

High School Math Prep SOLUTIONS

Strand A

Number Sense

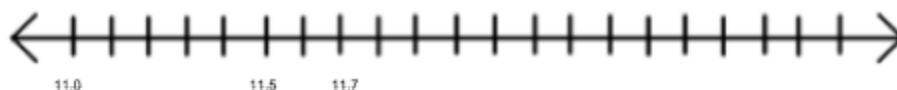
Solutions to Check for Understanding

A.1 Rounding Decimals and Place Value

- a) 1.965 - Find the number in the tenth place column (9) and look one place to the right for the rounding digit (6). Round if this number is greater than or equal to 5 and round down if it's less than 5. Solution = 2.0
- b) $9\frac{5}{12}$ as a whole number- 9 wholes and $\frac{5}{12}$ equivalent to 9.42. Rounding up to a whole number would be rounding to 9
- c) $19\frac{5}{7}$ as a whole number- 19.71 is your decimal. Rounding this to the nearest whole is 20.
- d) 3 is in the tens place. The number stands for 30 or 3 tens.

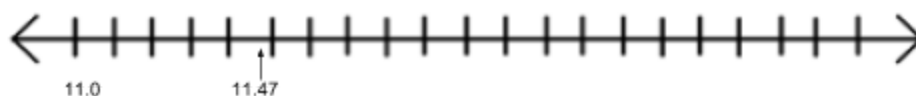
A.2 Decimals on a number line

a)



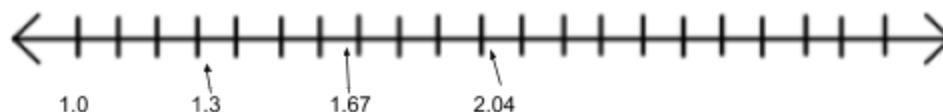
11.7 is greater than 11.5

b)



11.47 rounded to the nearest tenth is 11.5

c)



High School Math Prep SOLUTIONS

A.3 Finding Factors

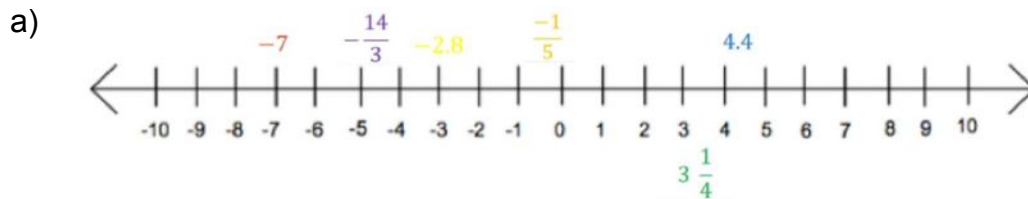
1. a) 64
 2×32
 $2 \times 2 \times 16$
 $2 \times 2 \times 2 \times 8$
 $2 \times 2 \times 2 \times 2 \times 4$
 $2 \times 2 \times 2 \times 2 \times 2 \times 2$
Express as an exponent: 2^6

1. b) 18
 3×6
 $3 \times 2 \times 3$
Express using an exponent: 2×3^2

2. a) 24
1 2 3 4 6 8 12 24

2. b) 96
1 2 3 4 6 8 12 16 24 32 48 96

A.4 Place numbers on a number line



A.5 Operations with Integers: Adding and Subtracting

- a) $8 + (-11) = -3$
- b) $-4 + 12 = 8$
- c) $-17 + (-6) = -23$
- d) $6 - (-8) = 14$
- e) $-10 - 14 = -24$
- f) $-16 - (-12) = -4$
- g) $(-7) + 9 + (-4) + 6 = 4$
- h) $15 + (-11) + 9 - (-5) = 18$

A.6 Operations with Integers: Multiplying and Dividing

- a) $-6 \times 8 = -48$
- b) $-11 \times -4 = 44$
- c) $-12 \times 3 = -36$
- d) $-12 \div 4 = -3$
- e) $-20 \div -5 = 4$
- f) $21 \div -7 = -3$
- g) $-72 \div 9 = -8$
- h) $-144 \div -12 = 12$

High School Math Prep SOLUTIONS

A.7 Order of Operations

- a) $10 \times (6 + 3) \div 2 = 45$
- b) $4 \times 6 \div (10 + 2) = 2$
- c) $8^2 + (13 - 4) \times 3 = 91$
- d) $(12 + 21 - 3) - 10 + 2^2 = 24$
- e) $10 \times (13 \times 6 - 8^2) - 4 = 136$

A.8 Order of Operations with Measurement

***Note* 1.6m = 160cm**

$$\begin{aligned} SA &= 2\pi r^2 + 2\pi r h \\ &= 2(\pi)(5)^2 + 2(\pi)(5)(160) \\ &= 2(\pi)(25) + 2(\pi)(5)(160) \\ &= 157.1 + 5026.5 \\ &= \mathbf{5183.6cm^2} \end{aligned}$$

$$\begin{aligned} V &= \pi r^2 h \\ &= (\pi)(5)^2(160) \\ &= (\pi)(25)(160) \\ &= \mathbf{12\ 566.4cm^3} \end{aligned}$$

A.9 Understand when to use different operations

- a) $217 + 392$
- b) $70 \div 14$
- c) 60×0.80
- d) $63 - 48$

High School Math Prep SOLUTIONS

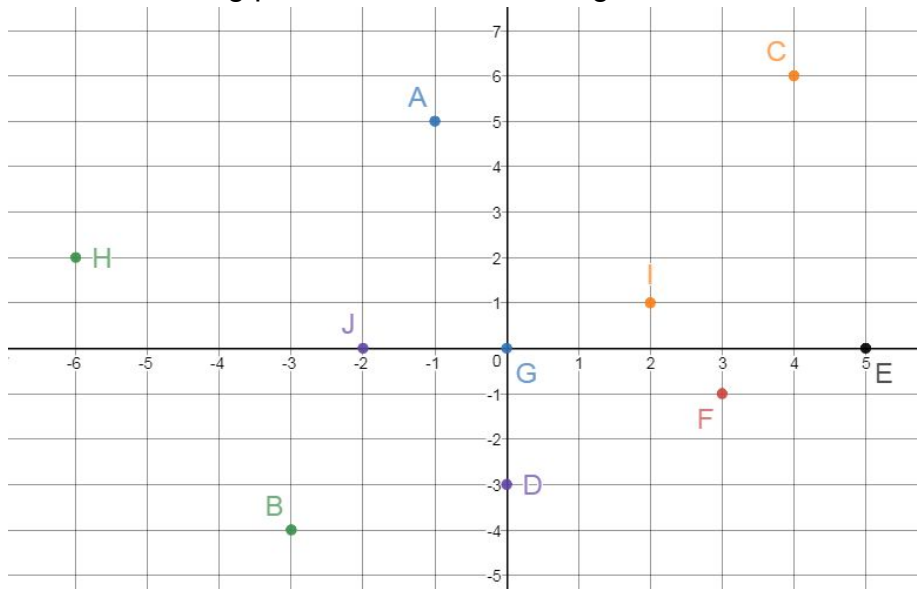
Strand B

B. Graphing, Proportions and Algebra

Solutions to Check for Understanding

B.1 Plotting points on a Cartesian Grid

a) Plot the following points on the Cartesian grid below:



b) Determine the coordinates of each point.

K (4,4) L (-7,5) M (0,8) N (10,-3) O (-4,-5)
P (0,0) Q (-2,0) R (2,-10) S (-8,-2) T (6,9)

B.2 Solve problems involving proportions

a) Determine how the proportion is increasing / decreasing:
 $35 / 15 = 2.33$ *all ingredients increase by a factor of 2.33

Determine new amount for each ingredient:

Sugar: $2.5 \text{ tsp} \times 2.33 = 5.83 \text{ tsp}$
Milk: $1.3 \text{ cups} \times 2.33 = 3.03 \text{ cups}$
Flour: $2.4 \text{ cups} \times 2.33 = 5.59 \text{ cups}$

High School Math Prep SOLUTIONS

b) $2 : 3 = x : 15$

3 **multiplied by 5** gives you 15 bags of sand
which means 2 **multiplied by 5** will give you 10 bags of stone.

c) $DE = 20$

$$\frac{AB}{AC} = \frac{DE}{DF}$$

*the key is to remember that with similar triangles, the corresponding sides are proportional to each other. You can set up ratio / fractions to represent the relationship and solve for the unknown.

d) $x = 5.5$;

Decide which relationships you can use to find the value of x. You will first need to find the value of EV...

$$\frac{CV}{FV} = \frac{EV}{TV} \quad \text{substitute in known values} \quad \frac{10}{16} = \frac{EV}{15} \quad \mathbf{EV = 9.4}$$

Now you can find the value of "x":

$$X = 15 - EV$$

$$X = 15 - 9.4$$

$$X = 5.6$$

As a quick check, you can see that the values make sense as relationship between the sizes of each side are consistent.

B.3 Solving Equations

a) Solve the following equations using guess and check:

i) $-4 + x = 10$

$x = 14$

ii) $x - 8 = -3$

$x = 5$

iii) $3x = 27$

iv) $\frac{x}{7} = 5$

High School Math Prep SOLUTIONS

$$x = 9$$

$$x = 35$$

b) Solve the following equations using the balance method:

i) $x - 38 = 75$

ii) $40 + x = -50$

$$\begin{aligned}x - 38 + 38 &= 75 + 38 \\x &= 113\end{aligned}$$

$$\begin{aligned}40 + x - 40 &= -50 - 40 \\x &= -90\end{aligned}$$

iii) $-13x = 65$

iv) $\frac{x}{16} = 7$

$$\begin{aligned}\frac{-13x}{-13} &= \frac{65}{-13} \\x &= -5\end{aligned}$$

$$\begin{aligned}\frac{x}{16} \times 16 &= 7 \times 16 \\x &= 112\end{aligned}$$

v) $2x + 3 = 15$

vi) $-4 + 5x = 16$

$$\begin{aligned}2x + 3 - 3 &= 15 - 3 \\2x &= 12 \\ \frac{2x}{2} &= \frac{12}{2} \\x &= 6\end{aligned}$$

$$\begin{aligned}-4 + 4 + 5x &= 16 + 4 \\5x &= 20 \\ \frac{5x}{5} &= \frac{20}{5} \\x &= 4\end{aligned}$$

vii) $\frac{x}{3} - 1 = 5$

viii) $43 = 3 + 5x$

$$\begin{aligned}\frac{x}{3} - 1 + 1 &= 5 + 1 \\ \frac{x}{3} &= 6 \\ \frac{x}{3} \times 3 &= 6 \times 3 \\x &= 18\end{aligned}$$

$$\begin{aligned}43 - 3 &= 3 - 3 + 5x \\40 &= 5x \\ \frac{40}{5} &= \frac{5x}{5} \\8 &= x\end{aligned}$$

High School Math Prep SOLUTIONS

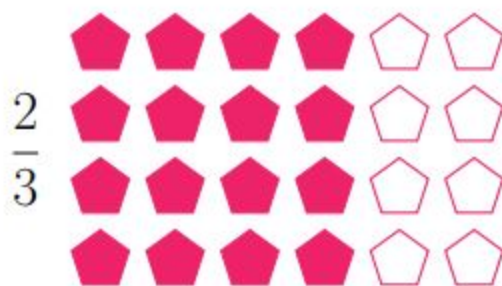
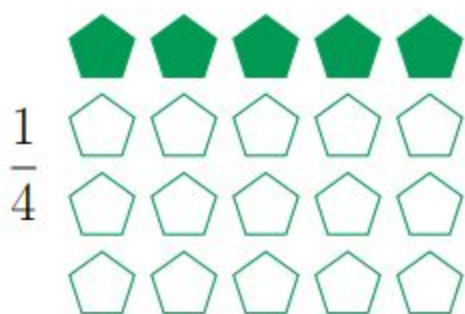
Strand

C. Fractions

Solutions to Check for Understanding

C.1 Representing numbers in different ways

a) Represent the following fractions



b) Understanding the different forms of a number

Fraction	Decimal	Percent (%)	Ratio
$\frac{1}{9}$	$0.11\bar{1}$	$11.\bar{1}$	1 : 9
$\frac{4}{9}$	$0.44\bar{4}$	$44.\bar{4}$	4 : 9
$\frac{1}{8}$	0.125	12.5	1 : 8

High School Math Prep SOLUTIONS

C.2 Multiplying fractions by a whole number

a) Multiplying fractions by a whole number

$$12 \times \frac{4}{3} \\ = 16$$

$$\frac{13}{7} \times 5 \\ = \frac{65}{7} = 9\frac{2}{7}$$

C.3 Adding/subtracting fractions

a) Evaluation the following:

$$\frac{11}{12} + \frac{1}{12} \\ = 1$$

$$\frac{7}{4} - \frac{8}{5} \\ = \frac{3}{20}$$

$$\frac{23}{2} + \frac{9}{4} \\ = \frac{55}{4} = 13\frac{3}{4}$$

C.4

Multiplying/dividing fractions

a) Evaluation the following

$$\frac{1}{2} \times \frac{5}{4} \\ = \frac{5}{8}$$

$$\frac{1}{6} \div \frac{8}{11} \\ = \frac{11}{48}$$

$$3\frac{2}{7} \div 1\frac{1}{4} \\ = \frac{92}{35} = 2\frac{22}{35}$$

C.5 Comparing fractions

a) Compare each pair of fractions using a $<$, $>$, or $=$

$$\frac{4}{9} < \frac{3}{4}$$

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

$$\frac{2}{5} < \frac{2}{3}$$

$$\frac{2}{9} < \frac{2}{8}$$

High School Math Prep SOLUTIONS

C.6 Mixed and improper fractions

a) Convert each mixed fraction to an improper fraction:

$$9\frac{1}{9} = \frac{82}{9}$$

$$3\frac{8}{9} = \frac{35}{9}$$

$$8\frac{7}{12} = \frac{103}{12}$$

$$7\frac{7}{9} = \frac{70}{9}$$

b) Convert each improper fraction to a mixed fraction:

$$\frac{32}{9} = 3\frac{5}{9}$$

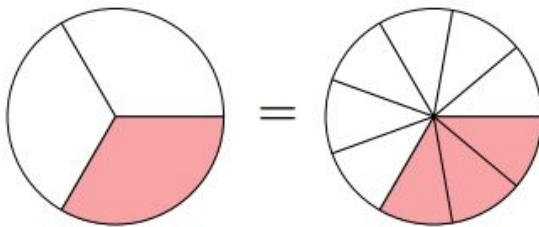
$$\frac{67}{12} = 5\frac{7}{12}$$

$$\frac{116}{15} = 7\frac{11}{15}$$

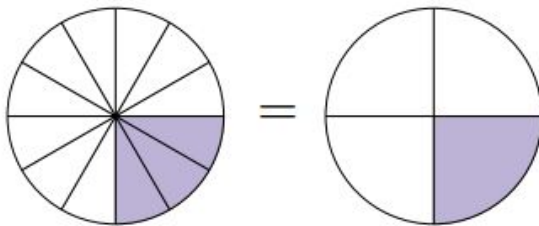
$$\frac{34}{15} = 2\frac{4}{15}$$

C.7 Equivalent fractions

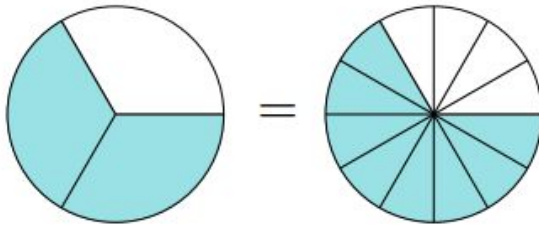
a) Shade the equivalent fraction and write the equivalent fraction:



$$\frac{1}{3} = \frac{3}{9}$$



$$\frac{1}{4} = \frac{3}{12}$$



$$\frac{2}{3} = \frac{8}{12}$$

High School Math Prep SOLUTIONS

b) Check mark the equations that show equivalent fractions

$$\frac{5}{11} = \frac{25}{55} \checkmark \quad \frac{5}{5} = \frac{10}{10} \checkmark \quad \frac{6}{9} = \frac{30}{45} \checkmark \quad \frac{8}{12} = \frac{32}{48} \checkmark$$

$$\frac{6}{11} = \frac{18}{33} \checkmark \quad \frac{3}{4} = \frac{9}{12} \checkmark \quad \frac{5}{9} = \frac{10}{18} \checkmark \quad \frac{6}{6} = \frac{30}{30} \checkmark$$

c) Find the missing numbers in the equivalent fractions below.

Instructions: Find the missing numbers in the equivalent fractions below.

$$\frac{2}{5} = \frac{8}{20}$$

4 ×

$$\frac{5}{7} = \frac{15}{21}$$

3 ×

$$\frac{1}{8} = \frac{4}{32}$$

4 ×

$$\frac{4}{12} = \frac{12}{36}$$

3 ×

$$\frac{8}{10} = \frac{32}{40}$$

4 ×

$$\frac{3}{10} = \frac{12}{40}$$

4 ×

$$\frac{1}{9} = \frac{2}{18}$$

2 ×

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

2 ×