Jeddah Knowledge International School

MATHEMATICS
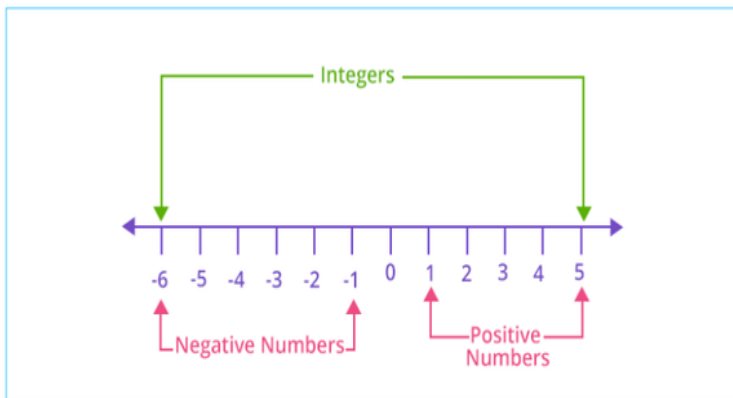## SUMMER Pack
2020-2021
Grade 6 Going To Grade 7

Name: _____

Section: _____

Part 1- Whole Numbers

What are Whole Numbers?

Whole Number Definition: Whole numbers are exact numbers like 0, 1, 2, 3, ... They are a set of positive integers along with 0 and exclude fractions and decimal numbers.

Order of Operations

Solve order of operation problems using PEMDAS. Remember this sentence for the correct order:

Please Excuse My Dear Aunt Sally.

P	( )	**Parentheses**
E	x^2	**Exponents**
M	x	**Multiplication**
D	÷	**Division**
A	+	**Addition**
S	−	**Subtraction**

Do each operation from **left to right**.

First, do what's in **Parentheses**	(8-3)	+	(2x4)²	x	2	-	(1+6)
Then, do the **Exponents**	5	+	8²	x	2	-	7
Next, **Multiply** and/or **Divide**	5	+	64	x	2	-	7
Last, **Add** and/or **Subtract**	5	+			128	-	7
					= 126		

Q1- Solve the following:

$2^3 \times (8 + 4 - 10)$

$2 \times (3^3 - 5 + 8)$

$(3 \times 2^2) \div (6 - 4)$

$3^3 \times (6 + 2 - 8)$

$(3^2 - 8 + 2) \times 4$

$(9^2 - 8 + 2) \div 5$

$(3 + 5^2 - 8) \times 4$

$(2^3 + 4) \div (9 - 6)$

Q2- Solve the following:

$2 \times (6 + 7 - 3 + 4) \times (9 - 8)$

$(6 - 4) \times (9 + 5 - 7) \times (3 + 2)$

$6 - 3 + 5 \times (8 + 4) \times (10 - 9)$

$6 - 3 + 9 \times (4 \times (8 + 2 - 10))$

$(8 + 7 - 10) \times (9 - 3 + 4) \times 2$

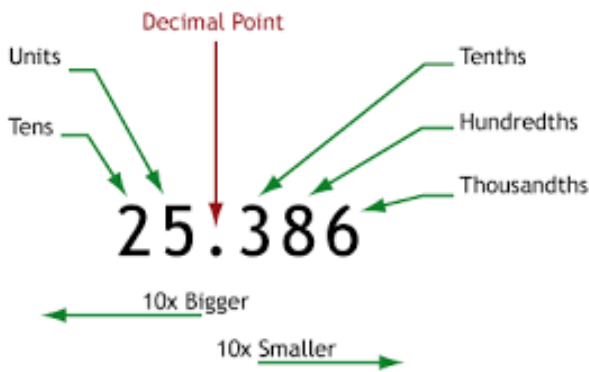$(10 - 9) \times (8 + 7 + 3 - 2) \times 6$

Q3: Word Problems

1. Jenny makes quilts. She can make seven quilts with 21 yards of material. How many yards of material would be required to make 21 quilts?

Working Area:

2. Brenden and Gaven were playing touch football against Cole and Freddy. Touchdowns were worth 7 points. Brenden and Gaven scored 7 touch downs. Cole and Freddy scored 9 touchdowns. How many more points did Cole and Freddy have than Brenden and Gaven?

Working Area:

Part 2- Decimal Numbers

Multiplying and Dividing by 10, 100 and 1000

Q1- Solve the following:

8.1 x 100 =	0.002 x 100 =	0.001 x 100 =
0.725 x 100 =	0.085 x 10 =	0.6 x 10 =
821.9 x 1000 =	0.056 x 10 =	96.08 x 1000 =
0.86 x 10 =	0.897 x 1000 =	0.6 x 10 =
31.9 x 10 =	8.78 x 1000 =	61.8 x 10 =
15.63 x 10 =	0.53 x 10 =	2.5 x 100 =
98 x 1000 =	0.09 x 10 =	2.737 x 100 =
0.088 x 1000 =	0.02 x 1000 =	0.001 x 100 =
0.96 x 10 =	62.58 x 1000 =	0.9 x 1000 =
453.7 x 1000 =	0.31 x 100 =	0.834 x 10 =
0.5 x 1000 =	9.33 x 10 =	1.4 x 1000 =

Q2- Operations with Decimal Numbers

I. $4.645+1.67$	**II.** $2-0.99$
III. 3.1×1.9	**IV.** $0.96\div0.12$
V. $7.1\ 0.96\div1000$	**VI.** 0.008×10000

Q3- Word Problems

1. Ashley is making cookies for her office end-of-year party

Each batch of cookies need 0.4 cups of sugar. If Ashley is making 13 batches of cookies, how much sugar dose she need?

2. Ashley found two boxes of sugar in the kitchen. The green box says 1.26 kg and the red box says 1.026 kg. Which box contains more sugar?

3. To make a miniature ice cream truck, you need tires with a diameter between 1.465 cm and 1.472 cm. Will a tire that is 1.4691 cm in diameter work? Explain why or why not.

4. Ellen wanted to buy the following items: A DVD player for $49.95, a DVD holder for $19.95 and a personal stereo for $21.95. Does Ellen have enough money to buy all three items if she has $90 with her?
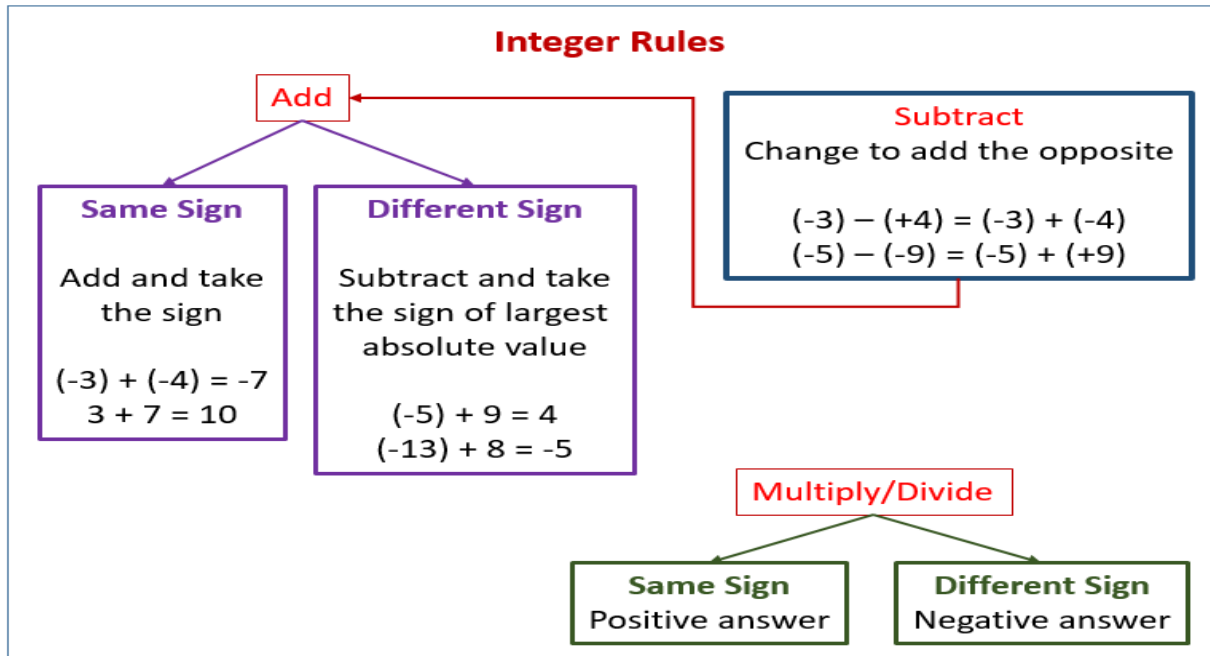
5. Melissa purchased $39.46 in groceries at a store. The cashier gave her $1.46 in change from a $50 bill. What did the cashier do wrong?

Part 3- Integers

Same sign keep and add different sign subtract. Take the sign of the bigger number then you will be exact!

Integer Rules

Add

Same Sign

Add and take the sign

$(-3) + (-4) = -7$
$3 + 7 = 10$

Different Sign

Subtract and take the sign of largest absolute value

$(-5) + 9 = 4$
$(-13) + 8 = -5$

Subtract
Change to add the opposite

$(-3) − (+4) = (-3) + (-4)$
$(-5) − (-9) = (-5) + (+9)$

Multiply/Divide

Same Sign
Positive answer

Different Sign
Negative answer

Q1- Solve the follwing:

$(-5) + (-4) =$ $(-4) × (-7) =$ $(+6) - (-2) =$

$(-3) + (+1) =$ $(-18) ÷ (-6) =$ $(-1) × (+5) =$

$(-2) × (-7) =$ $(+8) × (+3) =$ $(+9) + (-3) =$

$(+3) × (-1) =$ $(-4) - (-1) =$ $(+6) + (-5) =$

$(-3) + (+9) =$ $(-5) × (+3) =$ $(-3) ÷ (+3) =$

$(-3) × (+3) =$ $(-3) + (-6) =$ $(+8) + (-9) =$

Q2- Word Problems

1. A Seagull is flying 5 meters above sea level, a kayaker is paddling at sea level, a diver is swimming 2 meters below sea level, and a dolphin is 6 meters below sea level.

    a. write a integer to describe the height above sea level of each person or animal mentioned above.

    b. find the distance between the:

i. seagull and dolphin

ii. dolphin and kayaker

iii. diver and the dolphin

Working Area:

2. Team A is playing against Team B in a card game. This table shows the number of points scored by each team for the first 3 hands.

a. Find the difference in points scored by the teams in:

i) hand 1   ii) hand 2   iii) hand 3

Working Area:

|	Team A	Team B
Hand 1	-50	810
Hand 2	400	140
Hand 3	900	-300

3. Mt. Everest, the highest elevation in Asia, is 29,028 feet above sea level. The Dead Sea, the lowest elevation, is 1,312 feet below sea level. What is the difference between these two elevations?
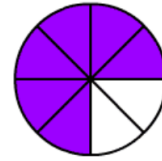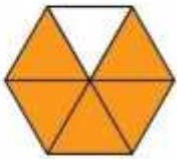
4. In Buffalo, New York, the temperature was -14°F in the morning. If the temperature dropped 7°F, what is the temperature now?
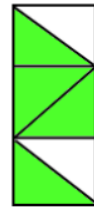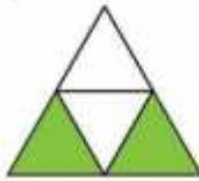
5. A submarine was situated 800 feet below sea level. If it ascends 250 feet, what is its new position?
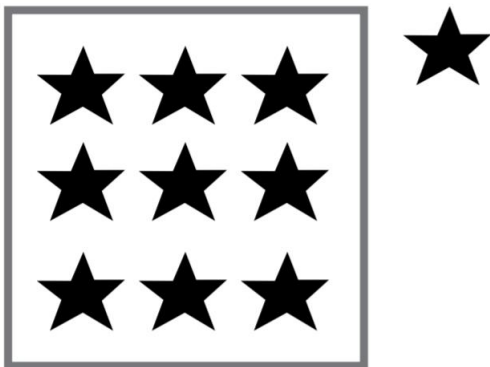
Part 4- Fractions of Shape

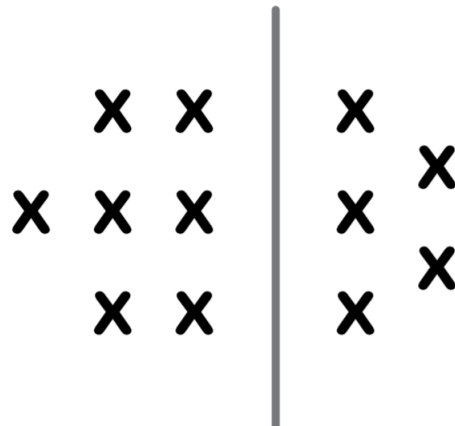What fraction of each shape has been shaded? Simplify if possible.
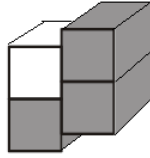
What fraction of the stars
are outside of the square?

What fraction of the **X** s
are to the right of the line?

Part 5- Fractions in words

You might see fractions in shops, on bills, in newspapers and recipes. It's useful to recognise fractions when they're written as words.

Fraction	Word	Plural
$\frac{1}{2}$	One half (a half)	halves
$\frac{1}{3}$	One third	thirds
$\frac{1}{4}$	One quarter	quarters
$\frac{1}{5}$	One fifth	fifths
$\frac{1}{6}$	One sixth	sixths
$\frac{1}{7}$	One seventh	sevenths
$\frac{1}{8}$	One eighth	eighths
$\frac{1}{9}$	One ninth	ninths
$\frac{1}{10}$	One tenth	tenths

Reading and writing fractions

1. Write each fraction in words.

a. $\frac{1}{2}$ _____

b. $\frac{1}{4}$ _____

c. $\frac{3}{4}$ _____

d. $\frac{1}{3}$ _____

e. $\frac{2}{3}$ _____

f. $\frac{1}{5}$ _____

g. $\frac{4}{5}$ _____

h. $\frac{2}{5}$ _____

i. $\frac{1}{10}$ _____

j. $\frac{9}{10}$ _____

2. Write each fraction in numbers.

a. a half _____

b. two quarters _____

c. three fifths _____

d. seven tenths _____

e. an eighth _____

f. five ninths _____

g. one quarter _____

h. five sixths _____

i. one third _____

j. five sevenths _____

Part 6- Fractions as division

$$\frac{2}{3} = 2 \div 3$$

$$\frac{5}{8} = 5 \div 8$$

$$\frac{9}{10} = 9 \div 10$$

Solve each fraction as though it were a division problem. Write your answer as a fraction.

Ex) $\frac{14}{3} = 14 \div 3$

$= 4\frac{2}{3}$

1) $\frac{88}{9} =$

2) $\frac{53}{5} =$

3) $\frac{92}{9} =$

4) $\frac{46}{7} =$

5) $\frac{35}{6} =$

6) $\frac{13}{2} =$

7) $\frac{78}{8} =$

8) $\frac{37}{8} =$

9) $\frac{57}{9} =$

10) $\frac{9}{2} =$

11) $\frac{21}{2} =$

Part 7- Equivalent Fractions

How to Write Equivalent Fractions

One Way: Use multiplication.

Multiply both the numerator and the denominator by the same nonzero number.

Example:

$$\frac{16}{20} = \frac{16 \times 2}{20 \times 2} = \frac{32}{40} \qquad \frac{16}{20} = \frac{32}{40} \quad \text{They are equivalent.}$$

Another Way: Use division.

Divide both the numerator and the denominator by the same nonzero number. Choose a common factor to divide by.

$$\frac{16}{20} = \frac{16 \div 4}{20 \div 4} = \frac{4}{5} \qquad \frac{16}{20} = \frac{4}{5} \quad \text{They are equivalent.}$$

4 is a common factor, so divide 16 and 20 by 4.

Q1-

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

$$\frac{\boxed{}}{11} = \frac{12}{44} \qquad \frac{4}{5} = \frac{12}{\boxed{}} \qquad \frac{6}{12} = \frac{24}{\boxed{}} \qquad \frac{4}{6} = \frac{8}{\boxed{}}$$

$$\frac{1}{5} = \frac{\boxed{}}{25} \qquad \frac{3}{\boxed{}} = \frac{6}{24} \qquad \frac{8}{\boxed{}} = \frac{16}{20} \qquad \frac{2}{\boxed{}} = \frac{10}{15}$$

Q2-

Determine which letter best represents an equivalent fraction.

1)

$$\frac{2}{16}$$

2)

$$\frac{16}{20}$$

3)

$$\frac{3}{8}$$

4)

$$\frac{5}{6}$$

A)

$$\frac{6}{16}$$

B)

$$\frac{10}{12}$$

C)

$$\frac{1}{8}$$

D)

$$\frac{4}{5}$$
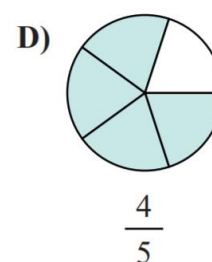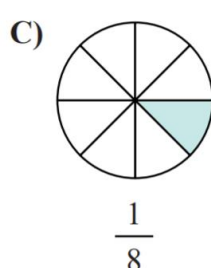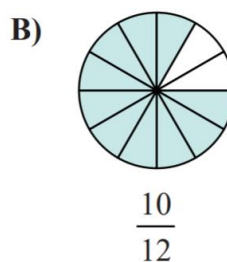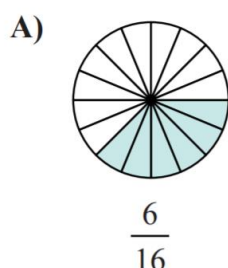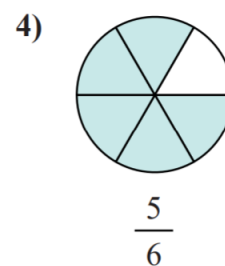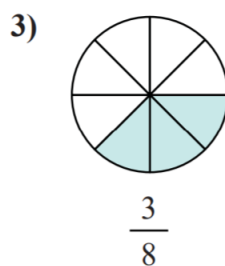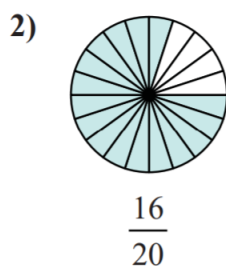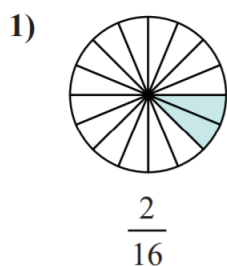
Part 8- Fractions in simplest form

How can you write fractions in simplest form?

A fraction is in **simplest form** if 1 is the only common factor of both the numerator and the denominator.

Example C

Write $\frac{18}{24}$ in simplest form.

One Way
Use divisibility rules.

Divide the numerator and the denominator by a common factor. Repeat until 1 is the only common factor.

$$\frac{18 \div 3}{24 \div 3} = \frac{6 \div 2}{8 \div 2} = \frac{3}{4}$$

18 and 24 are divisible by 3.

6 and 8 are divisible by 2.

Another Way
Divide by the GCF.

Divide the numerator and the denominator by their **greatest common factor (GCF)**.

$$\frac{18 \div 6}{24 \div 6} = \frac{3}{4}$$

The GCF of 18 and 24 is 6.

Simplify each fraction as much as possible.

Ex) $\dfrac{10 \div \mathbf{10}}{40 \div \mathbf{10}} = \dfrac{1}{4}$

1) $\dfrac{8}{64} = $ ____

2) $\dfrac{40}{64} = $ ____

3) $\dfrac{50}{60} = $ ____

4) $\dfrac{18}{27} = $ ____

5) $\dfrac{3}{24} = $ ____

6) $\dfrac{8}{12} = $ ____

7) $\dfrac{30}{80} = $ ____

8) $\dfrac{8}{48} = $ ____

9) $\dfrac{40}{48} = $ ____
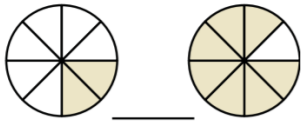
10) $\dfrac{16}{24} = $ ____
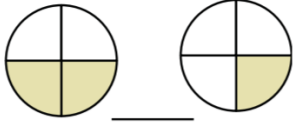
11) $\dfrac{24}{32} = $ ____
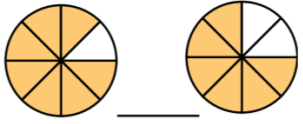
Part 9- Comparing Fractions
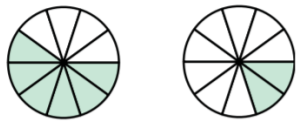
Q1-
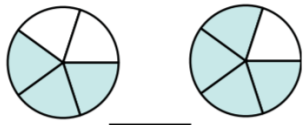
Compare the size of the fractions using < , > or =.
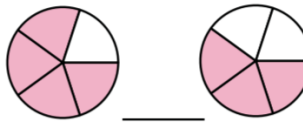
Ex) ___
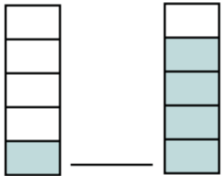
1) ___
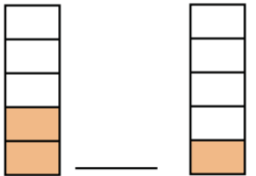
2) ___
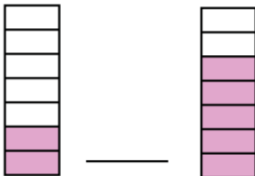
3) ___

4) ___

5) ___

6) ___

7) ___

8) ___

Q2- Compare the fractions below using < , >, or =.

A. $\dfrac{4}{5}$ ☐ $\dfrac{2}{3}$ B. $\dfrac{7}{10}$ ☐ $\dfrac{1}{4}$

C. $\dfrac{3}{10}$ ☐ $\dfrac{1}{5}$ D. $\dfrac{3}{9}$ ☐ $\dfrac{10}{11}$

E. $\dfrac{5}{6}$ ☐ $\dfrac{5}{8}$ F. $\dfrac{1}{2}$ ☐ $\dfrac{2}{3}$

G. $\dfrac{2}{6}$ ☐ $\dfrac{6}{9}$ H. $\dfrac{1}{8}$ ☐ $\dfrac{3}{9}$

Part 10- Improper Fractions and Mixed Numbers

A mixed number combines a whole number with a fraction. It is greater than one.

An improper fraction has a numerator that is larger than its denominator.

How to Write an Improper Fraction as a Mixed Number

Write $\frac{12}{5}$ as a mixed number.

Divide the numerator by the denominator.

The quotient is the whole number in the mixed number.

$$5\overline{)12}$$
$$-10$$
$$2$$

$2\frac{2}{5}$

The remainder is the numerator. The denominator stays the same.

$$\frac{12}{5} = 2\frac{2}{5}$$

How to Write a Mixed Number as an Improper Fraction

Multiply the denominator by the whole number. $3\frac{2}{5}$

$5 \times 3 = 15$

Then add the numerator. $15 + 2 = 17$

Write this number for the numerator. $\longrightarrow \frac{17}{5}$
Use the original denominator.

$$3\frac{2}{5} = \frac{17}{5}$$

Q1) Write each mixed number as an improper fraction.

a) $3\frac{1}{2}$ _____

b) $2\frac{3}{4}$ _____

c) $6\frac{6}{7}$ _____

d) $3\frac{5}{8}$ _____

e) $4\frac{4}{5}$ _____

f) $7\frac{2}{3}$ _____

Q2) Write each improper fraction as a mixed number in its simplest form.

a) $\frac{20}{5}$ _____

b) $\frac{18}{4}$ _____

c) $\frac{35}{9}$ _____

d) $\frac{19}{6}$ _____

e) $\frac{34}{8}$ _____

f) $\frac{43}{4}$ _____

Part 11- Adding and Subtracting Fractions

Always remember that fractions with the same denominators can only be added.

Step 1: Make sure that the denominators are the same. If not, then find the LCD.

Step 2: Once denominators are the same then subtract the numerators.

Step 3: Leave your answer in simplest form, if instructed.

Q1) Subtraction of Fractions.

a) $1\frac{7}{8} - \frac{4}{8} =$

b) $\frac{13}{16} - \frac{7}{16} =$

b) $\frac{2}{3} - \frac{4}{7} =$

c) $\frac{4}{12} - \frac{1}{6} =$

d) $3\frac{5}{8} - 2\frac{3}{4} =$

e) $5\frac{2}{5} - 1\frac{1}{10} - \frac{3}{4} =$

Q2) Addition of Fractions.

a) $\frac{3}{5} + \frac{2}{5} =$

b) $\frac{2}{7} + \frac{3}{7} =$

c) $\frac{3}{8} + \frac{3}{4} =$

d) $\frac{1}{2} + \frac{1}{3} =$

e) $1\frac{1}{6} + 2\frac{1}{3} =$

f) $\frac{2}{3} + 2\frac{5}{7} + \frac{17}{21} =$

Q3. Look at the picture below and answer the following.

a. What is the total amount of garlic powder, dry mustard and paprika?

----

b. How much olive oil and sugar would you need to make 8 servings?

Recipe for Salad Dressing

$\frac{3}{4}$ cup olive oil $\frac{1}{2}$ tsp. garlic powder

$\frac{1}{4}$ cup vinegar $\frac{1}{2}$ tsp. dry mustard

$\frac{3}{4}$ tsp. salt $\frac{1}{2}$ tsp. paprika

$\frac{1}{4}$ tsp. sugar

Put all ingredients into a pint jar
and shake well. Refrigerate.
Makes 4 servings.

Q4. Word Problems:

1. In a class of twenty-seven students, twelve are boys. What part of the class consists of boys?

2. Jenny completed four-fifths of her summer reading assignment. Her classmate Antonio completed seven-eighths of his assignment, and classmate Jerry completed three-fourths of his assignment. Which student read the least? Which student read the most? Which student fell in the middle? (Show all work.)

    Least:

    Most:

    Middle:

3. There are 61 centimetres of liquorice to be shared equally among 7 people. What length of liquorice will each person get?

Part 12- Multiplying and Dividing Fractions

Multiplying Mixed Numbers with Fractions

You can multiply a mixed number with a fraction by changing the mixed number into an improper fraction first. Follow these steps:

Example: $1\frac{2}{3}$ x $\frac{1}{6}$ ← numerator
← denominator

1. Multiply the whole number by the denominator. Then add the product to the numerator. Write the answer on top of the denominator.

$1\frac{2}{3}$ Then $\frac{3 + 2}{3}$ = $\frac{5}{3}$

multiply — add the result — The numerator — The denominator

2. Now we change $1\frac{2}{3}$ x $\frac{1}{6}$ to $\frac{5}{3}$ x $\frac{1}{6}$

3. Multiply a fraction with a fraction by multiplying the numerator with the numerator and the denominator with the denominator.

$$\frac{5}{3} \times \frac{1}{6} = \frac{5 \times 1}{3 \times 6} = \frac{5}{18}$$

- When multiplying fractions, they do NOT need to have a common denominator.
- To multiply two (or more) fractions, multiply across, numerator by numerator and denominator by denominator.
- If the answer can be simplified, then simplify it.

Q1- Multiply:

a) $\frac{3}{4} \times \frac{1}{5} =$

b) $\frac{2}{3} \times \frac{5}{7} =$

c) $\frac{4}{7} \times \frac{5}{6} =$

d) $2\frac{1}{4} \times 3\frac{1}{5} =$

e) $4\frac{3}{4} \times 2\frac{1}{5} =$

f) $3\frac{2}{3} \times 1\frac{4}{7} =$

Q2- Solve word problem below.

g) Two thirds of Mrs. Nikkel's class prefer chocolate ice cream to vanilla. She has 30 students in her class. How many students prefer chocolate?

Fraction Rules!

Dividing:

1. Find the reciprocal of the second fraction. That means, flip the second fraction over!

$$\frac{3}{8} \div \frac{4}{9} \quad \Updownarrow \quad \frac{3}{8} \div \frac{9}{4}$$

2. Change the division to multiplication.

$$\frac{3}{8} \times \frac{9}{4}$$

3. Follow the multiplication rules: Cross simplify if possible. Multiply straight across!

$$\frac{3}{8} \times \frac{9}{4} = \boxed{\frac{27}{32}}$$

Dividing Fractions

$$\frac{3}{4} \div \frac{2}{7}$$

Keep	Change	Flip	
$\frac{3}{4}$	$\times$	$\frac{7}{2}$	$= \frac{21}{8}$

Q3. Find the reciprocal of the following fractions.

Fraction	Reciprocal		Fraction	Reciprocal
$\frac{3}{5}$			$\frac{1}{2}$	
$\frac{8}{12}$			9	

Q4- Solve the following:

a) $\frac{3}{4} \div \frac{2}{3} =$

b) $\frac{1}{3} \div \frac{2}{3} =$

c) $\frac{1}{4} \div \frac{1}{2} =$

d) $\frac{1}{3} \div 3\frac{1}{3} =$

e) $1\frac{2}{3} \div 2\frac{1}{2} =$

f) $3\frac{1}{5} \div 1\frac{1}{2} =$

Part 13- Percentages, Fractions and Decimals

Writing Percents as Fractions

Percent	Fraction	Simplest From
20%	$\dfrac{20 \div 20}{100 \div 20}$	$\dfrac{1}{5}$
35%	$\dfrac{35 \div 5}{100 \div 5}$	$\dfrac{7}{20}$
110%	$\dfrac{110 \div 10}{100 \div 10}$	$\dfrac{11}{10}$

Writing Decimals as Percents

$D \rightarrow P$ Right $P \rightarrow D$ Left

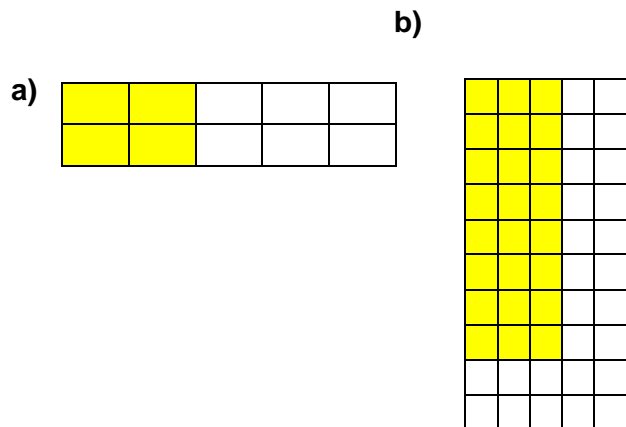| Decimal		Percent
0.43	$\dfrac{43}{100}$	43%
0.34		34%
0.05		5%

Right
A B C D E F G H I J K L M N O P Q R S T U V W X Y Z
Left

Q1. Convert fractions, percentages and decimals. Then simplify the fraction if needed

Fractions(Simplest form)	Percentages	Decimals
		0.66
	72%	
		0.4
$\dfrac{3}{8}$		
	8%	

Q2. What fraction is shaded? Simplify if possible. Re write as decimal and percentage.

Fraction   Decimal   Percentages   **b)**

a) -----------   -----------   --------------   **a)**

-----------   -----------   --------------

b) -----------   -----------   -----------

-----------   --------- -----------
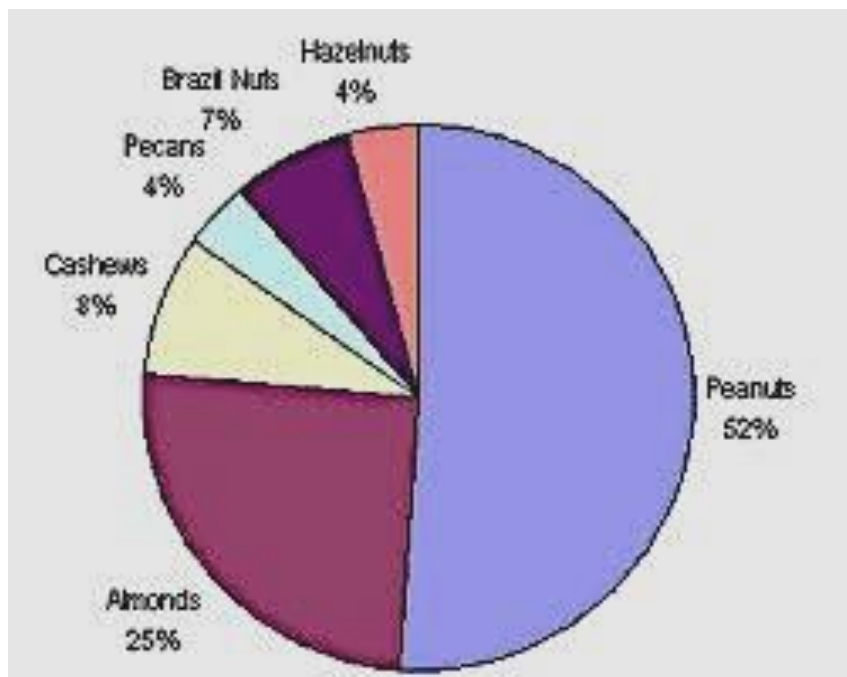
For questions 3 to 5, use the pie chart below:

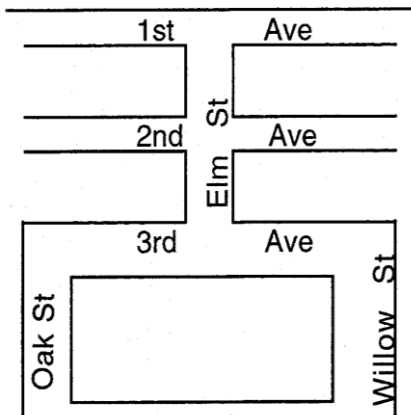Q3. The pie chart shows favourite nuts of 60 teachers. How many teachers like almonds?

Q4. Which two nuts represent 60% of the chart?

Q5. How many more like peanuts than Brazil nuts.

Part 14- Lines and Angles

Q1. Name two streets that are parallel and two pairs of streets that are perpendicular.

Parallel streets:

_____

_____

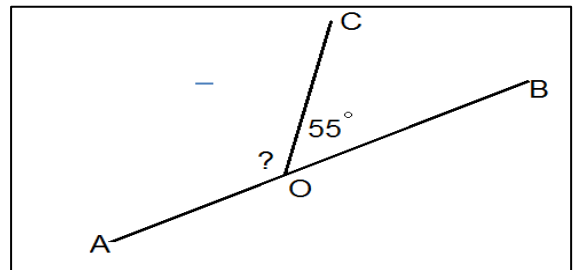Perpendicular streets:

_____ and

_____

_____ and _____

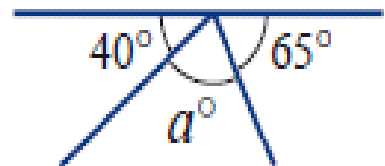**Q2.** Find the missing angle and name the given angle.

∠ AOC = _____

   Name: _____

   _____

Q3. Find the missing angles and give a reason.

a) Reason : _____

   a° = _____

b) Reason : _____

   a° = _____

c) Reason :_____

   a° = _____
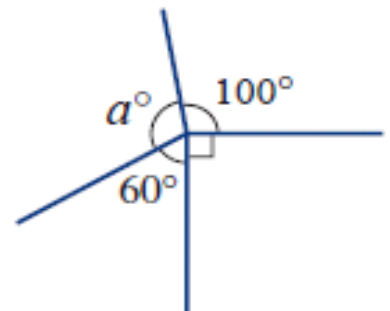
$60°$ $a°$
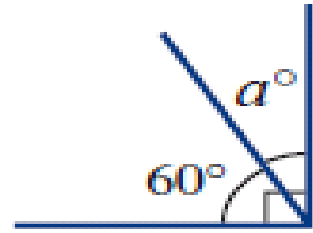
Special angles

Q4. Classify the following angles.
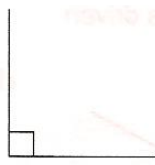
a

b
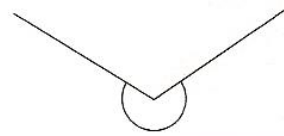
c

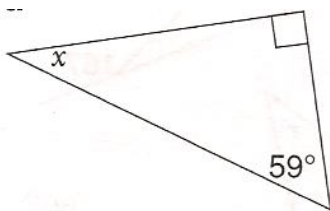--------------------   -----------------------   ------------------------

Angles in triangles

Q5. Find the missing angles in each triangle. Give a reason.

x

59°

Q

m

51° P

36°

R

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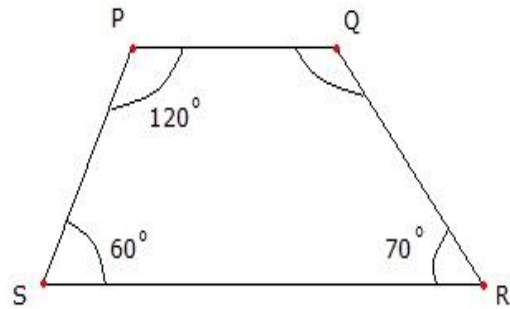---   ---
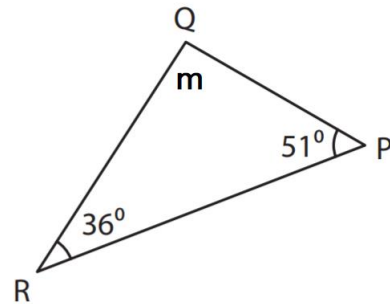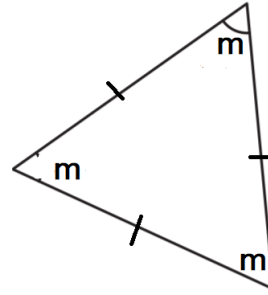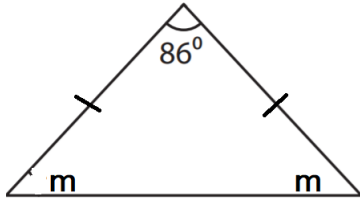
Angles in quadrilaterals

Q6.   Find the missing angles and name the other three given angle.

$\angle$ PQR = _____

Name: _____

_____

_____

_____

Challenge yourself with the word problems below:

1. A salesman bought a case of 48 backpacks for $576. He sold 17 of them for $18 at the swap meet, and the rest were sold to a department store for $25 each. How much was the salesman's profit?

Working Area:

2. A moving company is hired to take 578 clay pots to a florist shop. The florist will pay the moving company a $200 fee, plus $1 for every pot that is delivered safely. The moving company must pay the florist $4 each for any pots that are lost or broken. If two pots are lost, four pots are broken, and the rest are delivered safely, how much should the moving company be paid?

Working Area:

Open-ended Questions

1. Place the digits 1, 2, 3, 4, and 5 in these circles so that the sums across and vertically are the same. Describe the strategy you used to find your solution(s)
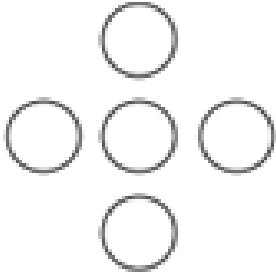
2. The product of two whole numbers is 96 and their sum is less than 30. What are the possibilities for the two numbers?

3. Sally and Jim each have a bag of hard candy. Sally said, "Jim, if you give me 5 pieces of candy from your bag, I'll have as many pieces as you." Jim laughed and answered, "No, you give me 5 of yours and I'll have twice as many as you." How many pieces did they each have to begin with?

4. I look like this: __ . __ __
    - My tenths digit is twice my hundredths digit.
    - My ones digit is equal to the sum of my tenths and hundredths digits.
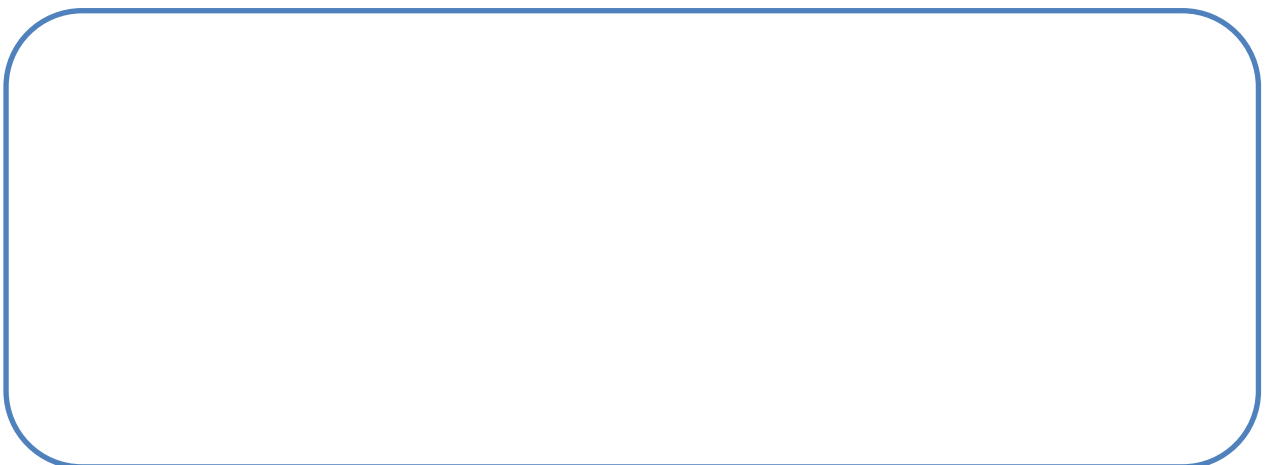   - My hundredths digit is even and greater than zero.

    What number am I?

5. I look like this: __ __ __ . __ __
    - My hundreds digit equals the sum of my tenths and ones digits.
    - My hundredths digit is one more than my hundreds digit.
    - One of my digits is zero.
    - My tenths and ones digits are odd and equal.
    - My overall value is less than 500.

    What number am I?

End of Summer Pack