

## OPTIONAL / EXTRA MATH 7 SEMESTER 1 STUDY GUIDE

USE THIS STUDY GUIDE TO PRACTICE BEFORE YOUR MATH EXAM. TRY THE PROBLEMS YOU NEED EXTRA PRACTICE ON AND CHECK WITH THE ANSWER KEY SENT HOME!

### CHAPTER 1: INTEGERS

Solve without using calculator.

a)  $-6 + (-7)$

$-13$

b)  $3 \cdot -2$

$-6$

c)  $10 - (-5)$

$15$

d)  $-72 \div (-12)$

$6$

e)  $-8 + 7 + 9$

$-8 + 16 = 8$

f)  $-4^2 \leftarrow$  opposite of  $4^2$

$-16$

g)  $-13 + 4$

$-9$

h)  $2 + 10$

$12$

i)  $-5(10)$

$-50$

j)  $11 + (-4)$

$7$

k)  $(-7)^2 \rightarrow -7 \cdot -7$

$49$

l)  $-9 + 18$

$9$

m)  $[6 + 3(2 + 5)] + -9$

$[6 + 3(7)] + -9$

$[6 + 21] + -9$

$27 + -9$

$18$

P  
E  
MD  
AS

n)  $12 \div 6 + (-3)^2 \cdot -2$

$12 \div 6 + 9 \cdot -2$

$2 + 9 \cdot -2$

$2 + -18$

$-16$

o)  $-36 \div (18) + 0 \div -2$

$-2 + 0 \div -2$

$-2 + 0$

$-2$

p)  $7 \cdot (-11) + 24 \div -8$

$-77 + 24 \div -8$

$-77 + -3$

$-80$

q)  $\frac{10 + (-6) \cdot -4}{-2}$

$\frac{10 + 24}{-2}$

$\frac{34}{-2}$

$-17$

$-17$

CHAPTER 2: RATIONAL NUMBERS

Solve without using calculator.

a) Write the mixed number as a decimal:  $5\frac{1}{6}$

$$5\frac{1}{6} \rightarrow 5.1\bar{6}$$

$$\begin{array}{r} 1.0000 \\ 6 \overline{) 1.0000} \\ \underline{-60} \phantom{00} \\ 40 \phantom{00} \\ \underline{-36} \phantom{00} \\ 40 \phantom{00} \\ \underline{-36} \phantom{00} \\ 40 \phantom{00} \\ \underline{-36} \phantom{00} \\ 40 \phantom{00} \end{array}$$

b) Write the decimal as a fraction in simplest form: 2.6

$$2.6 = 2\frac{6}{10} \div 2 = 2\frac{3}{5}$$

c)  $2\frac{1}{8} + (-3\frac{1}{2})$

$$\frac{17}{8} + \frac{-7 \cdot 4}{2 \cdot 4}$$

$$\frac{17}{8} + \frac{-28}{8} = \frac{-11}{8} = -1\frac{3}{8}$$

$$\begin{array}{r} 17 \\ \times 5 \\ \hline 85 \end{array} \quad \begin{array}{r} 13 \\ \times 3 \\ \hline 39 \end{array}$$

$$\begin{array}{r} 85 \\ + 39 \\ \hline 124 \end{array}$$

d)  $-5\frac{2}{3} + 2\frac{3}{5}$

$$\frac{-17 \cdot 5}{3 \cdot 5} + \frac{-13 \cdot 3}{5 \cdot 3}$$

$$\frac{-85}{15} + \frac{-39}{15} = \frac{-124}{15} = -8\frac{4}{15}$$

$$\begin{array}{r} 158 \\ \times 8 \\ \hline 120 \end{array}$$

e)  $-4\frac{1}{4} \cdot (\frac{3}{5})$

$$\begin{array}{r} 17 \\ \times 3 \\ \hline 51 \end{array}$$

$$-\frac{17 \cdot 3}{4 \cdot 5} = \frac{-51}{20} = -2\frac{11}{20}$$

f)  $-\frac{9}{2} \div -2\frac{3}{4}$

$$\frac{-9}{2} \div \frac{-11}{4}$$

$$\frac{-9}{2} \cdot \frac{4}{11} = \frac{18}{11} = 1\frac{7}{11}$$

g)  $-2.5 + (-13.072)$

$$\begin{array}{r} 13.072 \\ + 2.500 \\ \hline 15.572 \end{array}$$

$$-15.572$$

h)  $-3.6 - (-12.9)$

$$\begin{array}{r} 12.9 \\ - 3.6 \\ \hline 9.3 \end{array}$$

$$9.3$$

i)  $-1.7(-3.45)$

$$\begin{array}{r} 345 \\ \times 17 \\ \hline 2415 \\ + 3450 \\ \hline 5865 \end{array}$$

$$5.865$$

j)  $9.78 \div -0.3$

$$0.3 \overline{) 9.78}$$

$$\begin{array}{r} 32.6 \\ 3 \overline{) 97.8} \\ \underline{-96} \phantom{00} \\ 07 \phantom{00} \\ \underline{-60} \phantom{00} \\ 18 \phantom{00} \\ \underline{-18} \phantom{00} \\ 0 \end{array}$$

$$-32.6$$

CHAPTER 3: EXPRESSIONS AND EQUATIONS

Simplify the algebraic expression without using a calculator.

a)  $-5x + 12 + 2x + 20$   
 $-7x + 32$

b)  $w + 12 + 6(w + 2)$   
 $w + 12 + 6w + 12$   
 $7w + 24$

Solve the following equations without using a calculator.

c)  $-2.4 + w = 4.5$   
 $+2.4$        $+2.4$   
 $w = 6.9$

d)  $x + 3\frac{1}{3} = -4\frac{5}{6}$   
 $x + \frac{10}{3} = -\frac{29}{6} - \frac{10}{3}$   
 $x = -8\frac{1}{6}$

$-\frac{29}{6} + \frac{-10 \cdot 2}{3 \cdot 2}$   
 $-\frac{29}{6} + \frac{-20}{6}$   
 $-\frac{49}{6} = -8\frac{1}{6}$

e)  $\frac{2}{5}d = -6$   
 $\div \frac{2}{5}$        $\div \frac{2}{5}$   
 $d = -15$

$-\frac{6}{1} \div \frac{2}{5}$   
 KCF  
 $-\frac{6 \cdot 5}{1 \cdot 2} = -\frac{15}{1}$

f)  $\frac{k}{-4} = -\frac{1}{2} \cdot -\frac{4}{1} = \frac{4}{2} = 2$   
 $k = 2$

g)  $-6n = 72$   
 $\div -6$        $\div -6$   
 $n = -12$

h)  $7p + 10 = 24$   
 $-10$        $-10$   
 $7p = 14$   
 $\div 7$        $\div 7$   
 $p = 2$

i)  $-4g + 9g = 91$   
 $-13g = 91$   
 $\div -13$        $\div -13$   
 $g = -7$

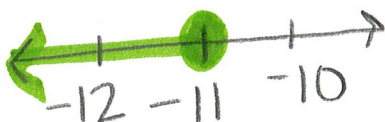
$\frac{13}{91}$

j)  $-3 - 6h = 21$   
 $+3$        $+3$   
 $-6h = 24$   
 $\div -6$        $\div -6$   
 $h = -4$

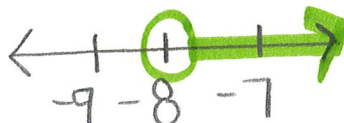
CHAPTER 4: INEQUALITIES

Solve and graph the solution of the following inequalities without using a calculator.

$$\begin{array}{l} \text{a) } k - 3 \leq -14 \\ +3 \quad +3 \\ \hline k \leq -11 \end{array}$$



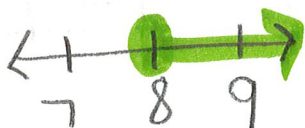
$$\begin{array}{l} \text{b) } -2 < \frac{u}{4} \\ \cdot 4 \quad \cdot 4 \\ \hline -8 < u \\ u > -8 \end{array}$$



$$\begin{array}{l} \text{c) } 3(g + 4) \geq -12 \\ \div 3 \quad \div 3 \\ \hline g + 12 \geq -12 \\ +12 \quad +12 \\ \hline g \geq 0 \end{array}$$



$$\begin{array}{l} \text{d) } -72 \geq -9j \\ \div -9 \quad \div -9 \\ \hline 8 \leq j \\ \text{Flip} \\ j \geq 8 \end{array}$$



$$\begin{array}{l} \text{e) } 5y + 7 < 22 \\ -7 \quad -7 \\ \hline 5y < 15 \\ \div 5 \quad \div 5 \\ \hline y < 3 \end{array}$$



$$\begin{array}{l} \text{f) } 7 > m + 18 \\ -18 \quad -18 \\ \hline -11 > m \\ m < -11 \end{array}$$



Write the word sentence as an inequality. You do not need to solve!

- g) The product of a number  $h$  and 12 is at least -48.

$$h \cdot 12 \geq -48 \quad \text{OR} \quad 12h \geq -48$$

- h) You sign up for a new phone plan. There is a monthly fee of \$20 and a charge of \$0.15 per text message. Your budget allows a maximum monthly total of \$40. Write an inequality that represents the number of text messages you can spend.

$$\begin{array}{l} \text{bill} \leq 40 \\ 20 + 0.15m \leq 40 \end{array}$$

- i) You earn \$8.50 per hour at your summer job. Write an inequality that represents the number of hours you need to work in order to earn more than \$500.

$$\begin{array}{l} \text{earnings} > 500 \\ 8.50h > 500 \end{array}$$



CHAPTER 5: RATIOS AND PROPORTIONS

Solve the following problems. You may use a calculator for this chapter! ☺

a) What is the unit price? → price per box

Boxes	3	6	9
Cost	\$3.60	\$7.20	\$10.80

$$\frac{\$3.60}{3 \text{ boxes}} \div 3$$

$$\frac{\$1.20}{1 \text{ box}}$$

b) Jenna runs 8 laps in 20 minutes. Find Jenna's average speed.

$$\frac{8 \text{ Laps}}{20 \text{ min}} \div 20$$

$$\frac{0.4 \text{ Laps}}{1 \text{ min}}$$

→ distance per minute  
0.4 Laps per minute

c) You can buy a 54 ounce bag of Skittles for \$6.98 or a 3.5 ounce box for \$2.40. Which option is the better buy?

$$\frac{\$6.98}{54 \text{ oz}} \div 54 = \$0.13$$

$$\frac{\$2.40}{3.5 \text{ oz}} \div 3.5 = \$0.69$$

54-ounce bag

d) You get \$27 to spend at the mall for doing 6 chores. Your friend gets \$36 for doing 8 chores. Are your pay rates equivalent (proportional)?

$$\frac{\$27}{6 \text{ chores}} \div 6 = \frac{\$36}{8 \text{ chores}} \div 8$$

yes they are equivalent

e) Find the unit rate with the specified units: laps per minute

Minutes	0	2	4	6
Laps	0	1	2	3

$$\frac{1 \text{ Lap}}{2 \text{ min}} \div 2 = \frac{0.5 \text{ Laps}}{1 \text{ min}}$$

$\frac{1}{2}$  Lap per minute

f) Determine if the rate forms a proportion: 45 marbles in 9 bags; 135 marbles in 27 bags

$$\frac{45 \text{ marbles}}{9 \text{ bags}} \div 3 = \frac{135 \text{ marbles}}{27 \text{ bags}} \div 3$$

yes!

g) Determine if the rate forms a proportion: 9 feet in 12 seconds; 16 feet in 45 seconds

$$\frac{9 \text{ ft}}{12 \text{ sec}} \div 3 = \frac{16 \text{ ft}}{45 \text{ sec}} \div 3$$

NO!

h) Solve the following proportion:

$$\frac{3}{7} = \frac{x}{28}$$

$$x = 12$$

i) Solve the following proportion:

$$\frac{9}{a} = \frac{14}{42}$$

$$14a = 378$$
$$\div 14 \quad \div 14$$
$$\boxed{a = 27}$$

j) The following graph shows a proportional relationship because:

1. It is a straight line
2. It goes through the origin (0,0)

k) Use the "Cost of Gelato" graph to find the unit rate.

$$\frac{\$3}{2 \text{ scoops}} = \frac{\$1.50}{1 \text{ scoop}}$$

\$1.50 per scoop

