Integer Operation

Adding/Subtracting
- Box each integer and the sign(s) in front.
- Change double negatives to positive if you need to.
- Then, do the SS or the DD!
    - SS = SAME (signs) SUM so add and keep the sign!
    - DD = DIFFERENT (signs) DIFFERENCE so subtract and keep the sign of the number with the largest absolute value.

Multiply/Divide
SAME SIGNS=POSITIVE
(-5) × (-5) = 25   (-5) / (-5)= 1
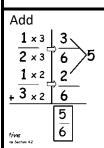
DIFFERENT SIGNS= NEGATIVE
(+5) × (-5) = -25   (-5) / (5) = -1

**Remember the friendship analogy for multiplying and dividing!

Fraction Operation

Add	Subtract		Multiply	Divide

Add

$$\frac{1 \times 3}{2 \times 3} = \frac{3}{6}$$
$$\frac{1 \times 2}{3 \times 2} = \frac{2}{6}$$
$$+ \frac{5}{6}$$

five
on Section 4.2

Subtract

$$6\frac{3}{4} - 4\frac{1}{2}$$

$$6\frac{3}{4} \qquad 6\frac{3}{4}$$
$$-4\frac{1 \times 2}{2 \times 2} \qquad 4\frac{2}{4}$$
$$\overline{\qquad 2\frac{1}{4}}$$

$$5\frac{1}{2} - 2\frac{3}{5}$$

$$4\,5\frac{1 \times 5}{2 \times 5} = \frac{5}{10} + \frac{10}{10} = \frac{15}{10}$$
$$-2\frac{3 \times 2}{5 \times 2} = \frac{6}{10} \qquad \frac{6}{10}$$
$$\overline{2} \qquad \overline{\frac{9}{10}}$$
$$2\frac{9}{10}$$

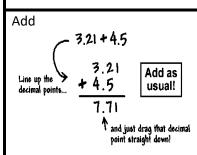**Multiply**

$$1\frac{3}{4} \times 2\frac{1}{2} = ?$$
$$\frac{7}{4} \times \frac{5}{2} = \frac{35}{8} = 4\frac{3}{8}$$

Divide

$$\frac{4}{5} \div \frac{2}{3}$$
$$\frac{4}{5} \times \frac{3}{2} = \frac{12}{10} = 1\frac{1}{5}$$

Decimal Operation

Add	Subtract	Multiply	Divide

Add

3.21 + 4.5

Line up the decimal points...
$$\begin{array}{r} 3.21 \\ + 4.5 \\ \hline 7.71 \end{array}$$
Add as usual!
and just drag that decimal point straight down!

Subtract

8.97 − 2.82

Line up the decimal points...
$$\begin{array}{r} 8.97 \\ - 2.82 \\ \hline 6.15 \end{array}$$
Subtract as usual!
and just drag that decimal point straight down!

Multiply

3.77 × 2.8 = ?

$$\begin{array}{r} 3.77 \ (2\,\text{decimal places}) \\ \times \quad 2.8 \ (1\,\text{decimal place}) \\ \hline 3016 \\ +754 \\ \hline 10.556 \ (3\,\text{decimal places}) \end{array}$$

Divide

$$0.08\overline{)7.224}$$

$$0.08\overline{)7.224} = 90.3$$
$$-72$$
$$024$$
$$-24$$
$$0$$

Order of Operation

(PEMDAS)

Do the operation(s) in **P**arentheses first.
Do all **E**xponents
Multiply or **D**ivide (order from left to right)
Add or **S**ubtract (order from left to right)

Unit Rate

120 miles in 6 hours

miles	hours
120	6
x	1

Percents

20% of 80

part	whole
20	100
x	80

part	whole
20 5÷	100
(16) 5÷	80

percent of 60 is 15

part	whole
x	100
15	60

part	whole
(25) 4 ÷	100
15 4÷	60

Solving 2 step equations/ inequalities

Ex.
$$9x + 3 = 21$$
$$ -3 \quad -3$$
$$\frac{9x}{9} = \frac{18}{9}$$
$$x = 2$$

Ex.
$$5 + \frac{x}{6} = 13$$
$$-5 \qquad -5$$
$$6\left(\frac{x}{6}\right) = (8)6$$
$$x = 48$$

Ex.
$$\frac{2}{3}x + 8 \leq 4$$
$$\phantom{\frac{2}{3}x} -8 \quad -8$$
$$\frac{3}{2} \cdot \frac{2}{3}x \qquad -4 \cdot \frac{3}{2}$$
$$x \leq \frac{-12}{2} = -6$$

Ex.
$$-17x - 11 \leq -45$$
$$ + 11 \quad +11$$
$$\frac{-17x}{-17} \qquad \frac{-34}{-17}$$
$$x \geq 2$$

Fraction/Decimal/Percent					
Fraction to decimal	Decimal to fraction	Fraction to percent	Percent to fraction	Percent to decimal	Decimal to percent
divide numerator by denominator or change denominator to 10, 100, 1000 and make equivalent fraction	Put number over it place value and simplify $.15 = \dfrac{15}{100} \dfrac{\div 5}{\div 5} = \dfrac{3}{20}$ The last digit is in the hundredths place.	Create an equivalent fraction with denominator 100 $\dfrac{12}{20}$ x5 $\dfrac{60}{100}$ 60%	Re-write the percent as a fraction over 100 and simplify $8\% \dfrac{8}{100} \dfrac{\div 4}{\div 4} = \dfrac{2}{25}$	Divide by 100 or move the decimal 2x to right remove percent	Multiply by 100 or move the decimal 2x to the left and add percent sign

Data

Mean- the average

$Mean\ (avg) = \dfrac{3+7+10+8+31+10+2}{7} = \dfrac{71}{7}$
↓
10.14

Range- difference between the highest and lowest value

3, 7, 10, 8, 31, 10, 2

$\begin{array}{r} 31 \\ -2 \\ \hline 29 \end{array}$

Mode- the number or numbers that occcur most often

Mode   3, 7, ⑩ 8, 31, ⑩ 2
↓
10

Median- the middle number of the data put in order

7 numbers

Median = 2, 3, 7, 8, 10, 10, 31
↓   ↑
8   middle

Median = 71

Lower half   Upper half

62   63   64   64   70 ✗ 72   76   77   81   81

Lower quarter   Upper quarter

Interquartile range: 77–64 = 13

$Q_1 = 64$ $Q_3 = 77$

LENGTH

Customary	Metric
1 mile (mi) = 1,760 yards (yd)	1 kilometer (km) = 1,000 meters (m)
1 yard (yd) = 3 feet (ft)	1 meter (m) = 100 centimeters (cm)
1 foot (ft) = 12 inches (in.)	1 centimeter (cm) = 10 millimeters (mm)

VOLUME AND CAPACITY

Customary	Metric
1 gallon (gal) = 4 quarts (qt)	1 liter (L) = 1,000 milliliters (mL)
1 quart (qt) = 2 pints (pt)	
1 pint (pt) = 2 cups (c)	
1 cup (c) = 8 fluid ounces (fl oz)	

WEIGHT AND MASS

Customary	Metric
1 ton (T) = 2,000 pounds (lb)	1 kilogram (kg) = 1,000 grams (g)
1 pound (lb) = 16 ounces (oz)	1 gram (g) = 1,000 milligrams (mg)

LINEAR EQUATIONS

Slope-intercept form	$y = mx + b$
Constant of proportionality	$k = \dfrac{y}{x}$

CIRCUMFERENCE

Circle	$C = 2\pi r$	or	$C = \pi d$

AREA

Triangle	$A = \frac{1}{2}bh$
Rectangle or parallelogram	$A = bh$
Trapezoid	$A = \frac{1}{2}(b_1 + b_2)h$
Circle	$A = \pi r^2$

VOLUME

Prism	$V = Bh$
Pyramid	$V = \frac{1}{3}Bh$

ADDITIONAL INFORMATION

Pi	$\pi \approx 3.14$	or	$\pi \approx \frac{22}{7}$
Distance			$d = rt$
Simple interest			$I = Prt$
Compound interest			$A = P(1 + r)^t$