

Ch 12 Fair Game Review

★ Simplify all fractions

$$\textcircled{1} \quad 0.26 = \frac{26}{100} \div 2 \quad \frac{13}{50}$$

$$\textcircled{5} \quad \begin{array}{r} .375 \\ 8 \overline{) 3.000} \\ \underline{-24} \\ 60 \\ \underline{-56} \\ 40 \end{array}$$

$$\textcircled{10} \quad \frac{1}{8} + \frac{1}{9} \quad \textcircled{1} \text{ Common denominators } \frac{1 \times (9)}{8 \times (9)} + \frac{1 \times (8)}{9 \times (8)} = \frac{9}{72} + \frac{8}{72}$$

$$\textcircled{2} \text{ add numerators } 9+8 = \boxed{\frac{17}{72}}$$

③ denominator remains same

④ simplify if possible (NOT POSSIBLE) NO COMMON FACTORS

$$\textcircled{12} \quad \frac{7}{12} - \frac{1}{4} \quad \textcircled{1} \text{ Common denominators } \frac{7}{12} - \frac{1 \times (3)}{4 \times (3)} = \frac{7}{12} - \frac{3}{12}$$

$$\textcircled{2} \text{ subtract numerators } 7-3 = \underline{4}$$

③ denominator remains same 12

$$\textcircled{4} \text{ simplify if possible } \frac{4 \div 4}{12 \div 4} = \frac{1}{3}$$

(4 - greatest common factor)

Chapter 12

(14) $\frac{5}{9} \cdot \frac{1}{3}$

- ① multiply numerators $5 \times 1 = \boxed{5}$
- ② multiply denominators $9 \times 3 = \boxed{27}$
- ③ simplify if possible $\frac{5}{27}$ (no common factors)

(16) $\frac{7}{8} \div \frac{11}{16}$

- ① Keep the first fraction $\frac{7}{8}$
- ② multiply by the reciprocal
 - ↓ division sign changed to multiply
 - ↓ second fraction reciprocal $\frac{11}{16} \rightarrow \frac{16}{11}$

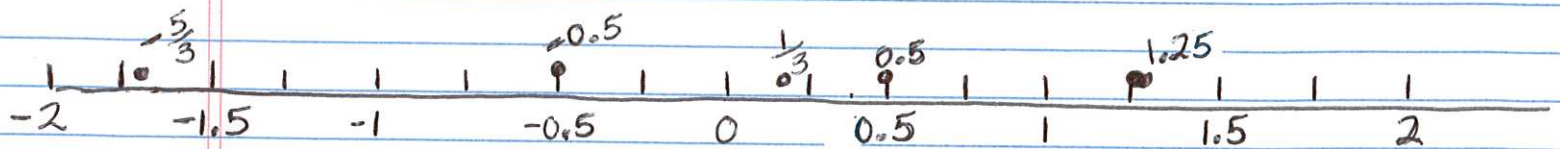
↙ $\frac{7}{8} \times \frac{16}{11}$

- ③ multiply numerators $7 \times 16 = 112$
- ④ multiply denominators $8 \times 11 = 88$
- ⑤ simplify if possible $\frac{112}{88} = \frac{24 \div 8}{88 \div 8} = \boxed{1 \frac{3}{11}}$

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12.1 Rational Numbers

Activity Solution:



a. $-0.5, 1.25, -\frac{1}{3}, 0.5, -\frac{5}{3}$

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$$\textcircled{4} \quad -\frac{1}{2}, \boxed{}, \frac{1}{3}, \boxed{}, \frac{1}{5}, \boxed{}$$

↑

any value greater than $-\frac{1}{2}$ and less than $\frac{1}{3}$
 possible solutions $(-0.25, 0, \frac{1}{4})$

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$$\textcircled{1} \quad \frac{-9}{10} = -0.9$$

$$\textcircled{4} \quad -0.84 = \frac{-84}{100} = \frac{-21}{25}$$

$$\textcircled{7} \quad \frac{1}{5}, 0.1, -\frac{1}{2}, -0.25, 0.3$$

$$\begin{array}{cccccc} \downarrow & \downarrow & \downarrow & \downarrow & \downarrow & \\ .2 & , & 0.1 & , & -.5 & , & -0.25 & , & 0.3 \end{array}$$

① change all numbers to
common form
fraction or decimal
(your choice)

$$-.20, 0.10, -.50, -0.25, 0.30$$

② add zeros to have
equal digits after decimal

$$-.50, -0.25, 0.10, .20, 0.30$$

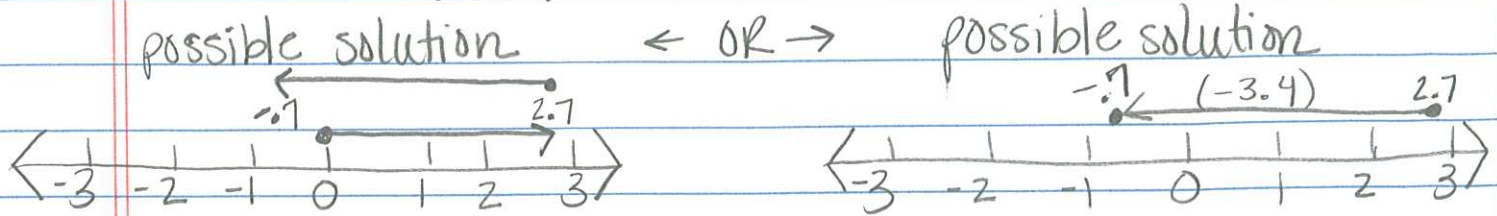
③ order least to greatest

$$\begin{array}{cccccc} \downarrow & \downarrow & \downarrow & \downarrow & \downarrow & \\ -\frac{1}{2} & , & -0.25 & , & 0.1 & , & \frac{1}{5} & , & 0.3 \end{array}$$

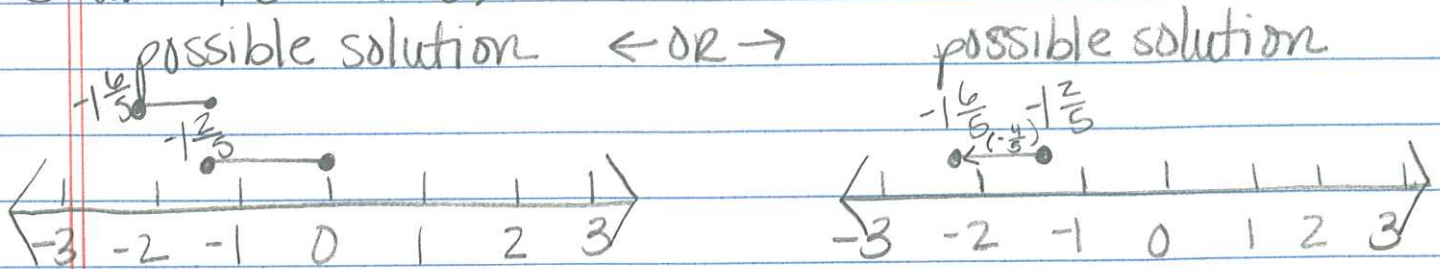
④ put back to original form

pg 267 12.2

① a. $2.7 + (-3.4)$



② a. $-1\frac{2}{5} + (-\frac{4}{5})$



$-1\frac{6}{5}$ or $-2\frac{1}{5}$

$-1\frac{6}{5}$ or $-2\frac{1}{5}$

page 268 ③ activity: Writing Expressions

a. $1.5 + (-2.3)$

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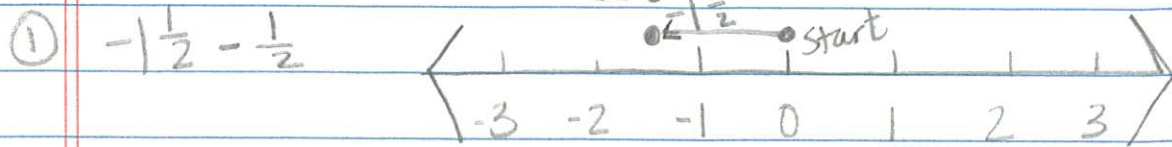
puzzle ⑤ Sum: $\frac{3}{4}$

Start $\rightarrow \frac{1}{2}(3) + \frac{2}{3}(2) = \frac{3}{6} + \frac{4}{6} = \frac{7}{6}$

$\frac{7}{6}(4) - \frac{3}{4}(6) = \frac{28}{6} - \frac{18}{6} = \frac{10}{6}$

continued on next page

pg. 271 12.3 Subtracting Rational Numbers



Hint: Remember when subtracting, you are adding the opposite

$$-1\frac{1}{2} + (-\frac{1}{2}) = -2$$

pg. 272 ③ Activity: Financial Literacy

Hint: deposits represent positive numbers (addition)
withdrawals represent negative numbers (subtraction)

pg. 274 12.3 practice

Hint: subtracting means add the opposite

$$\textcircled{1} \frac{4}{9} - (-\frac{2}{9}) = \frac{4}{9} + (\frac{2}{9}) = \frac{6}{9} \div 3 = \boxed{\frac{2}{3}}$$

pg. 275 ① activity → skip

② activity → see TE multiplying by inverse of 1

Tip: when multiplying or dividing (+) & (-) numbers

pg 278

Same sign
(positive solution)

$$\begin{aligned} (+) \times (+) &= (+) \\ (-) \times (-) &= (+) \\ (+) \div (+) &= (+) \\ (-) \div (-) &= (+) \end{aligned}$$

Chapter 12

different sign
(negative solution)

$$\begin{aligned} (+) \times (-) &= (-) \\ (-) \div (+) &= (-) \end{aligned}$$

$$\textcircled{1} \quad \frac{-8}{9} \left(\frac{-18}{25} \right) = \frac{-8 \times -18}{9 \times 25} = \frac{144}{225}$$

$$\textcircled{2} \quad -4 \left(\frac{9}{16} \right) = \frac{-4 \times 9}{1 \times 16} = \frac{-36}{16} = -2 \frac{4}{16} = -2 \frac{1}{4}$$

$$\textcircled{3} \quad -3 \frac{3}{7} \times 2 \frac{1}{2} = \frac{-24}{7} \times \frac{5}{2} = \frac{-120}{14} = -8 \frac{8}{14} = -8 \frac{4}{7}$$

$$\textcircled{4} \quad \frac{-2}{3} \div \frac{5}{9} = \frac{-2}{3} \times \frac{9}{5} = \frac{-18}{15} = -1 \frac{3}{5} = \boxed{-1 \frac{1}{5}}$$

$$\textcircled{5} \quad \frac{7}{13} \div (-2) = \frac{7}{13} \div \frac{-2}{1} = \frac{7}{13} \times \frac{1}{-2} = \boxed{\frac{7}{-26} \text{ or } \frac{-7}{26}}$$

$$\textcircled{6} \quad -5 \frac{5}{8} \div \left(-4 \frac{7}{12} \right) = \frac{-45}{8} \div \frac{-55}{12} = \frac{-45}{8} \times \frac{12}{-55} = \frac{540}{440} = 1 \frac{100}{440} = 1 \frac{5}{22}$$

optional: $\frac{-45}{8} \times \frac{12}{-55} = \frac{-9}{2} \times \frac{3}{-11}$
 cross simplify before multiply $\frac{8}{8} \times \frac{12}{-55} = \frac{2}{-11}$
 $= \frac{-27}{-22} = 1 \frac{5}{22}$

CH 14 Selected Solutions

Fair Game Review

pg. 303
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#1 $\frac{3}{18} \div 3 = \frac{1}{6}$ (Divide by GCF)

#8 $\frac{4}{10} = \frac{16}{40}$ ① Simplify each fraction

$$\frac{4 \div 2}{10 \div 2} = \frac{2}{5} \quad \frac{16 \div 8}{40 \div 8} = \frac{2}{5}$$

$\frac{2}{5} = \frac{2}{5}$ yes they are equivalent

#11

$$\frac{\text{Hawks}}{\text{All birds}} = \frac{12 \div 2}{58 \div 2} = \frac{6}{29}$$

#12 $\frac{d}{12} = -4$

means $d \div 12 = -4$

inverse of \div is \cdot (multiply)

$$12 \cdot \frac{d}{12} = -4 \cdot 12$$

multiply both sides by 12

$$d = -48$$

Check to see if solution works by plugging in

$$\frac{-48}{12} = -4$$

$$-48 \div 12 = -4 \checkmark$$

$$\# 18 \quad -23.4 = -1.3w$$

↑
multiplied

inverse is to divide

$$\frac{-23.4}{-1.3} = \frac{-1.3w}{-1.3}$$

$$\begin{array}{r} 18 \\ 1.3 \overline{) 23.4} \\ \underline{-13} \\ 104 \\ \underline{104} \\ 0 \end{array}$$

$$w = 18$$

#20 You and 3 friends = 4 people

$$4p = 35$$

4 people ↑ price per ticket ↑ total

$$\frac{4p}{4} = \frac{35}{4}$$

$$p = \$8.75$$

$$\begin{array}{r} 8.75 \\ 4 \overline{) 35.00} \\ \underline{-32} \\ 30 \\ \underline{-28} \\ 20 \\ \underline{20} \\ 0 \end{array}$$

14.1 Ratios and Rates

pg 305

(2) Activity

a) $\frac{\frac{1}{2} \text{ c}}{4 \text{ fl oz}}$

 $\frac{1}{2}$ cup of flour per 4 fl oz water

$$\begin{aligned} \frac{1}{2} \div 4 \\ \frac{1}{2} \div \frac{4}{1} \\ \frac{1}{2} \cdot \frac{1}{4} &= \frac{1}{8} \end{aligned}$$

OR



$\frac{1}{2}$ split 4 ways
each piece has a value of $\frac{1}{8}$

pg 307

a) $10 \text{ gal} \times \frac{22 \text{ mi}}{\text{gal}}$

Bought 10 gallons of gas. Truck gets 22 miles per gallon. How far can it go on 10 gallons?

$$\frac{10 \text{ gal}}{1} \times \frac{22 \text{ mi}}{1 \text{ gal}}$$

$$\frac{10}{1} \cdot \frac{22}{1} = 220 \text{ miles}$$

pg 308

8 to 14

1) $\frac{8}{14} \div 2 = \frac{4}{7}$

4) $\frac{\$2.50}{5 \text{ oz}}$

$2.50 \div 5$

$$\begin{array}{r} .50 \\ 5 \overline{) 2.50} \\ \underline{25} \\ 00 \end{array}$$

\\$0.50 per oz

8) $\frac{\$9.45}{5 \text{ notebooks}}$

$9.45 \div 5$

$$\begin{array}{r} 1.89 \\ 5 \overline{) 9.45} \\ \underline{5} \\ 44 \\ \underline{45} \\ 00 \end{array}$$

5 notebooks

\\$1.89 per notebook

14.2

p311

$$b) \frac{75 \text{ points}}{15 \text{ Q}} \quad 75 \div 15$$

$$15 \overline{) 75} \\ \underline{75} \\ 0$$

5 points per Q

$$\frac{70 \text{ points}}{14 \text{ Q}} \quad 70 \div 14$$

$$14 \overline{) 70} \\ \underline{70} \\ 0$$

5 points per Q

Yes, it is fair. Each person got 5 points per question.

p312

$$\# 2 \quad \frac{2}{3} \stackrel{?}{=} \frac{12}{18}$$

$$\frac{2}{3}$$

Method 1: Simplify

$$\frac{12 \div 6}{18 \div 6} = \frac{2}{3}$$

Yes, they are proportional

Method 2: Cross products

$$\frac{2}{3} = \frac{12}{18} \quad 3 \cdot 12 = 36$$

$$2 \cdot 18 = 36$$

Products are $=$, so they are proportional

$$\# 10 \quad \frac{32 \text{ notes}}{4 \text{ measures}} \stackrel{?}{=} \frac{12 \text{ notes}}{2 \text{ measures}}$$

Method 1

$$\frac{32}{4} = 8$$

$$\frac{12}{2} = 6$$

Not equal, Not proportional

Method 2

$$\frac{32}{4} = \frac{12}{2}$$

$$4 \cdot 12 = 48$$

$$32 \cdot 2 = 64$$

Not $=$, not prop

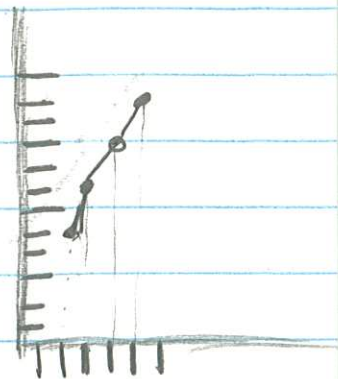
14.2

pg 313
-314

#1 A proportional relationship will be a straight line that goes through origin

x	2	3	4	5
y	5	7	9	11

$$(2, 5), (3, 7), (4, 9), (5, 11)$$



Not proportional (not going to origin and not a straight line)

#5

(1, 60) The car went 60 miles in 1 hour.

(2, 120) The car went 120 miles in 2 hours

(0, 0) The car went 0 miles in 0 hours.

p 316 14.3

$$a) \text{ batting average} = \frac{\text{hits (H)}}{\text{at Bats (A)}}$$

$$0.200 = \frac{x \text{ hits}}{50 \text{ times at bat}}$$

$$(50) \cdot 0.200 = \frac{x}{50} \cdot 50$$

Inverse operation
multiply by 50
on both sides

$$\begin{array}{r} \cdot 0.200 \\ \times \quad 50 \\ \hline 100.00 \end{array}$$

$$x = 10$$

Needs 10 hits

14.3

pg 318

$$\#1 \quad \frac{\# \text{ correct}}{\# \text{ in all}} = \frac{\text{test \%}}{100}$$

$$\frac{x}{50} = \frac{84}{100}$$

method #1: cross products

$$100x = (50)(84)$$

$$\frac{100x}{100} = \frac{4200}{100}$$

$$x = 42$$

$$\frac{x}{50} = \frac{84}{100}$$

$\xrightarrow{\div 2}$
 $\xleftarrow{\div 2}$

method #2

Find pattern

$$84 \div 2 = 42$$

$$\#7 \quad \frac{26}{z} = \frac{13}{22}$$

$$\frac{26}{z} = \frac{13}{22}$$

$\xleftarrow{\cdot 2}$
 $\xrightarrow{\cdot 2}$

$$13z = (26)(22)$$

$$13z = 572$$

$$z = 44$$

or find pattern

$$z = 44$$

p 322 14.4

$$1) \quad \frac{a}{40} = \frac{3}{10}$$

$$10a = (40)(3)$$

$$\frac{10a}{10} = \frac{120}{10}$$

$$a = 12$$

$$\frac{a}{40} = \frac{3}{10}$$

$\xleftarrow{\cdot 4}$
 $\xrightarrow{\cdot 4}$

$$3 \cdot 4 = 12$$

$$a = 12$$

14.4

pg 322

#6

$$\frac{8}{11} = \frac{4}{y+2}$$

cross products

$$(11)(4) = 8(y+2)$$

$$44 = 8y + 16$$

two step equation

$$8y + 16 = 44$$

$$-16 \quad -16$$

$$\frac{8y}{8} = \frac{28}{8}$$

$$y = 3.5$$

$$8 \overline{) 28.0}$$

$$\underline{24} \downarrow$$

$$40$$

$$\underline{40}$$

$$0$$

p 323

14.5

Antelope

$$\frac{61 \text{ miles}}{1 \text{ hour}} = \frac{? \text{ ft}}{? \text{ sec}}$$

$$(61 \text{ miles}) \left(\frac{5280 \text{ ft}}{\text{mi}} \right) = 322,080 \text{ ft}$$

$$\begin{array}{r} 15280 \\ \times 61 \\ \hline 5280 \\ 316800 \\ \hline 322,080 \end{array}$$

$$(1 \text{ hour}) \left(\frac{60 \text{ min}}{1 \text{ hr}} \right) \left(\frac{60 \text{ sec}}{1 \text{ min}} \right) = 3600 \text{ sec}$$

$$\frac{322,080 \text{ ft}}{3600 \text{ sec}} \quad 3600 \overline{) 322,080}$$

14.5 Practice

p 326

1) Find slope on a graph

Count $\frac{\text{rise}}{\text{run}}$ Start at (0,0) rise 4 units run 2 units $\frac{4}{2} = \frac{2}{1}$

2 point method

(0,0) (2,4)

 x_1, y_1 x_2, y_2

slope
(m) = $\frac{y_2 - y_1}{x_2 - x_1}$

$$\frac{4-0}{2-0} = \frac{4}{2} = \frac{2}{1}$$

Given
6) $m \leq \frac{1}{12}$

a) rise 4 ft

run 50 ft

$$\frac{4 \div 2}{50 \div 2} = \frac{2}{25}$$

rewrite

$$\frac{1}{12} = \frac{2}{24} ; \frac{2}{24} > \frac{2}{25}$$

b) Can adjust height or length
(or both)

14.6 Direct Variation

p327	Thumb	Wrist	Neck	Waist
	lin	$2(\text{thumb})$	$2(\text{wrist})$	$2(\text{neck})$
		$2(1)=2$	$2(2)=4$	$2(4)=8$

p330 14.6 Practice

$$K = \frac{y}{x}$$

(constant of proportionality)

equation: $y = Kx$ where K is a #
 (*relates to $y = mx + b$)
 in Algebra)

1) $K = \frac{y}{x}$
 $\frac{3}{1}, \frac{6}{2}, \frac{9}{3}, \frac{12}{4}$
 $3 \quad 3 \quad 3 \quad 3$

Yes it shows direct variation because all values have same K .

4) $y + 2 = x$
 $-2 \quad -2$

$$y = x - 2$$

No, it is not in format $y = Kx$

5) $\frac{3}{3}y = \frac{x}{3}$ (which is same as $\frac{1}{3}x$)

$$y = \frac{1}{3}x$$

Yes, it follows format $y = Kx$ $K = \frac{1}{3}$

14.6

p 330

#7

$$y = 8$$

$$x = 2$$

$$k = \frac{y}{x}$$

$$\frac{8}{2} = \frac{4}{1} = 4$$

$$k = 4$$

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$$\#2.) \quad 65\% = \frac{65}{100} = \boxed{\frac{13}{20}}$$

$$\#4.) \quad 250\% = \frac{250}{100} = \boxed{\frac{5}{2} \text{ or } 2\frac{1}{2}}$$

$$\#8.) \quad \frac{1}{5} = \frac{0.2}{5 \overline{)1.0}} = 0.2 \cdot 100 = \boxed{20\%}$$

$$\#11.) \quad 1\frac{2}{5} = \frac{7}{5} \quad \frac{1.4}{5 \overline{)7.0}} = 1.4 \cdot 100 = \boxed{140\%}$$

15.1 Percents and Decimals

pg. 333

① Activity

$$\textcircled{a} \quad 30\% = \frac{30}{100} \text{ per Cent.}$$

$$= \frac{3}{10} \text{ simplify}$$

$$= 0.3 \text{ fraction as a decimal}$$

page 334 15.1

② Activity

$$\textcircled{a} 13.5\% = \frac{13.5}{100} \text{ per cent}$$

$$= \frac{13.5 (10)}{100 (10)}$$

$$= \frac{135}{1000} = \boxed{0.135}$$

page 336 15.1 Practice

Write as a decimal

$$\# 2 \quad 160\% = \frac{160}{100} = 100 \overline{)160.0} \quad 1.6$$

$$160\% = \boxed{1.6}$$

$$\begin{array}{r} 1.6 \\ 100 \overline{)160.0} \\ \underline{-100} \\ 600 \\ \underline{-600} \\ 0 \end{array}$$

#6 decimal as percent

$$0.49 (100) = \boxed{49\%}$$

$$\# 11 \begin{array}{l} \text{fraction} \\ \text{decimal} \end{array} 84.95\% = \frac{8495}{10000} = \boxed{\frac{1699}{2000}}$$

$$\downarrow$$

$$= \boxed{0.8495}$$

page 337

15.2 Which number form is more common
Then find the greater

① Activity

@ Sales Tax = percent

$$7\% = \frac{7}{100} \quad \frac{1}{20} = \frac{5}{100}$$

$$\frac{7}{100} > \frac{5}{100}$$

7% is greater

② Activity: hint - write them all
as decimals

page 340

15.2 Practice - Write all numbers in
the same form

#1

0.06, 60%

rewrite

$$60\% = 0.6$$

compare 0.06

0.60

$$0.6 > 0.06$$

original
form

60% is greater

15.3 The Percent Proportion

page 344

#1 40% of 60 is what number?

$$\frac{\text{percent } 40}{100} = \frac{X^{\text{part}}}{60^{\text{Whole}}}$$

Cross multiply

$$\frac{40}{100} = \frac{X}{60}$$

$$100X = 2400$$

$$\frac{100X}{100} = \frac{2400}{100}$$

$$X = 24$$

24 is 40% of 60

#6 150% of what number is 18?

$$\frac{\text{percent } 150}{100} = \frac{18^{\text{part}}}{X^{\text{Whole}}}$$

$$150X = 1800$$

$$\frac{150X}{150} = \frac{1800}{150}$$

$$X = 12$$

15.4 The Percent Equation

page 347

#6

$$\boxed{\text{Part} = \text{Percent} \cdot \text{Whole}}$$

as a decimal

16 is what percent of 250

$$16 = ? \cdot 250$$

$$\boxed{* \begin{array}{l} 16 = 250X \\ \hline 16 = 250X \\ \hline 250 \quad 250 \end{array}}$$

$$0.064 = X$$

$$0.064(100) = 6.4$$

page 348

#1 What number is 35% of 80?

$$\text{Part} = \text{Percent} \cdot \text{Whole}$$

as a decimal

$$X = 0.35(80)$$

$$\boxed{X = 28}$$

#4 12% of what number is 48

$$48 = 0.12X$$

$$\frac{48}{0.12} = \frac{0.12X}{0.12}$$

$$400 = X$$

$$\boxed{400 = X}$$

page 352

Percent of Increase and Decrease

$$\text{percent of change} = \frac{\text{amount of change}}{\text{original change}}$$

$$\text{percent} = \frac{\text{new amount} - \text{original}}{\text{original}}$$

#4 125 invitations to 75 invitations

$$x = \frac{75 - 125}{125}$$

$$x = \frac{-50}{125}$$

$$x = -0.4 \text{ (100)} = -40 \text{ percent}$$

$$x = \boxed{40\% \text{ decrease}}$$

#6 7 players to 10 players

$$x = \frac{10 - 7}{7}$$

$$x = \frac{3}{7}$$

$$x = 0.4285... \stackrel{\text{(round)}}{\approx} 0.429 (100)$$

$$x = 42.9$$

$$\boxed{42.9\% \text{ increase}}$$

15.6 Discounts and Markups

pg. 356

$$\begin{array}{r} \# 5 \quad \text{Cost to store: } \$20 \quad 100\% \\ \quad \text{Markup: } 15\% \quad + 15\% \\ \hline \quad \quad \quad \quad \quad \quad 115\% \end{array}$$

$$20(1.15) = 23$$

\$23

15.7 Simple Interest

$$\text{Interest} = \text{Principal} \times \text{Rate} \times \text{Time}$$

(decimal form) (years)

$$I = PRT$$

page 357

① Activity

②

$$x = 100(0.06) \left(\frac{1}{2} \text{ year}\right) 0.5$$

6 months

$$x = 3$$

\$3

interest earned

\$103

balance end of 6 months

Find

page 360

Interest and Balance

$$I = PRT$$

#1 \$400 at 7% for 3 years

$$x = 400(0.07) 3$$

$$\begin{array}{r} \overline{\$84} \quad x = 84 \\ \hline \overline{\$484} \end{array}$$

find annual interest rate

page 360

#3

$$I = PRT$$

$$I = \$18, P = \$200, t = 18 \text{ months}$$

18 months = 1.5 years

$$18 = 200 \times (1.5)$$

$$\frac{18}{300} = \frac{300 \times}{300}$$

$$0.06 = x$$

$$0.06(100) = 6\%$$