Sail into Summer with Math!

For Students Entering Math 6

This summer math booklet was developed to provide students in kindergarten through the eighth grade an opportunity to review grade level math objectives and to improve math performance.

Math 6 Summer Mathematics Packet

Table of Contents

Write Numbers in Words and Digits

Hints/Guide:

In order to read numbers correctly, we need to know the order of each place value. The order is the following:

1,000,000 is one million	100,000 is one hundred thousand
10,000 is ten thousand	1,000 is one thousand
100 is one hundred	10 is ten
1 is one	0.1 is one tenth
0.01 is one hundredth	0.001 is one thousandth

So, the number 354.67 is read as three hundred fifty four and sixty-seven hundredths and 3,500,607.004 is read as three million, five hundred thousand, six hundred seven and four thousandths. Please remember that the word "and" indicates and location of the decimal point in mathematics and should not be used anywhere else (for example, it is inappropriate to read 350 as three hundred and fifty, because "and" means a decimal point). Also, the term "point" in mathematics is a geometry term and should not be used in naming numbers (for example, 3.5 is not three "point" five, but rather three and five tenths).

Exercises:

Write the number name:

1. 560.08 _____
2. 7.016 _____
3. 24.47 _____
4. 6,003 _____
5. 3,005,600.07 _____

Write the number the name represents:

6. Forty-five thousandths _____
7. Seventeen and seven hundredths _____
8. Five million, three hundred thousand, twenty-nine and six tenths _____
9. Six million and five thousandths _____
10. Two hundred eight thousand, four _____

Order Decimals

Hints/Guide:

To compare decimals and list them from least to greatest, it is easier to compare decimals that are the same place value, so one process we can use to compare decimals is to include trailing zeros to make all of the decimals that same place value. For example, to put the following in order from least to greatest:

.3, 1.61, .006, .107 is easier to compare as:

0.300, 1.610, 0.006, 0.107

to achieve 0.006, 0.107, 0.300, 1.610

and then return to the original form: 0.006, 0.107, 0.3, 1.61

Exercises:

List each group of numbers in order from least to greatest:

1. 20, 4, .6, .08

_____

2. 246.8, 248.6, 244.9, 246.5

_____

3. 1.03, 2.4, .89, .987

_____

4. 14.8, 2.68, .879, 8.47

_____

5. 5.3, 5.12, 5.38, 5.29

_____

6. 54.89, 56.3, 58.1, 52.98

_____

7. 4, .006, .8, .07

_____

8. 297, 3.456, 64.4, 7.24

_____

9. 794, 793.8, 794.65, 794.7

_____

10. 9, 6.7, 7.24, 14

_____

11. 4.2, 4.19, 4.07, 4.3

_____

12. 3.75, 6.7, 3.8, .45

_____

Add and Subtract Whole Numbers

Hints/Guide:

The key in adding and subtracting whole numbers is the idea of regrouping. If a column adds up to more than ten, then the tens digit of the sum needs to be included in the next column. Here is an example of the steps involved in adding:

$$\begin{array}{r} {\scriptstyle 1} \\ 346 \\ +\ 157 \\ \hline 3 \end{array} \quad \text{to} \quad \begin{array}{r} {\scriptstyle 1} \\ 346 \\ +\ 157 \\ \hline 03 \end{array} \quad \text{to} \quad \begin{array}{r} \\ 346 \\ +\ 157 \\ \hline 503 \end{array}$$

Because 6 + 7 = 13, the 3 is written in the ones digit in the solution and the 1 is regrouped to the tens digit. Then, 1 + 4 + 5 = 10, the 0 is written in the tens digit of the solution and the 1 is regrouped to the hundreds place of the problem. Finally, since 1 + 3 + 1 = 5, the solution is 503.

For subtraction, regrouping involves transferring an amount from a higher place value to lesser place value. For example:

$$\begin{array}{r} {\scriptstyle 3\,1} \\ 3\not{4}6 \\ -\ 157 \\ \hline 9 \end{array} \quad \text{to} \quad \begin{array}{r} {\scriptstyle 2\,13} \\ 3\not{4}6 \\ -\ 157 \\ \hline 89 \end{array} \quad \text{to} \quad \begin{array}{r} {\scriptstyle 2} \\ 3\not{4}6 \\ -\ 157 \\ \hline 189 \end{array}$$

Because 7 cannot be taken from 6 in the set of whole numbers, we must regroup 1 ten to create 16 - 7, which is 9. Then, since we have taken 1 ten, the 4 has become 3, and we must take 1 from the 3 to create 13, and 13 - 5 = 8. Finally, we have 2 hundreds remaining, and 2 - 1 = 1, so the solution is 189.

Exercises: Solve: No Calculators!

1. $\begin{array}{r} 6{,}496 \\ 4{,}113 \\ +\ 3{,}608 \\ \hline \end{array}$

2. 54,398 + 64,508 =

3. $\begin{array}{r} 3{,}254 \\ 754 \\ +\ 690 \\ \hline \end{array}$

4. $\begin{array}{r} 54{,}678 \\ +\ 7{,}123 \\ \hline \end{array}$

5. $\begin{array}{r} 98{,}455 \\ -\ 9{,}770 \\ \hline \end{array}$

6. 14,789 - 908 =

7. $\begin{array}{r} 38{,}904 \\ -\ 9{,}878 \\ \hline \end{array}$

8. 908 - 774 =

9. $\begin{array}{r} 6{,}996 \\ -\ 456 \\ \hline \end{array}$

Multiply and Divide Whole Numbers

Hints/Guide:

To multiply whole numbers, we must multiply the first number by one digit of the second number. The key is that when multiplying by each digit we must remember the place value of the number we are multiplying by:

```
  534
x  46
 3204
21360
24562
```

So we first multiply 534 by 6 to get 3204 (This is done by regrouping digits similar to adding, so 6 x 4 = 24, the 4 is written down and the 2 is added to the next product). Next, a zero is placed in the ones digit because when multiplying by the 4 in 46, we are multiplying by the tens digit, or 40. Next, we multiply 534 x 4 to get 21360. Finally, we add the two products together to get 24,564.

To divide whole numbers, we must know basic division rules are the opposite of multiplying rules. So if we know our times tables, we know how to divide (a review over the summer might not be a bad idea!). Since 3 x 4 is 12, then 12 ÷ 4 = 3 and 12 ÷ 3 = 4. Again, we deal with one digit at a time, so:

```
   634
12 | 7608
  - 72
    40
  - 36
     48
   - 48
      0
```

First, we notice that 12 does not divide into 7, so we determine how many times 12 goes into 76. This is 6. Next, multiply 6 x 12 and place the answer, 72, under the 76 you have used. Now, subtract 76 - 72 and place the 4 underneath the 72. Bring down the next digit from the number being divided, which is 0, and determine how many times 12 goes into 40. The answer is 3 and 3 x 12 = 36, so place 36 under the 40. Now, subtract 40 - 36 and place the 4 under 36 and bring down the 8. 12 goes into 48 four times evenly, so there is no remainder in this problem.

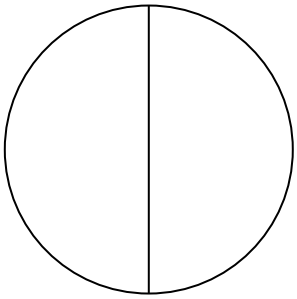
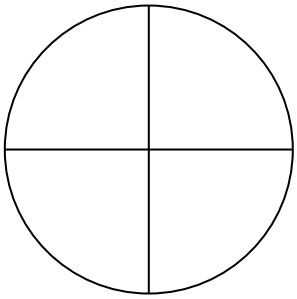
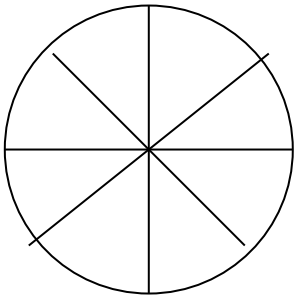
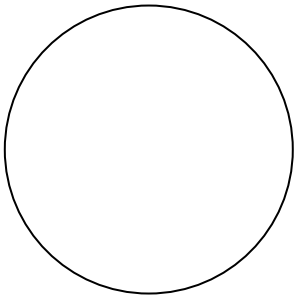
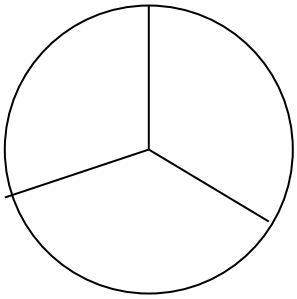
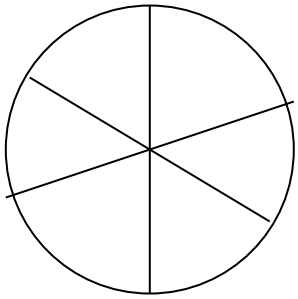
Exercises: Solve: No Calculators!

1. 742 x 17
2. 25 x 13
3. 659 x 7
4. 407 x 29
5. 81 x 5
6. $86\overline{)2{,}236}$
7. $57\overline{)13{,}338}$
8. $5\overline{)205}$
9. $7\overline{)1463}$
10. $16\overline{)3840}$
11. $11\overline{)2211}$
12. $9\overline{)3789}$

Background of Fractions

Label the following fractional parts (circles) with the given fractions.

1 whole, $\frac{1}{2}, \frac{1}{3}, \frac{1}{4}, \frac{1}{6}, \frac{1}{8}$

Fraction Operations

Hints/Guide:

When adding and subtracting fractions, we need to be sure that each fraction has the same denominator, then add or subtract the numerators together. For example:

$$\frac{1}{8}+\frac{3}{4}=\frac{1}{8}+\frac{6}{8}=\frac{1+6}{8}=\frac{7}{8}$$

That was easy because it was easy to see what the new denominator should be, but what about if it is not so apparent? For example: $\frac{7}{12}+\frac{8}{15}$

For this example we must find the Lowest Common Denominator (LCM) for the two denominators. 12 and 15

12 = 12, 24, 36, 48, 60, 72, 84, ...
15 = 15, 30, 45, 60, 75, 90, 105, ...
LCM (12, 15) = 60

So, $\frac{7}{12}+\frac{8}{15}=\frac{35}{60}+\frac{32}{60}=\frac{35+32}{60}=\frac{67}{60}=1\frac{7}{60}$ Note: Be sure answers are in lowest terms

To multiply fractions, we multiply the numerators together and the denominators together, and then simplify the product. To divide fractions, we find the reciprocal of the second fraction (flip the numerator and the denominator) and then multiply the two together. For example:

$$\frac{2}{3}\bullet\frac{1}{4}=\frac{2}{12}=\frac{1}{6} \text{ and } \frac{2}{3}\div\frac{3}{4}=\frac{2}{3}\bullet\frac{4}{3}=\frac{8}{9}$$

Exercises: Perform the indicated operation: No calculators!
SHOW ALL WORK. Use a separate sheet of paper (if necessary) and staple to this page.

1. $\frac{1}{4}+\frac{3}{5}=$
2. $\frac{6}{7}+\frac{2}{3}=$
3. $\frac{2}{5}+\frac{8}{9}=$
4. $\frac{3}{4}-\frac{2}{3}=$
5. $\frac{2}{5}-\frac{2}{9}=$
6. $\frac{9}{11}-\frac{2}{5}=$
7. $\frac{1}{3}\bullet\frac{2}{3}=$
8. $\frac{3}{4}\bullet\frac{3}{5}=$
9. $\frac{7}{8}\bullet\frac{2}{5}=$
10. $\frac{3}{8}\div\frac{3}{4}=$
11. $\frac{1}{4}\div\frac{1}{4}=$
12. $\frac{7}{11}\div\frac{3}{5}=$

Add and Subtract Mixed Numbers

Hints/Guide:

When adding mixed numbers, we add the whole numbers and the fractions separately, then simplify the answer. For example:

$$\begin{array}{r} 4\frac{1}{3} = 4\frac{8}{24} \\ +\,2\frac{6}{8} = 2\frac{18}{24} \\ \hline 6\frac{26}{24} = 6 + 1\frac{2}{24} = 7\frac{2}{24} = 7\frac{1}{12} \end{array} \qquad \begin{array}{r} 7\frac{3}{4} = 7\frac{18}{24} \\ -\,2\frac{15}{24} = 2\frac{15}{24} \\ \hline 5\frac{3}{24} = 5\frac{1}{8} \end{array}$$

First, we convert the fractions to have the same denominator, then add the fractions and add the whole numbers. If needed, we then simplify the answer.

Exercises: Solve in lowest terms: No Calculators!

SHOW ALL WORK. Use a separate sheet of paper (if necessary) and staple to this page.

1. $2\frac{1}{4} + 8\frac{1}{2}$

2. $3\frac{8}{15} + 7\frac{1}{3}$

3. $3\frac{3}{5} + 5\frac{1}{2}$

4. $5\frac{3}{8} + 4\frac{1}{4}$

5. $7\frac{3}{7} + 6\frac{1}{2}$

6. $5\frac{5}{9} + 1\frac{1}{3}$

7. $4\frac{1}{3} - 2\frac{1}{4}$

8. $6\frac{3}{4} - \frac{2}{3}$

9. $9\frac{2}{3} - 6\frac{1}{4}$

10. $6\frac{3}{4} - 5\frac{1}{5}$

11. $7\frac{1}{2} - 3\frac{1}{4}$

12. $3\frac{1}{2} - 2\frac{3}{10}$

Multiply Fractions and Solve Proportions

Hints/Guide:

To solve problems involving multiplying fractions and whole numbers, we must first place a one under the whole number, then multiply the numerators together and the denominators together. Then we simplify the answer:

$$\frac{6}{7} \bullet 4 = \frac{6}{7} \bullet \frac{4}{1} = \frac{24}{7} = 3\frac{3}{7}$$

To solve proportions, one method is to determine the multiplying factor of the two equal ratios. For example:

$\frac{4}{9} = \frac{24}{x}$ since 4 is multiplied by 6 to get 24, we multiply 9 by 6, so $\frac{4}{9} = \frac{24}{54}$.

Since the numerator of the fraction on the right must be multiplied by 6 to get the numerator on the left, then we must multiply the denominator of 9 by 6 to get the missing denominator, which must be 54.

Exercises: Solve (For problems 8 - 15, solve for N): No Calculators!
SHOW ALL WORK. Use a separate sheet of paper (if necessary) and staple to this page.

1. $4 \bullet \frac{3}{4} =$
2. $\frac{1}{5} \bullet 7 =$
3. $8 \bullet \frac{1}{5} =$
4. $6 \bullet \frac{3}{7} =$
5. $\frac{4}{5} \bullet 4 =$
6. $\frac{2}{3} \bullet 6 =$
7. $7 \bullet \frac{1}{4} =$
8. $\frac{1}{5} = \frac{n}{20}$
9. $\frac{3}{n} = \frac{12}{28}$
10. $\frac{1}{n} = \frac{5}{25}$
11. $\frac{n}{4} = \frac{3}{12}$
12. $\frac{3}{7} = \frac{12}{n}$
13. $\frac{n}{9} = \frac{12}{27}$
14. $\frac{2}{3} = \frac{18}{n}$
15. $\frac{2}{7} = \frac{n}{21}$

Add and Subtract Decimals

Hints/Guide:

When adding and subtracting decimals, the key is to line up the decimals above each other, add zeros to have all of the numbers have the same place value length, then use the same rules as adding and subtracting whole numbers, with the answer having a decimal point in line with the problem. For example:

$$\begin{array}{rrr} & 34.5 & 34.500 \\ 34.5 + 6.72 + 9.045 = & 6.72 & = \ 6.720 \\ & \underline{+\ 9.045} & \underline{+\ 9.045} \\ & & 50.265 \end{array}$$

AND

$$\begin{array}{rr} 5 - 3.25 = & 5.00 \\ & \underline{-\ 3.25} \\ & 1.75 \end{array}$$

Exercises: Solve: No Calculators!

SHOW ALL WORK. Use a separate sheet of paper (if necessary) and staple to this page.

1. $15.7 + 2.34 + 5.06 =$
2. $64.038 + 164.8 + 15.7 =$
3. $2.6 + 64.89 + 4.007 =$
4. $12.9 + 2.008 + 75.9 =$
5. $\begin{array}{r} 543.8 \\ 27.64 \\ \underline{+\ 6.9} \end{array}$
6. $2.6 + 4.75 =$
7. $43.31 + 7.406 =$
8. $\begin{array}{r} 64.9 \\ 343.6 \\ \underline{+\ 6.007} \end{array}$
9. $6.45 + 54.9 =$
10. $3.8 + .76 + .008 =$
11. $87.4 - 56.09 =$
12. $5.908 - 4.72 =$
13. $68.9 - 24.74 =$
14. $955.3 - 242.7 =$
15. $\begin{array}{r} 695.42 \\ \underline{-\ 44.79} \end{array}$
16. $432.97 - 287.32 =$
17. $43.905 - 9.08 =$
18. $\begin{array}{r} 78.9 \\ \underline{-\ 54.7} \end{array}$
19. $200 - 14.96 =$
20. $15 - 2.43 =$

Multiply and Divide Decimals

Hints/Guide:

To multiply decimals, the rules are the same as with multiplying whole numbers, until the product is determined and the decimal point must be located. The decimal point is placed the same number of digits in from the right of the product as the number of decimal place values in the numbers being multiplied. For example:

8.54 x 17.2, since 854 x 172 = 146888, then we count the number of decimal places in the numbers being multiplied, which is three, so the final product is 146.888 (the decimal point comes three places in from the right).

To divide decimals by a whole number, the process of division is the same, but the decimal point is brought straight up from the dividend into the quotient. For example:

$3\overline{)\,51.06}$ $\quad 17.02$ The decimal point moves straight up from the dividend to the quotient.

Exercises: Solve: No Calculators!

SHOW ALL WORK. Use a separate sheet of paper (if necessary) and staple to this page.

1. 63 x .14

2. .87 x 2.3

3. 8.94 x 2.1

4. 4.2 x .62

5. 34.5 x 4.7

6. 32.1 x .45

7. 91.4 x 47

8. 3.9 x 11

9. $35\overline{)70.35}$

10. $7\overline{)25.83}$

11. $14\overline{)45.584}$

Reading Scales and Finding Area and Perimeter

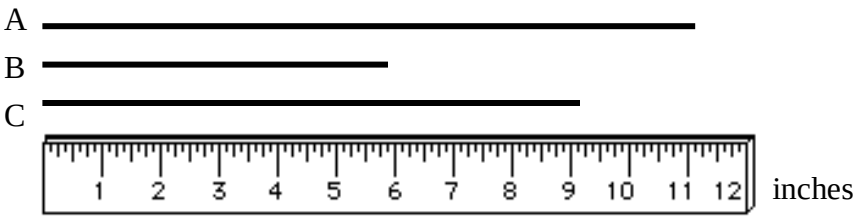
Hints/Guide:

To determine the correct answer when reading scales, the important thing to remember is to determine the increments (the amount of each mark) of the given scale.

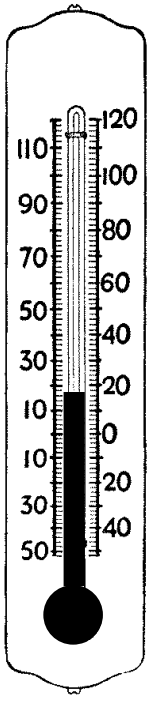
To find the perimeter of a rectangle or square, we must add the lengths of all of the sides together. To find the area of a square or a rectangle, we must multiply the length by the width.

Exercises:

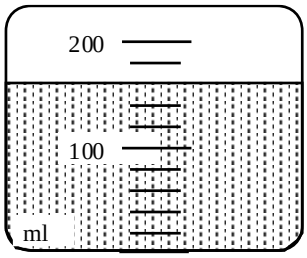
1. Find the length of each line to the nearest inch:



2. Find the temperature in Celsius

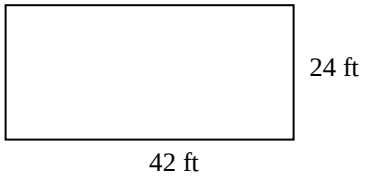


3. Determine the amount of liquid in ml.

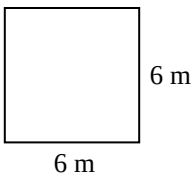


4. Find each area and perimeter:

a.



b.



c.

Find the Average of a Set of Numbers

Hints/Guide:

To find the average of a set of numbers, we add together all of the numbers and then divide by how many numbers are in the data set. For example:

If the tests scores are 73, 87, 94, 84, 92, and 95, then we add the scores together: 73 + 87 + 94 + 84 + 92 + 95 = 525, and since there are 6 numbers in the data set, we divide 527 by 6 and get the quotient of 87.5.

Exercises: No Calculators!

SHOW ALL WORK. Use a separate sheet of paper (if necessary) and staple to this page.

For problem 1, use the following chart

Week	Monday	Tuesday	Wednesday	Thursday	Friday
1	65	68	72	74	68
2	68	75	80	68	75
3	75	74	69	79	80
4	80	82	76	67	79

1. Find the average (mean) temperature for:

   Monday _____ Tuesday _____ Wednesday _____

   Thursday _____ Friday _____

2. If George has test scores of 85, 88, 92, and 87, what is his average (mean) score?

   Challenge: Using the same test scores for George, what would his fifth test score need to be to have an average (mean) grade of 90?

3. If Tina's bowling scores were 120, 155, 145, 162, and 138, what was her average (mean) score?

   Challenge: What would Tina's score need to be in the sixth game if she wanted an average over those six games of 145?

Integers I

Hints/Guide:

To add integers with the same sign (both positive or both negative), add their absolute values and use the same sign. To add integers of opposite signs, find the difference of their absolute values and then take the sign of the larger absolute value.

To subtract integers, add its additive inverse.

For example 6 - 11 = a becomes 6 + -11 = a and solves as -5 = a.

Exercises: Solve the following problems: No Calculators!

1. 6 + (-7) =
2. (-4) + (-5) =
3. 6 + (-9) =
4. (-6) - 7 =
5. 6 - (-6) =
6. 7 - (-9) =
7. 5 + (-8) =
8. -15 + 8 =
9. 14 + (-4) =
10. -9 - (-2) =
11. -7 - 6 =
12. -8 - (-19) =
13. 29 - 16 + (-5) =
14. -15 + 8 - (-19) =
15. 45 - (-13) + (-14) =
16. -15 - 6 - 9 =
17. -7 + (-6) - 7 =
18. 29 - 56 - 78 =
19. 17 + (-7) - (-5) =
20. 45 - (-9) + 5 =

Integers II

Hints/Guide:

The rules for multiplying integers are:

Positive x Positive = Positive	Negative x Negative = Positive
Positive x Negative = Negative	Negative x Positive = Negative

The rules for dividing integers are the same as multiplying integers.

Exercises: Solve the following problems: No Calculators!

1. $4 \bullet (-3) =$
2. $(-12) \bullet (-4) =$
3. $(-8)(-3) =$
4. $\frac{-14}{2} =$
5. $\frac{28}{-4} =$
6. $\frac{-36}{-6} =$
7. $6\,(-5) =$
8. $8\,(-4 - 6) =$
9. $-6\,(9 - 11) =$
10. $\frac{(-5)(-6)}{-2} =$
11. $\frac{6(-4)}{8} =$
12. $\frac{-56}{2^3} =$
13. $\frac{-6-(-8)}{-2} =$
14. $-7 + \frac{4+(-6)}{-2} =$
15. $45 - 4\,(5 - (-3)) =$
16. $(-4 + 7)\,(-5 + 3) =$
17. $16 - (-3)\,(-7 + 5) =$
18. $\frac{4+(-6)-5-3}{-6+4} =$
19. $(-2)^3(-5-(-6)) =$
20. $13\,(-9 + 7) + 4 =$