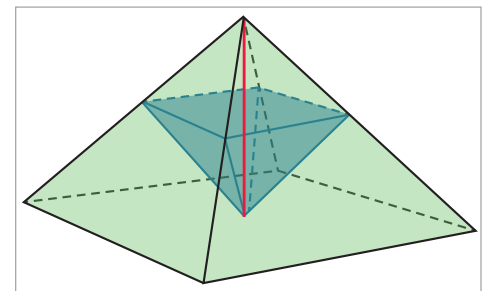
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Section 6.1 Spread



Section 13.1 Graph



Section 4.6 Pyramid Graphic

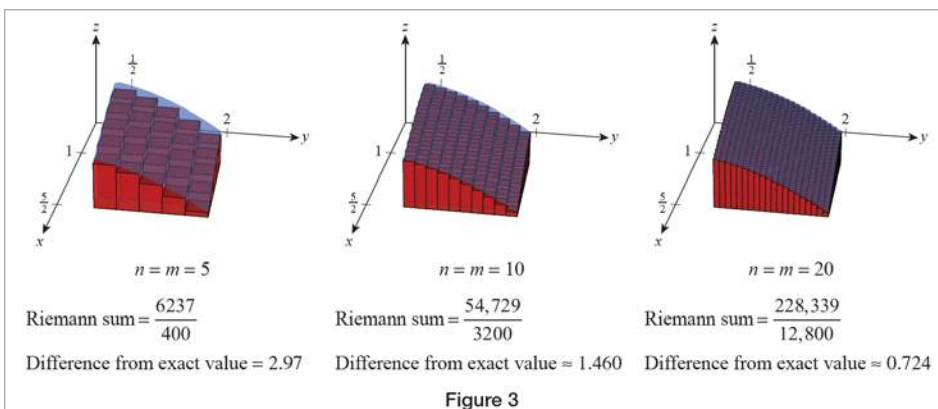
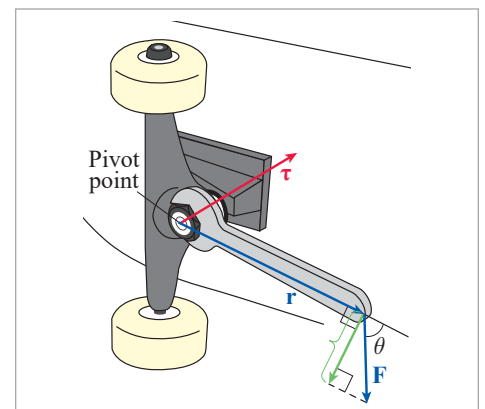


Figure 3

Section 14.1 Figure 3 Riemann Sum Graphic



Section 11.4 Skateboard Graphic

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Calculus with Early Transcendentals

by Paul Sisson and Tibor Szarvas

A comprehensive, mathematically rigorous exposition, *Calculus with Early Transcendentals* blends precision and depth with a conversational tone to include the reader in developing the ideas and intuition of calculus. A consistent focus on historical context, theoretical discovery, and extensive exercise sets provides insight into the many applications and inherent beauty of the subject.

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About the Authors:

Paul Sisson

Paul Sisson received his bachelor's degree in mathematics and physics from New Mexico Tech and his PhD from the University of South Carolina. Since then, he has taught a wide variety of math and computer science courses, including Intermediate Algebra, College Algebra, Calculus, Topology, Mathematical Art, History of Mathematics, Real Analysis, Mathematica Programming, and Network Operating Systems. He is Professor of Mathematics and Provost Emeritus at Louisiana State University in Shreveport.

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780 Chapter 9 Parametric Equations and Polar Coordinates

Chapter 9 Review Exercises

1-4 Sketch the curve defined by the parametric equations by eliminating the parameter.

- $x = \frac{1}{\sin t}, y = t^2$
- $x = t + 5, y = t^2 - 2$
- $x = \frac{3}{4 - t^2}, y = 2t - 2$
- $x = 4 \cos t, y = \cos t + 1$

5-8 Construct parametric equations defining the graph of the given equation.

- $y^2 = x^2 + 4$
- $6x = 2 - y$

7-8 Find parametric equations to represent the graph described; parameters will vary.

- Line, passing through $(4, 4)$ and $(-3, -4)$
- Circle, center $(1, 1)$, radius 1

9-10 Find the equations of any horizontal or vertical tangent lines to the given curve.

- $x = 2t + 1, y = t^2 - 4$
- $x = -2t^2, y = \frac{3}{t - 2}, t < 2$

11-14 Find the values of dy/dx and d^2y/dx^2 for the given curve at the indicated point.

- $x = 2t^2 + 1, y = \sqrt{t - 1}; (9, 0)$
- $x = e^t, y = t^2 e^t; (0, 0)$
- $x = \frac{1}{t}, y = t^2 + e; (1, 2)$
- $x = \sin t, y = \cos 2t; (\frac{1}{2}, \frac{1}{2})$

15-16 Find the values of the parameter for any inflection points of the given curve.

- $x = t - t^2, y = 3t + 1$
- $x = 3t - 1, y = t^2(2 - t^2)$

17-18 Find the area enclosed by the given curve.

- $x = \sin 3t, y = \sin 2t, \frac{\pi}{3} \leq t \leq \frac{\pi}{3}$
- $x = \cos^2 t, y = \sin^2 t, 0 \leq t \leq 2\pi$

19-20 Find the arc length of the given curve on the indicated interval.

- $x = \frac{5}{3}t^3, y = 4t, 0 \leq t \leq 5$
- $x = t \cos t + \cos t, y = t \sin t - \sin t, 0 \leq t \leq \pi$

21-22 Find the area of the surface generated by revolving the parametric curve about the indicated axis.

- $x = \frac{t^3}{3}, y = 2t + 1, 0 \leq t \leq 1$; about the y -axis
- $x = \frac{1}{t^2}, y = \sqrt{t}, 0 \leq t \leq 1$; about the x -axis
- $x = 3t - \frac{t^3}{3}, y = \sqrt{3}(9 - t^2), 0 \leq t \leq 3$; about the y -axis

23-25 Convert the point from polar to Cartesian coordinates.

- $(-3, \frac{\pi}{3})$
- $(\frac{7\sqrt{2}}{6}, \frac{\pi}{4})$

26-27 Convert the point from Cartesian to polar coordinates.

- $(-\sqrt{3}, -1)$
- $(0, 12)$

28-29 Rewrite the rectangular equation in polar form.

- $x^2 + y^2 = 16a^2$
- $x^2 + y^2 = 4a^2$

Chapter 9 Review Exercises 781

30-31 Rewrite the polar equation in rectangular form.

- $r = 4 \cos \theta$
- $r = \frac{16}{4 \cos \theta + 4 \sin \theta}$

32-33 Sketch a graph of the given polar equation.

- $r = 4 + 3 \cos 3\theta$
- $r^2 = 25 \cos 2\theta$

34-36 Find the slope of the line tangent to the given polar curve at the indicated point.

- $r = 4 \cos 3\theta, \theta = \frac{\pi}{12}$
- $r = \frac{1}{\theta^2 + 1}, \theta = \frac{\pi}{2}$

37-38 Find all points where the given polar curve has a horizontal or vertical tangent line.

- $r = 2 \cos \theta, 0 \leq \theta \leq 2\pi$
- $r = 1 + \cos \theta, 0 \leq \theta \leq \pi$

39-40 Find the area of the shaded region.

- $r = 2 \cos \theta$
- $r = 2 + \cos \theta$

41-43 Find the area of the specified region.

- A large loop of $r = 1 + 2 \cos 2\theta$
- The portion of the rose $r = 4 \cos 2\theta$ outside the circle $r = 2$
- The area between $r = \sec t$ and $r = 4 \sec t$ for $\pi/4 \leq t \leq \pi/2$
- The spiral $r = t^2, 0 \leq t \leq 2\pi$
- The cardioid $r = 2 + 2 \cos \theta$

44-46 Find the area of the surface generated by revolving the curve $r = 2 \cos \theta, 0 \leq \theta \leq \pi$ about $\theta = \pi/2$. (Hint: See Exercise 38 in Section 9.4.)

47-52 Sketch the graph of the given conic section, and determine the coordinates of the foci and the equations of the directrices or asymptotes as appropriate.

- $\frac{(x+1)^2}{9} - \frac{(y-2)^2}{16} = 1$
- $x^2 + 6y^2 - 6x + 12y = -9$
- $x^2 + 3y^2 - 12x + 4y = 0$
- $x^2 - 3x + 2y + 14 = 0$
- $\frac{(x+2)^2}{9} - \frac{(y-1)^2}{16} = 1$
- $9x^2 - 4y^2 = 54x - 4y - 41 = 0$

53-63 Find the equation, in standard form, of the conic section with the given properties.

- Ellipse, center at $(-1, 4)$, major axis is vertical and of length 8, foci $\sqrt{5}$ units from the center
- Ellipse, foci at $(1, 2)$ and $(7, 2)$, $a = \frac{5}{2}$
- Ellipse, vertices at $(\frac{7}{2}, -1)$ and $(\frac{1}{2}, -1)$, $c = 0$
- Ellipse, vertices at $(1, -4)$ and $(1, 2)$, minor axis of length 8

Chapter 9 Review Exercises Spread

Section 6.2 Slice Graphic

Chapter 11

Vectors and the Geometry of Space

11.1 Three-Dimensional Cartesian Space 867

- Cartesian Coordinates in Three Dimensions
- Distance in Three Dimensions

11.2 Vectors and Vector Algebra 873

- Vector Terminology and Notation
- Vector Algebra

11.3 The Dot Product 884

- The Dot Product and Its Properties
- Applications of the Dot Product

11.4 The Cross Product 895

- The Cross Product and Its Properties
- Applications of the Cross Product

11.5 Describing Lines and Planes 905

- Lines in Space
- Planes

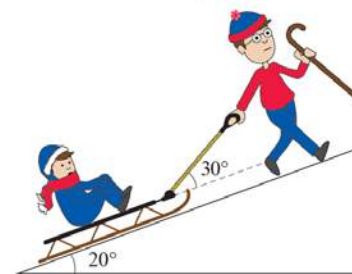
11.6 Cylinders and Quadric Surfaces 916

- Cylinders
- Quadric Surfaces

Chapter 11 Opener

Illustration by Jameson Deichman

98. A father is pulling his little son in a sled up a 20° slope that is 20 meters long. The rope makes a 30° angle with the surface of the slope and the combined weight of the child and the sled is 200 newtons. (Ignore friction and any acceleration of motion.)



Section 11.3 Exercise Graphic

102 Chapter 2 Limits and the Derivative

Introduction

This chapter opens with a discussion of two broadly defined problems whose solutions turn out to have much in common. Mathematically, the task of determining the instantaneous velocity of an object and the task of finding the line tangent to the graph of a function both depend on the concept of limit. Much of this chapter revolves around developing an intuitive sense as well as a rigorous definition of the concept.

The limit idea inherently involves motion and reflects a major difference between the relatively static world of algebra and the dynamic world of calculus. As with so many concepts in mathematics, the evolution of the idea spans centuries and ages. Some early thinkers, such as the philosopher Zeno of Elea (ca. 495-ca. 430 BC) and the mathematician Archimedes of Syracuse (ca. 287-ca. 212 BC), developed an appreciation of the power and depth of the concept centuries before later mathematicians overcame the difficulties of rigorously defining and using limits.

Much later, in the seventeenth century AD, the ideas and methods involving limits were brought together and ultimately characterized as "calculus." But even after calculus came to be recognized as an especially rich branch of mathematics, the limit concept retained its somewhat dangerous reputation and continued to trick many learners. Great mathematicians and advisors were made using calculus throughout the 1600s and

1700s by a long list of famous mathematicians (many of whom you will read about in the coming chapters), but rigorous definitions of "limit" and related ideas didn't appear until the 1800s. The definition we use today is essentially due to the French mathematician Augustin-Louis Cauchy (1798-1857), who also refined and made rigorous the idea of continuity as it applies to functions.

The two problems that open the chapter serve as motivation for the mathematics that follows, but by the end of the chapter it will be apparent

The limit idea inherently involves motion and reflects a major difference between the relatively static world of algebra and the dynamic world of calculus.

Archimedes of Syracuse (ca. 287-ca. 212 BC)

Chapter 2 Introduction

The Mystical Half-Dozen

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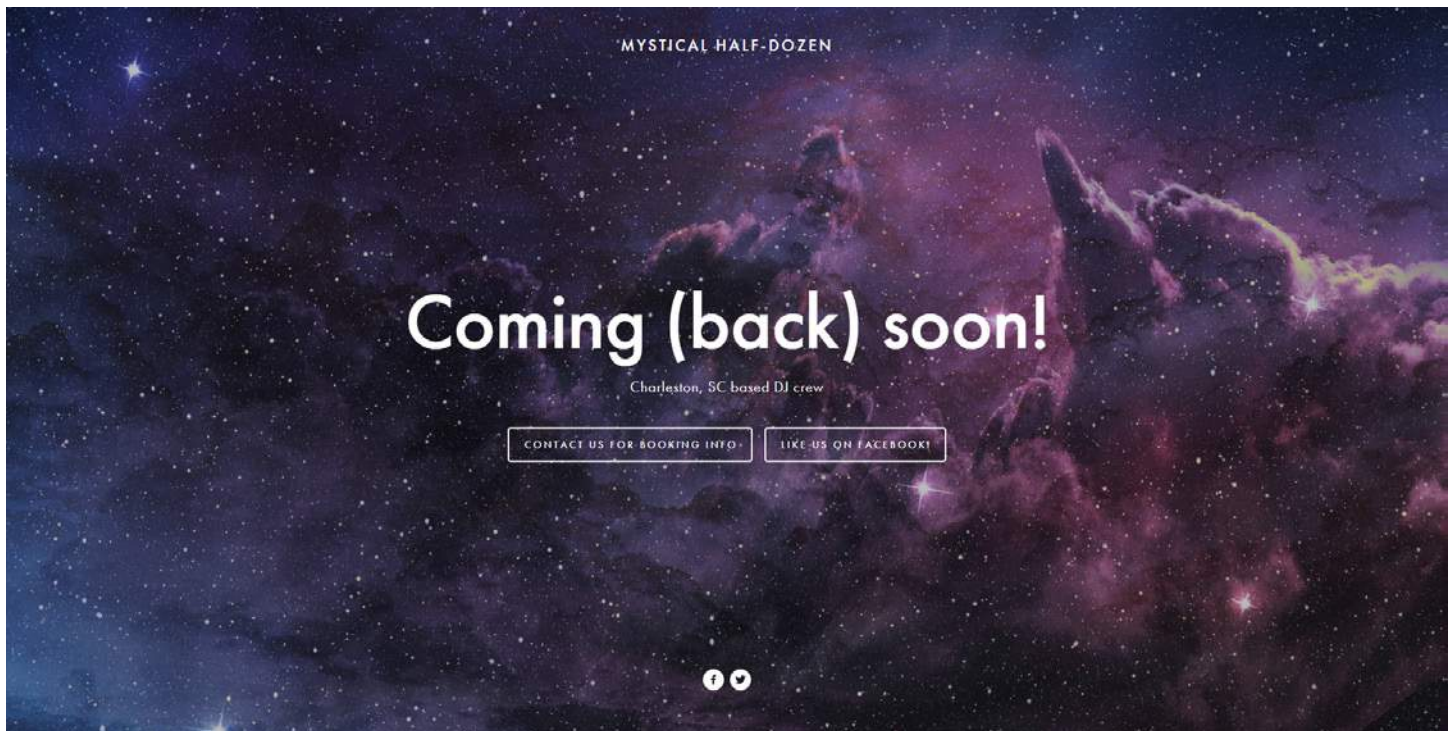
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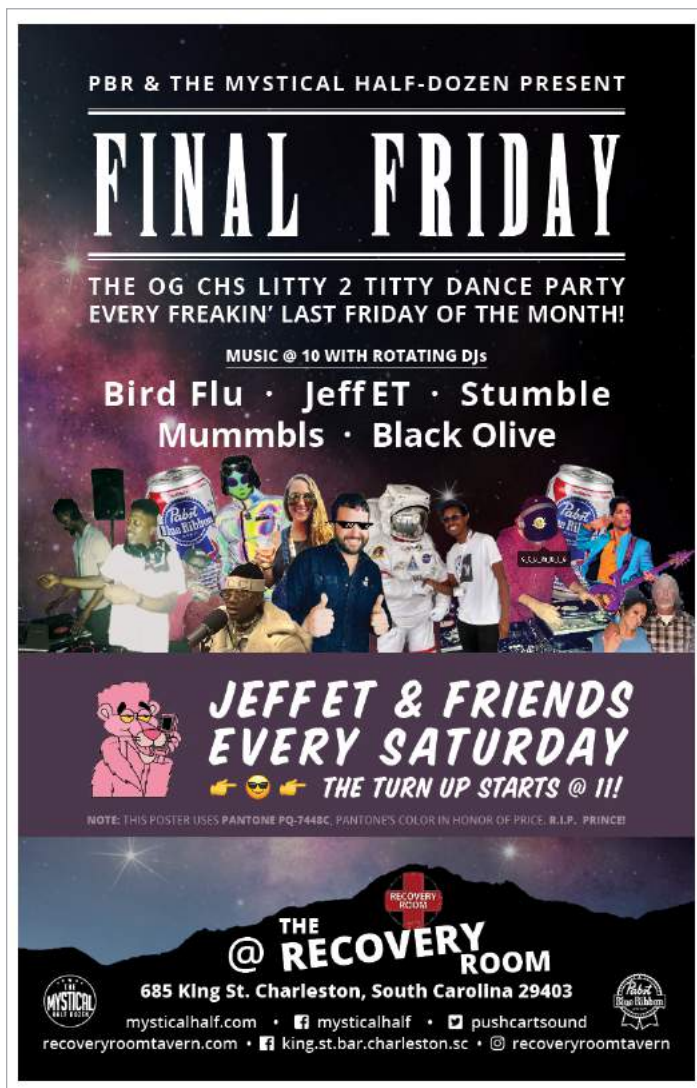
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2018 Poster for Monthly and Weekly Parties



2019 Poster for Monthly and Weekly Parties



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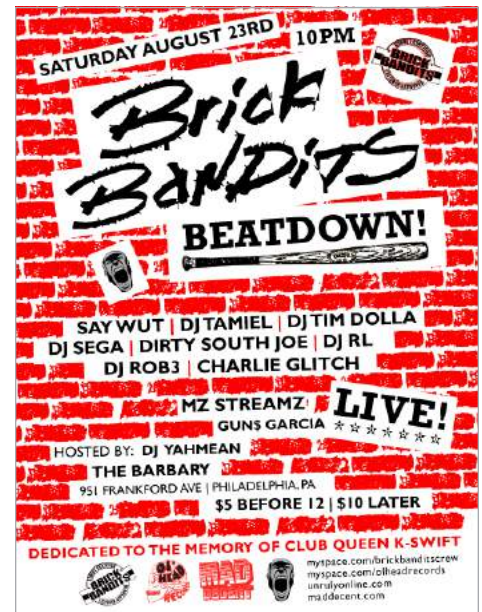
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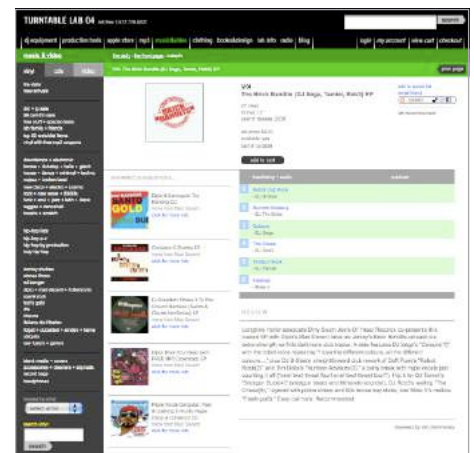
Record Label - Side A



Record Label Side A



Release Party Flyer



Record for Sale on Turntable Lab



Record and Sleeve (Final Product)

XX Campaign

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XLR8R Page 2

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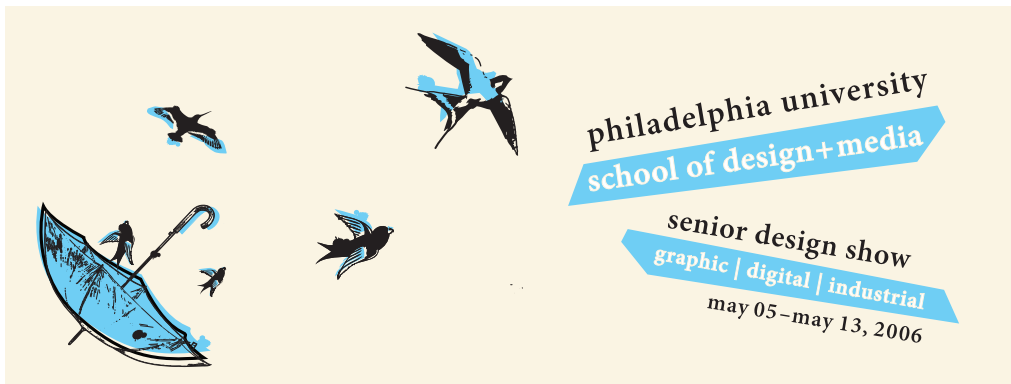
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Environmental Graphic - Horizontal Banner

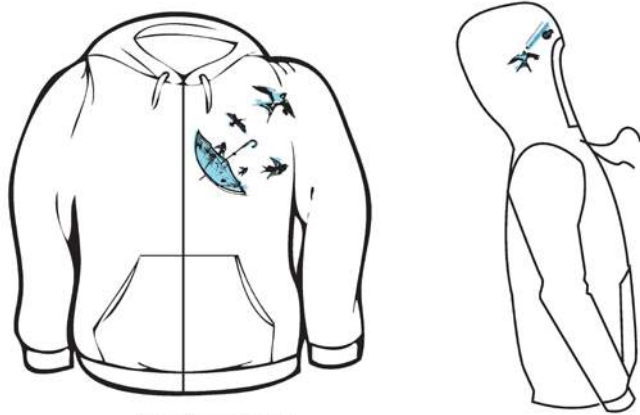


18" x 24" Poster - Front



18" x 24" Poster - Back

Note: All items designed in collaboration with Brandon Forant



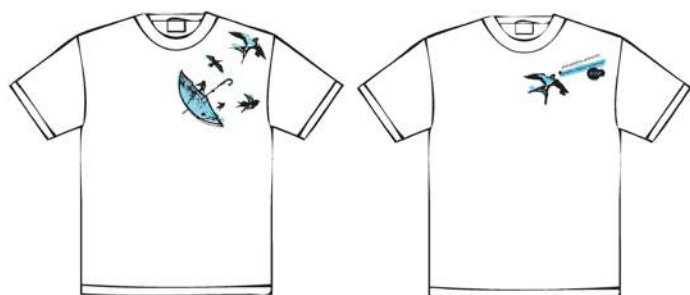
front graphic

right side hood graphic

Hooded Sweatshirt Mock Up



Hooded Sweatshirt Front Graphic



front

back

T-Shirt Mock Up



T-Shirt Back Graphic



Environmental Graphic - Vertical Banner

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Product Design
Package Design
Web Design
User Interface Design
Information Design
Prototyping
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