INSTRUCTOR'S SOLUTIONS MANUAL

MATH LIT

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Rock Valley College

PEARSON

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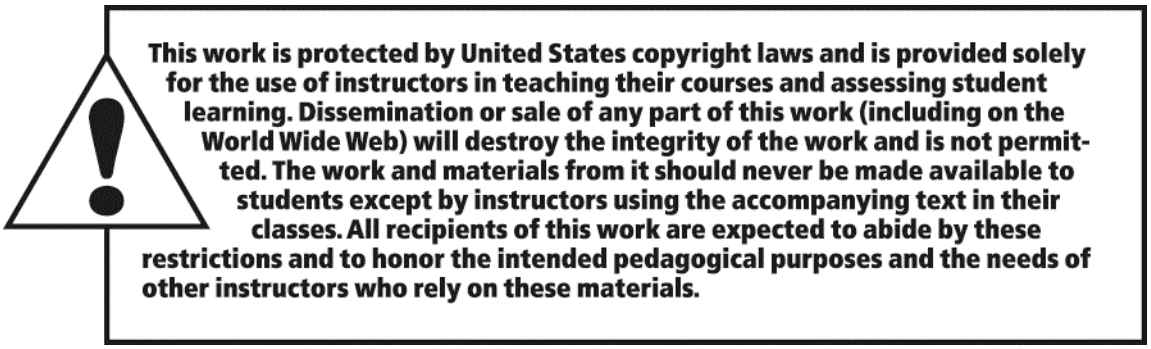

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Cycle 1: What Can Be Learned?

Part 1

Lesson 1.2 Getting Started: Syllabus

Skills:

1. 3

2. Answers will vary. Possible answers include: *Help Me Solve This*, *View an Example*, *Video*, and *Ask My Instructor*.

Concepts and Applications:

3. Answers will vary.

4. a. There are 3 parts per cycle.
   b. Most lessons begin with an *Explore*.
   c. The objectives can be found in the *Wrap-Up* box and at the start of the homework.
   d. Lesson 1.4 is the first lesson to include the *How It Works* feature.
   e. Venn diagrams are defined in the first *Look It Up* feature
   f. Four lessons per cycle are devoted to the focus problem.
   g. There are five steps in the *Wrap-Up* at the end of each cycle.
   h. The symbol for pi and its decimal approximation are discussed in the *Sticky Note*.
   i. "What can be learned?" is the theme of the first cycle.

Lesson 1.3 Getting Started: Skills

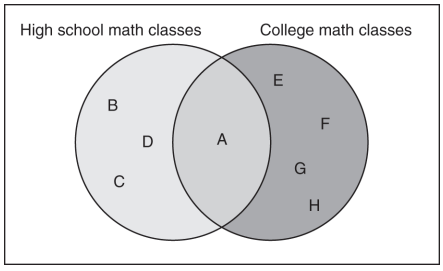
Skills:

1. $72 \cdot \frac{3}{8} = \frac{72}{1} \cdot \frac{3}{8} = \frac{\overset{9}{\cancel{72}}}{1} \cdot \frac{3}{\underset{1}{\cancel{8}}} = 27$

2. $\frac{1}{7} \div \frac{1}{42} = \frac{1}{7} \cdot \frac{42}{1} = \frac{42}{7} = 6$

Concepts and Applications:

3. a.

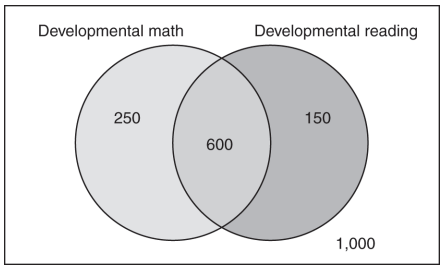


A - H Answers will vary.

b. If a statement is in the overlap of the two circles on the Venn diagram, then the statement applies to both high school and college math classes.

c. If a statement is outside of both circles on the Venn diagram, then it does not apply to high school or college math classes.

4. a.



b. There are 1,000 students taking either developmental math or developmental reading. Since 600 of them are taking both math and reading and 250 of them are taking only math, that leaves

$1,000 - 600 - 250 = 150$ students who are taking only developmental reading.

c. There are 2,000 students in the freshman class at this particular college. Since 1,000 of them are taking either developmental math or developmental reading, that leaves

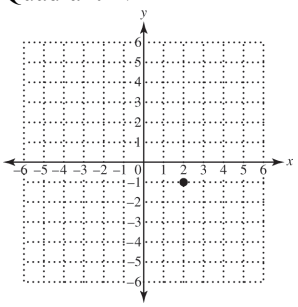
$2,000 - 1,000 = 1,000$ students who are not taking either developmental reading or developmental math.

5. Answers will vary but might include the need to get a common denominator as a difference or the need to simplify as a common trait.

Lesson 1.4 Getting Started: Groups

Skills:

1. Quadrant IV



2. $(-1, 2)$; Quadrant II

Concepts and Applications:

3. a. If your point is on the positive vertical axis, then you are neither outgoing nor reserved, and you are a logical thinker.
   b. If your point is on the negative horizontal axis, then you are neither intuitive nor logical and use thoughts and feelings equally to solve problems. You are social in your communication style.
   c. If your point is on the origin, then you have a very neutral personality and probably exhibit some of each characteristic mentioned.
   d. If your point is in Quadrant III, then you are outgoing and use an intuitive approach to solve problems. You are creative and social.

4. Answers will vary. Groups function better when everyone contributes and no one person does all the work. Some people find groups to be more ideal when all the personality quadrants are represented.

5. Answers will vary.

6. Answers will vary. If there are ideas from class that are not clear to you when you leave, you might consider seeking help from the instructor or comparing notes with other group members.

7. It is more comfortable to be in a class when the content is easy and not challenging to you, but little learning takes place when you are not challenged. In order to grow, the flower has to disrupt the soil. In order for you to learn, you will need to be willing to experience some moments of disequilibrium.

Lesson 1.5 A Tale of Two Numbers

Skills:

1. $\dfrac{18 \text{ pounds}}{8 \text{ weeks}} = 18 \div 8 \text{ pounds per week } = 2.25 \text{ pounds per week}$

2. $\dfrac{27 \text{ hours}}{3 \text{ days}} = \dfrac{27 \text{ hours}}{3 \cdot 24 \text{ hours}} = \dfrac{27}{72} = \dfrac{3}{8}$

Concepts and Applications:

3. Answers will vary. Possible answers include:
   You will pay 8 cents in sales tax for every dollar purchase.
   You will pay 8 dollars in sales tax for every $100 purchase.
   You will pay $80 in sales tax for a $1,000 purchase.

4. Answers will vary.

5. The second student is assuming that the ratio also identifies the total number of students, but it does not. There are many different combinations of boys and girls that could give a ratio of 5 to 7. There could be 10 boys and 14 girls, for example, or 20 boys and 28 girls.

6. If the ratio of boys to girls is 5 to 7, then the ratio of boys to students is 5 to 12. So $\dfrac{5}{12}$ of the students are boys. The other $\dfrac{7}{12}$ of the students are girls.

7. Answers will vary. Possible answers include:

3 desktops and 4 laptops $\left(\frac{3}{4}\right)$

6 desktops and 8 laptops $\left(\frac{6}{8}=\frac{3}{4}\right)$

9 desktops and 12 laptops $\left(\frac{9}{12}=\frac{3}{4}\right)$

8. If the ratio of desktops to laptops is 3 to 4, then the ratio of desktops to total computers is 3 to 7.

$$\frac{3 \text{ desktops}}{7 \text{ computers}}=\frac{3\cdot 10 \text{ desktops}}{7\cdot 10 \text{ computers}}=\frac{30 \text{ desktops}}{70 \text{ computers}}$$

If there are 70 computers total, then 30 of them are desktops.

9. If the baby panda weighed 8 oz (0.5 lb) at birth and 75 pounds at one year, then the panda gained 74.5 lb during the first year.

$$\frac{74.5 \text{ lb}}{1 \text{ year}}=\frac{74.5 \text{ lb}}{12 \text{ months}}\approx 6.21 \text{ pounds/month}$$

$$\frac{74.5 \text{ lb}}{1 \text{ year}}=\frac{74.5 \text{ lb}}{52 \text{ weeks}}\approx 1.43 \text{ pounds/week}$$

Lesson 1.6 Part and Whole

Skills:

1. a. $$\frac{2}{15}+\frac{1}{9}=\frac{2\cdot 3}{15\cdot 3}+\frac{1\cdot 5}{9\cdot 5}=\frac{6}{45}+\frac{5}{45}=\frac{11}{45}$$

   b. $$\frac{4}{21}-\frac{1}{12}=\frac{4\cdot 4}{21\cdot 4}-\frac{1\cdot 7}{12\cdot 7}=\frac{16}{84}-\frac{7}{84}=\frac{9}{84}=\frac{3}{28}$$

2. a. $$\frac{2}{15}\cdot\frac{3}{8}=\frac{\overset{1}{\cancel{2}}\cdot 3}{15\cdot\underset{4}{\cancel{8}}}=\frac{1}{\underset{5}{\cancel{15}}}\cdot\frac{\overset{1}{\cancel{3}}}{4}=\frac{1}{20}$$

   b. $$\frac{2}{15}\div\frac{1}{9}=\frac{2}{15}\cdot\frac{9}{1}=\frac{2}{\underset{5}{\cancel{15}}}\cdot\frac{\overset{3}{\cancel{9}}}{1}=\frac{6}{5}$$

Concepts and Applications:

3. a. Since $\frac{2}{3}$ of the students follow the first path, and 75% of them pass, we need to find 75% of $\frac{2}{3}$.

$$75\% \cdot \frac{2}{3} = \frac{3}{4} \cdot \frac{2}{3} = \frac{2}{4} = \frac{1}{2}$$

b. Since $\frac{1}{3}$ of the students follow the second path, and 90% of them pass, we need to find 90% of $\frac{1}{3}$.

$$90\% \cdot \frac{1}{3} = \frac{9}{10} \cdot \frac{1}{3} = \frac{3}{10}$$

c. $$\frac{1}{2} + \frac{3}{10} = \frac{1 \cdot 5}{2 \cdot 5} + \frac{3}{10} = \frac{5}{10} + \frac{3}{10} = \frac{8}{10} = \frac{4}{5}$$

4. a. $$\frac{\frac{2}{3} \text{ C flour}}{2 \text{ dozen cookies}} = \frac{\frac{2}{3} \text{ C flour} \cdot 4}{2 \text{ dozen cookies} \cdot 4} = \frac{\frac{8}{3} \text{ C flour}}{8 \text{ dozen cookies}}$$

To make 8 dozen cookies, you will need $\frac{8}{3} = 2\frac{2}{3}$ cups of flour.

b. You have 10 cups of flour and each $\frac{2}{3}$ cup will make a batch of 2 dozen cookies. So you need to know how many $\frac{2}{3}$ cups are in 10 cups.

$$10 \div \frac{2}{3} = \frac{10}{1} \cdot \frac{3}{2} = \frac{10}{1} \cdot \frac{3}{2} = 15$$

The 10 cups of flour will make 15 batches of 2 dozen cookies or 30 dozen cookies.

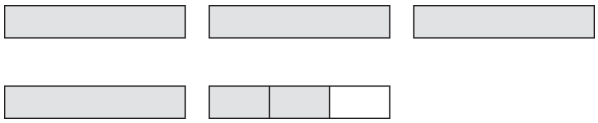
5. a. Addition; For example, $3\frac{1}{4} = 3 + \frac{1}{4}$.

b. To change a mixed number to an improper fraction, multiply the denominator by the whole number, add that to the numerator, and write the total over the denominator.

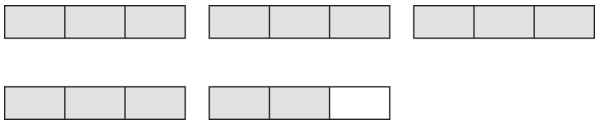
c. $$4\frac{2}{3} = \frac{4 \cdot 3 + 2}{3} = \frac{14}{3}$$

d. $4\frac{2}{3} = 4.\overline{6}$ and $\frac{14}{3} = 4.\overline{6}$; yes

e.

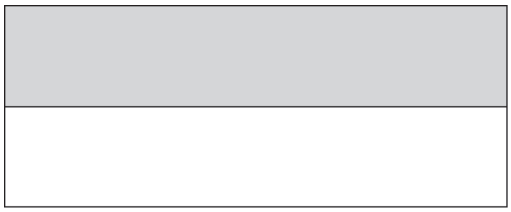


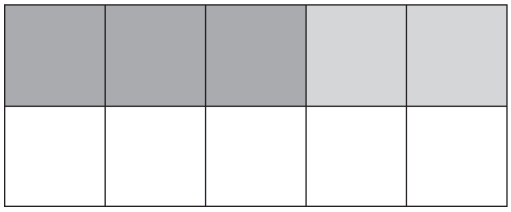
f.



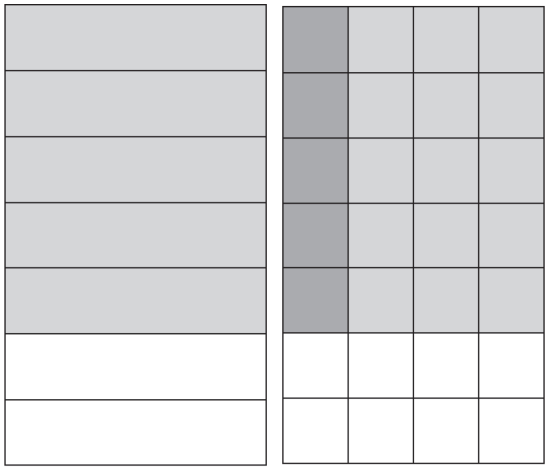
6. It is often considered easier to multiply fractions since you do not have to get a common denominator as you do when adding fractions. Answers will vary.

7. a.





b.



Lesson 1.7 The Elusive A in Math

Skills:

1. a. $16 - 12 = 4$ percentage points

   b. 30 – 49 years

   c. 27% of $360° = 0.27(360) = 97°$

2. a. 2005, 2008

   b. 48% of $950 = 0.48(950) = 456$ people

Concepts and Applications:

3. They lack either ability or agility or both. Students might be mimicking *View an Example* or relying too heavily on *Help Me Solve This* if they lack the ability to complete the problem on their own. Also, they might be able to do problems if they look exactly like the homework problems did, but they do not have the deeper understanding required to apply their knowledge to different problems.

4. a. Naomi lacks ability and agility with old topics. She should work on her own to improve her knowledge of prerequisite material.

   b. Tim lacks agility. When working on a new skill, he should ask himself if he knows when to use the skill or is just mimicking problems already seen. He needs to work more on understanding the concepts instead of just working in a rote way.

   c. Marla lacks attitude and seems overconfident and lazy. Each time she takes a class, she needs to take the experience seriously and not assume that course requirements like attendance do not apply to her.

5. Answers will vary.

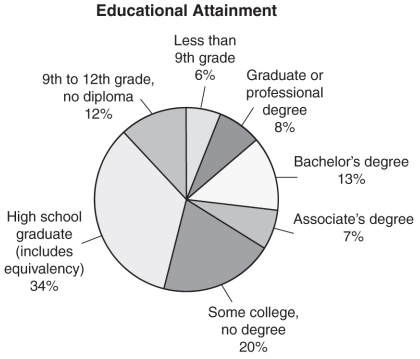
6. part-to-whole; part-to-part

7. a. Less than 9^{th} grade, 9^{th} to 12^{th} grade (no diploma), high school graduate (includes equivalency)

   b. High school graduate (includes equivalency)

   c. Percents seem to total to 100. All levels seem to be listed.

   d.



e. Answers will vary.

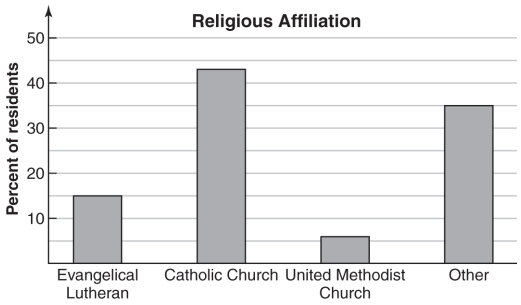
8. a. Residents who claim no religious affiliation seem to be missing from this graph.

b. No. The percents total to 99%, likely due to rounding.

c. $50\% \text{ of } 156,300 = 0.50(156,300) = 78,150$ residents
$43\% \text{ of } 78,150 = 0.43(78,150) \approx 33,605$ residents

d. The central angle for the largest sector appears to be about $150°$.
The central angle is actually $43\% \text{ of } 360° = 0.43(360°) = 154.8°$.
The estimate was fairly accurate.

e.



f. Answers will vary.

9. Each student's grade percentage would be a sector of the circle and considered a category, but the categories are not parts of the same whole. The categories would also total to more than 100%.

Lesson 1.8 Two by Two

Skills:

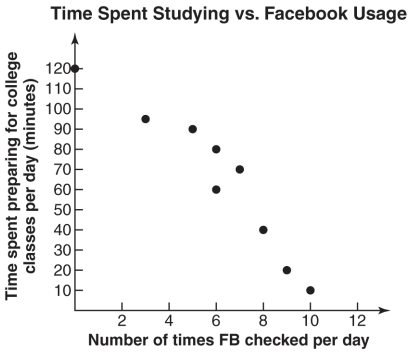
1. a. Independent variable: Time in years
Dependent variable: Tree height in feet

b. Independent variable: Sleep time in hours
Dependent variable: Swim time in minutes

Concepts and Applications:

2. Independent variable: Number of FB checks
Axis: Horizontal
Minimum value: 0
Maximum value: 12
Increment: 2

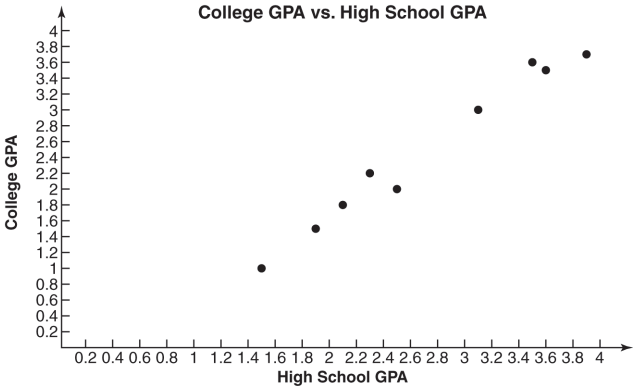
Dependent variable: Time spent preparing for class
Axis: Vertical
Minimum value: 0
Maximum value: 120
Increment: 10



Preparation times tends to decrease as the number of FB checks increases.

3. Independent variable: HS GPA
Axis: Horizontal
Minimum value: 0
Maximum value: 4
Increment: 0.2

Dependent variable: College GPA
Axis: Vertical
Minimum value: 0
Maximum value: 4
Increment: 0.2



The higher your HS GPA, the higher your college GPA is likely to be.

4. No. Neither age nor weight values in the table increase by the same amount each time. An increment would need to be chosen for each axis to create a consistent scale.

Lesson 1.9 Multiply or Divide?

Skills:

1. $500 \text{ mg} \div 1000 \text{ mg/g} = 0.5 \text{ g}$

2. $10 \text{ mi} \cdot 5,280 \text{ ft/mi} = 52,800 \text{ ft}$
$52,800 \text{ ft} \cdot 12 \text{ in./ft} = 633,600 \text{ in.}$

Concepts and Applications:

3. No. It depends on the conversion fact you are using. For example, to convert 3 miles to kilometers using the fact that $1 \text{ km} \approx 0.62 \text{ mi}$, you would divide by 0.62. However, to convert 3 miles to kilometers using the fact that $1 \text{ mi} \approx 1.61 \text{ km}$, you would multiply by 1.61.

4. a. $30 \text{ days} \cdot 24 \text{ hours/day} = 720 \text{ hours}$
$720 \text{ hours} \cdot 60 \text{ minutes/hour} = 43,200 \text{ minutes}$
$43,200 \text{ minutes} \cdot 60 \text{ seconds/minute} = 2,592,000 \text{ seconds}$

b. $30 \text{ days} \cdot 86,400 \text{ seconds/day} = 2,592,000 \text{ seconds}$

c. They are the same.

5. a. smaller
b. larger

6. a. $1 \text{ centimeter} \div 2.54 \text{ centimeters/inch} = 0.39 \text{ inch}$

b. $1 \text{ foot} \div 5,280 \text{ feet/mile} = 0.000189 \text{ mile}$

Cycle 1 Part 1 Recap

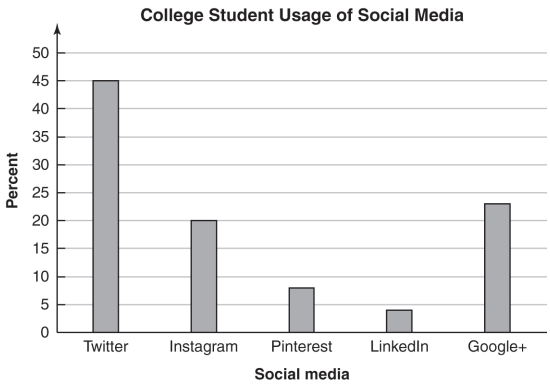
Skills:

1. $\dfrac{\$50,000}{1 \text{ year}} \div 50 \text{ weeks/year} \div 40 \text{ hours/week} = \$25/\text{hour}$

Concepts and Applications

2. a. A pie graph cannot be created to represent the data since it is likely that some students in the class are in more than one social media category. A pie graph can only be used when the categories do not overlap and encompass the whole. A bar graph would be an appropriate choice to display this data.

b.



3. a. 75 miles and 1 hour

b. $\dfrac{179 \text{ miles}}{2\frac{37}{60} \text{ hours}} \approx 68.4 \text{ miles per hour}$

Cycle 1: What Can Be Learned?

Part 2

Lesson 1.11 Higher or Lower?

Skills:

1. tax: $0.0825(\$72) = \$5.94$ or total: $1.0825(\$72) = \$77.94$
   total: $\$72 + \$5.94 = \$77.94$

2. tip: $0.20(\$42) = \$8.40$ or total: $1.20(\$42) = \$50.40$
   total: $\$42 + \$8.40 = \$50.40$

Concepts and Applications:

3. a. Answers will vary.

   b. Order matters. Increasing by \$1,000 first and then adding 3% will always produce a larger salary than using the other order because we apply the percentage increase to a larger amount if the increment is given first.

   c. Add \$1,000, then increase by 3%: New salary $= 1.03(S + 1{,}000)$
   Increase by 3%, then add \$1,000: New salary $= 1.03S + 1{,}000$

   d. Looking at the formulas, if the \$1,000 increment is applied first, then the 3% is applied to that as well. So the final amount with the increment applied first will always be larger by 3% of \$1,000 or \$30.

   e. Management would prefer the plan that adds the percentage first and the increment second. Employees would prefer the plan that adds the increment first and the percentage second.

4. a. 5% of $\$100 = \$5$
   $\$100 - \$5 = \$95$

   b. 0.95

   c. Multiply by (1 – percent as a decimal)

5. Option 1: Apply the 10% discount and then the \$20 coupon
   $0.90P - 20$

   Option 2: Apply the \$20 coupon and then the 10% discount
   $0.90(P - 20)$

   Option 1 will always result in a lower price and is better for the customer.

6. No; There is not one unique salary for each experience level. Specifically, 5 years of experience corresponds to two different salary levels (\$62,000 and \$64,000).

Lesson 1.12 The X Factor

Skills:

1. a. $2n+5$; 9

   b. $2n+5=9$

   c. n

   d. 2, 5, 9

   e. $2n$, 5, 9

2. a. expression

   b. equation

   c. expression

   d. expression

   e. equation

   f. expression

Concepts and Applications:

3. The second student is correct. The acceleration due to gravity is a constant since its value is 9.8 m/sec^2 . Although it is represented with a letter, the quantity is considered a constant.

4. An expression does not have "sides" because it does not have an equal sign.

5. a.

$$\begin{aligned} 5x-20 &= 5(4)-20 \\ &= 20-20 \\ &= 0 \end{aligned}$$

   b.

$$\begin{aligned} 5(4)-20 &\stackrel{?}{=} 0 \\ 20-20 &\stackrel{?}{=} 0 \\ 0 &= 0 \end{aligned}$$

6. The way we have used Excel requires an understanding of algebra, and Excel is commonly used in the workplace.

7. a. Answers will vary. One possible answer: $2x+3y+5$

   b. Answers will vary. One possible answer: $2x+4=3x-1$

8. $1.15F+10$

Lesson 1.13 Take 2 and Call Me…

Skills:

1. $\dfrac{4 \text{ comic strips}}{2 \text{ hours}} = \dfrac{4 \text{ comic strips} \cdot 3}{2 \text{ hours} \cdot 3} = \dfrac{12 \text{ comic strips}}{6 \text{ hours}}$

   6 hours

2. $\dfrac{4 \text{ need refresher math}}{10 \text{ students}} = \dfrac{4 \text{ need refresher math} \cdot 90}{10 \text{ students} \cdot 90} = \dfrac{360 \text{ students}}{900 \text{ students}}$

   or $\dfrac{4}{10} = 40\%$; $0.40(900) = 360$

   360 students

Concepts and Applications:

3. a. Mortgage rates mostly decreased during April and May, but they started to rise at the beginning of June.

   b. Mortgage rates reached their highest value on approximately 4/7.

   c. Mortgage rates reached their lowest value on approximately 6/8.

   d. (5/1, 4.91); On 5/1/11, the interest rate on a 30-year fixed-rate mortgage was 4.91%.

   e. With the new scale, the interest rates would appear to change less over these months since the vertical changes would be diminished with the broader vertical scale.

4. a. The unemployment rate increased from 2001 to 2004, then decreased from 2004 to 2007. The unemployment rate rose sharply until 2010, when it began to level off and then decrease.

   b. The unemployment rate was highest in 2011 when it was approximately 16%. The corresponding ordered pair is (2011, 16).

   c. The unemployment rate was lowest in 2001 when it was approximately 5%. The corresponding ordered pair is (2001, 5).

   d. If the city has a population of 150,000, then the number of unemployed individuals for the lowest unemployment rate is $0.05(150,000) = 7,500$. The number of unemployed individuals for the highest unemployment rate is $0.16(150,000) = 24,000$. The difference in the number of unemployed individuals is $24,000 - 7,500 = 16,500$.

   e. A bar graph could have been used instead, but the line graph smoothes out the changes and implies a trend in a way that the bar graph would not.

5. $\dfrac{40 \text{ work hours}}{5 \text{ commute hours}} = 8 \text{ work hours/commute hour}$; $\dfrac{56 \text{ work hours}}{7 \text{ commute hours}} = 8 \text{ work hours/commute hour}$

   Yes, the work hours and commute hours are in proportion.