

Math Tools

Folder

Name: _____

Teacher: _____

Room: _____

Look for the
Keys in
Word Problems

Add $+$

If you read:

sum • total • all together
plus • in all

Subtract $-$

If you read:

remainder • difference
less than • fewer
how many more • minus

Multiply \times

If you read:

product • times • twice
total • multiplied by

Divide \div

If you read:

quotient • goes into
split equally • each

Multiplication

0	1	2	3	4	5	6	7	8	9	10	11	12
1	1	2	3	4	5	6	7	8	9	10	11	12
2	2	4	6	8	10	12	14	16	18	20	22	24
3	3	6	9	12	15	18	21	24	27	30	33	36
4	4	8	12	16	20	24	28	32	36	40	44	48
5	5	10	15	20	25	30	35	40	45	50	55	60
6	6	12	18	24	30	36	42	48	54	60	66	72
7	7	14	21	28	35	42	49	56	63	70	77	84
8	8	16	24	32	40	48	56	64	72	80	88	96
9	9	18	27	36	45	54	63	72	81	90	99	108
10	10	20	30	40	50	60	70	80	90	100	110	120
11	11	22	33	44	55	66	77	88	99	110	121	132
12	12	24	36	48	60	72	84	96	108	120	132	144

Divide and conquer

Dragon (Divide)
Mouthwash (Multiply)
Sweetens (Subtract)
Charbroiled (check)
Breath (Bring down)

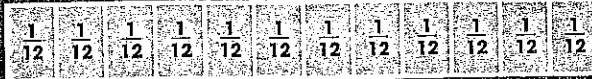
$$\begin{array}{r}
 15 \text{ r}2 \\
 3 \overline{)47} \\
 \underline{-3} \\
 17 \\
 \underline{-15} \\
 2
 \end{array}$$

Decimals, Percentages, and Fractions

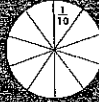
$\frac{1}{12}$



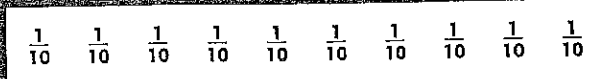
.083
8.3%



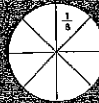
$\frac{1}{10}$



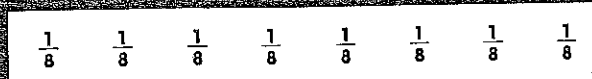
.10
10%



$\frac{1}{8}$



.125
12.5%



$\frac{1}{6}$



.167
16.7%



$\frac{1}{5}$



.20
20%



$\frac{1}{4}$



.25
25%



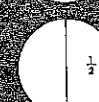
$\frac{1}{3}$



.333
33.3%



$\frac{1}{2}$



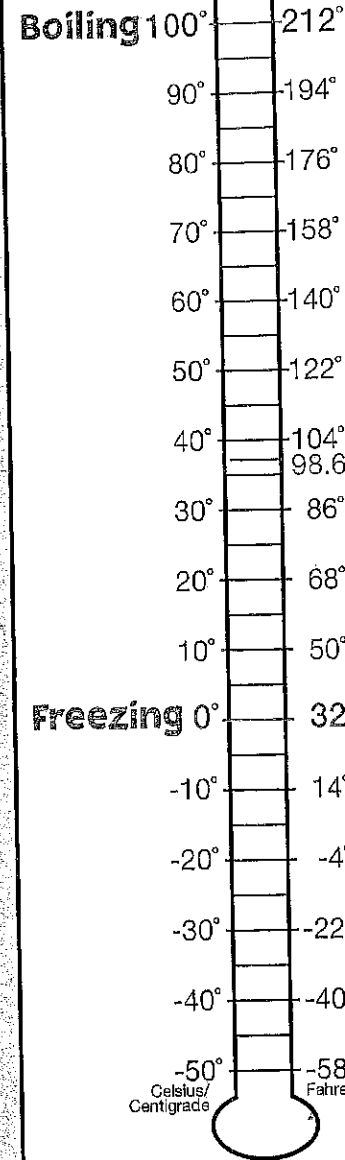
.50
50%



1

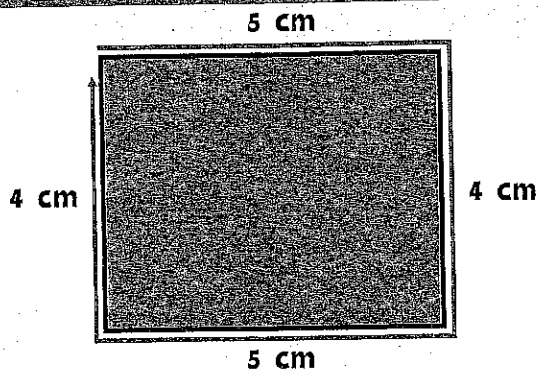


1
100%



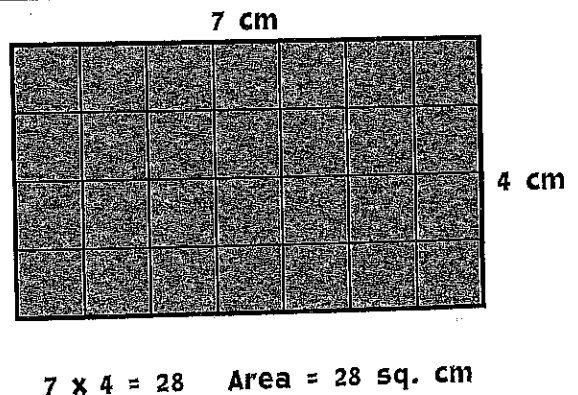
Perimeter:

the distance around the outside of a figure

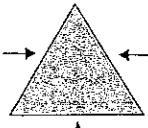
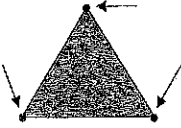
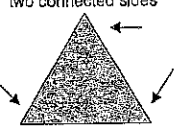


Area:


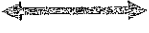
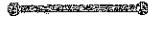


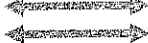


the amount of square units inside a figure



Exploring Plane Figures





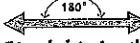
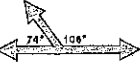
<p>Side the line segments that make up a figure</p>  <p>A triangle has 3 sides.</p>	<p>Vertex the point where two sides meet</p>  <p>A triangle has 3 vertices.</p>	<p>Angle the measurement of the space between two connected sides</p>  <p>A triangle has 3 angles.</p>
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Lines and More

<p>Point an exact location in space</p> 	<p>Line extends indefinitely in both directions</p> 	<p>Line Segment a portion of a line that has two endpoints</p> 
<p>Ray begins at a fixed point and extends indefinitely in one direction</p> 	<p>Angle two rays that share an endpoint</p> 	<p>Parallel Lines two lines that will never intersect</p> 
<p>Perpendicular Lines two lines that cross to form four right angles</p> 	<p>Intersecting Lines lines that have exactly one point in common</p> 	











Angles

An angle is a figure formed by two rays diverging from a common point, called the vertex.

<p>Acute Angle measures less than 90°</p> 	<p>Right Angle measures 90°</p> 	<p>Obtuse Angle measures between 90° and 180°</p> 
<p>Complementary Angles have measurements with a sum of 90°</p> 	<p>Straight Angle measures 180°</p> 	<p>Supplementary Angles have measurements with a sum of 180°</p> 









Polygons

A polygon is a closed plane figure that is made up of at least three line segments. It has an equal number of sides, angles, and vertices.

<p>Triangle (3)</p> 	<p>Pentagon (5)</p> 	<p>Hexagon (6)</p> 	<p>Octagon (8)</p> 	<p>Decagon (10)</p> 
<p>Quadrilaterals (4)</p>				
<p>Square four equal sides meet at right angles</p> 	<p>Rectangle four sides meet at right angles</p> 	<p>Parallelogram two pairs of parallel sides</p> 	<p>Rhombus a parallelogram with four equal sides</p> 	<p>Trapezoid one pair of parallel sides</p> 





Solid Figures

A solid figure is a three-dimensional figure.

<p>Cylinder two congruent circular bases joined by a curved surface</p> 	<p>Sphere all of its points are the same distance from its center</p> 	<p>Cone one circular base and one vertex joined by a curved surface</p> 
<p>Triangular Prism two congruent triangular bases parallel to one another</p> 	<p>Triangular Pyramid triangular base and three triangular sides</p> 	
<p>Cube six congruent square faces</p> 	<p>Rectangular Prism six rectangular faces meet at right angles</p> 	<p>Square Pyramid square base and four triangular sides</p> 

Circles




A circle is a shape with all points the same distance from the center.

<p>Radius the distance from the center of the circle to any point on the circle</p> 	<p>Diameter the distance across a circle through the center</p> 
<p>Chord a line segment with endpoints that are any two points on the circle</p> 	<p>Circumference the distance around the outside of a circle</p> 





Triangles

A triangle is a polygon with three sides.

Triangles can be classified by the length of their sides:

<p>Equilateral triangles have three equal sides</p> 	<p>Isosceles triangles have two equal sides</p> 	<p>Scalene triangles have no equal sides</p> 
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Triangles can be classified by the measure of their angles:

<p>Equiangular triangles have three equal angles</p> 	<p>Obtuse triangles have one obtuse angle</p> 	<p>Right triangles have one right angle</p> 	<p>Acute triangles have three acute angles</p> 
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BASIC PROPERTIES OF NUMBERS

Commutative

Changing the order of addends or factors does not affect the sum or product.

$$a + b = c$$

$$b + a = c$$

$$a \times b = c$$

$$b \times a = c$$

$$12 + 6 = 18$$

$$6 + 12 = 18$$

$$5 \times 7 = 35$$

$$7 \times 5 = 35$$

Associative

The order in which numbers are grouped does not affect the sum or product.

$$(a + b) + c = d$$

$$a + (b + c) = d$$

$$(a \times b) \times c = d$$

$$a \times (b \times c) = d$$

$$(3 + 5) + 2 = 10$$

$$3 + (5 + 2) = 10$$

$$(4 \times 7) \times 3 = 84$$

$$4 \times (7 \times 3) = 84$$

Distributive

Adding two or more numbers together, then multiplying the sum by a factor is equal to multiplying each number alone by the factor first, and then adding the products.

$$a(b + c) = (a \times b) + (a \times c)$$

$$4(1 + 8) = (4 \times 1) + (4 \times 8)$$

$$4 \times 9 = 4 + 32$$

$$36 = 36$$

Identity

The additive identity is zero. If you add zero to an addend, the sum will equal that addend.

$$a + 0 = a$$

$$8 + 0 = 8$$

The multiplicative identity is one. If you multiply a factor by one, the product will equal that factor.

$$a \times 1 = a$$

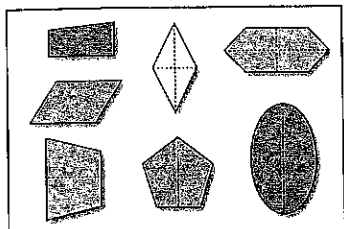
$$25 \times 1 = 25$$

Symmetry

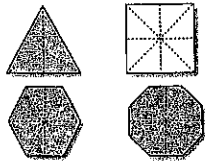
A figure is **symmetrical** if it can be folded in such a way so that one half of it exactly matches the other half.

A **line of symmetry** is a line on which the figure can be folded so that its two halves match exactly.

Some figures may have more than one line of symmetry.



Count the lines of symmetry in these regular shapes. Do you notice a pattern?

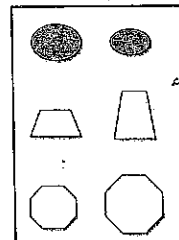
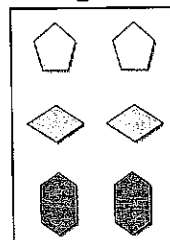


Congruency

Figures are **congruent** if they have the same shape and size.

Congruent

Not Congruent



Units of Measurement

	Standard	Metric		Standard	Metric
Length	inch (in.) foot (ft.) yard (yd.) mile (mi.)	millimeter (mm) centimeter (cm) decimeter (dm) meter (m) kilometer (km)	Liquid	ounce (oz.) cup (c.) pint (pt.) quart (qt.) gallon (gal.)	milliliter (mL) liter (L)
Weight	ounce (oz.) pound (lb.) ton	milligram (mg) gram (g) kilogram (kg)	Temperature	Fahrenheit (°F)	Celsius/ centigrade (°C)

Place Values

billions			millions			thousands			ones		decimals			
hundred billions	ten billions	billions	hundred millions	ten millions	millions	hundred thousands	ten thousands	thousands	hundreds	tens		tenths	hundredths	thousandths

ten	10	10^1
hundred	100	10^2
thousand	1,000	10^3
ten thousand	10,000	10^4
hundred thousand	100,000	10^5
million	1,000,000	10^6
billion	1,000,000,000	10^9
trillion	1,000,000,000,000	10^{12}
quadrillion	1,000,000,000,000,000	10^{15}
quintillion	1,000,000,000,000,000,000	10^{18}
sextillion	1,000,000,000,000,000,000,000	10^{21}
septillion	1,000,000,000,000,000,000,000,000	10^{24}
octillion	1,000,000,000,000,000,000,000,000,000	10^{27}
nonillion	1,000,000,000,000,000,000,000,000,000,000	10^{30}
decillion	1,000,000,000,000,000,000,000,000,000,000,000	10^{33}

Rounding Numbers

Example: Rounding to the nearest thousand

26,745

26,345

Circle the digit.

26,745

Then underline next door.

26,345

Goes up to 7

If that's five or greater,

27,745

go back and add one more.

Stays 6

26,345

If it's four or lower, should you change your number? No!

27,000

Either way, what's to the right, will all become zero.

26,000

More Rounding Numbers

Examples:	Rounded to the nearest 10	Rounded to the nearest 100	Rounded to the nearest 1000	Rounded to the nearest 10,000
28,327	28,330	28,300	28,000	30,000
55,281	55,280	55,300	55,000	60,000
192,407	192,410	192,400	192,000	190,000
2,638,425	2,638,430	2,638,400	2,638,000	2,640,000