

# Friendship Junior High School Sixth Grade Accelerated Math Program

Room 102A (Mr. Lavine)

# 4



4th Quarter Units of Study

Graphing Linear Equations  
Interest & Radicals  
Properties

*Friendship Junior High School  
Sixth Grade Accelerated Math  
Mr. Lavine*

## *Fourth Quarter Goals and Objectives*

*The final quarter begins with an in-depth unit on graphing linear equations. This unit is from the middle chapters of a high school Algebra I course. Performance in this unit will be a good indicator of success during the seventh grade year. This unit will be followed by work on simple and compound interest, interpolation and calculating square roots, properties and imaginary numbers. During the quarter, we will emphasize the following:*

**Mastery of Skills & Concepts From An In-Depth Algebra Unit  
Consistent 92% Accuracy Level on Unit Tests  
Preparation for a Cumulative Final Exam Covering the Year**

*The final exam at the end of the year will be a four part test covering the areas of problem solving, algebra, geometry, and vocabulary.*

## UNIT 12

# Graphing Linear Equations

### 1. NUMBER LINE GRAPHING

Solve these equations & inequalities. Show work and graph the solution.

- ①  $x = -3$
- ②  $x - 5 = 2$
- ③  $3n - 4 = 8$
- ④  $3 - 2n = 4n - 9$
- ⑤  $3(2a - 2) = 2a + 8$
- ⑥  $2(3a - 1) = 6a + 5$
- ⑦  $2x - 4 = 2(x - 2)$
- ⑧  $x > -2$
- ⑨  $x \leq 4$
- ⑩  $5n - 3 < n + 13$
- ⑪  $2(n + 3) \geq 6$

- ⑫  $4n - 3 > 2(2n - 1)$
- ⑬  $2a - 1 < 4a - 7$
- ⑭  $15 + 2a \leq 2(a + 9)$
- ⑮  $a - 5 \geq 3(a - 2)$

### 2. THE CHART METHOD

Put each linear equation in slope-intercept form. Make a chart. Graph the solution.

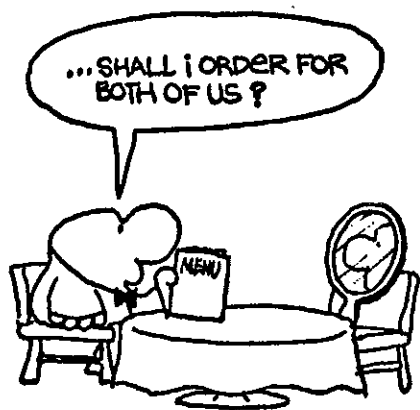
- ①  $2x + y = 12$
- ②  $x + y = 6$
- ③  $3x - y = -2$
- ④  $5x - 2y = 0$
- ⑤  $3x + y = 3$
- ⑥  $2y = 8$
- ⑦  $4x - y = 6$
- ⑧  $4x = -16$
- ⑨  $x - y = 3$
- ⑩  $x = 4 - 2y$

Review: Graph on a numb. line.

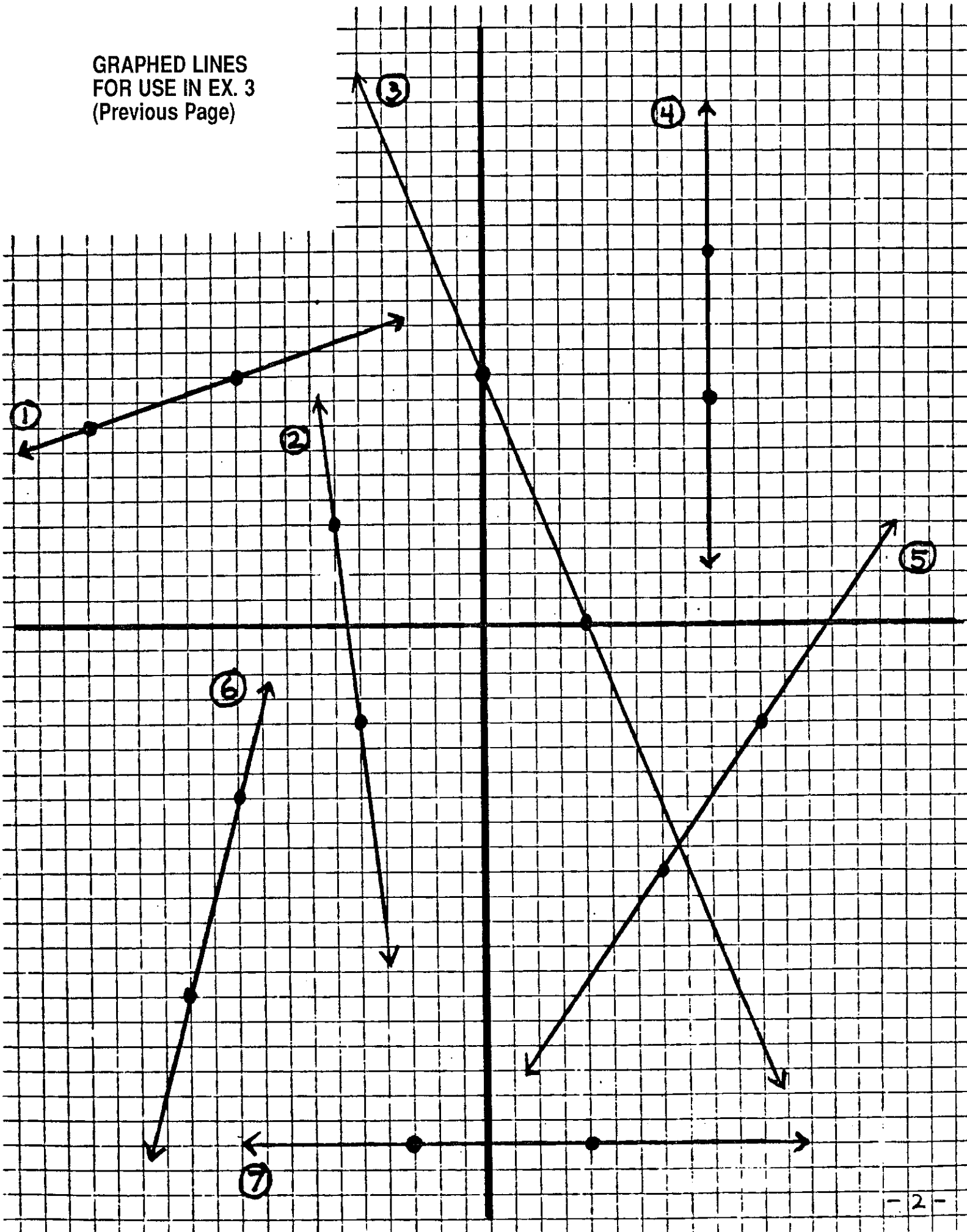
- ⑪  $3x - 1 < 6x + 5$
- ⑫  $4x = 12$

### 3. SLOPE

Determine the slope of each line graphed in the diagram on the next page.



GRAPHED LINES  
FOR USE IN EX. 3  
(Previous Page)



#### 4. SLOPE METHOD

Graph the line that includes the indicated point and has the indicated slope.

- ①  $(-4, +2)$   $m = 2/3$
- ②  $(+2, -5)$   $m = -1/2$
- ③  $(0, 0)$   $m = 3$
- ④  $(-2, +5)$   $m = 0$
- ⑤  $(-3, 0)$   $m = -2$
- ⑥  $(-1, -4)$   $m = \text{no slope}$
- ⑦  $(-2, -2)$   $m = 1$

Review: Graph using the chart method.

⑧  $2x - y = 8$

#### 5. DETERMINE SLOPE

Determine the slope of a line that contains these points.

- ①  $(-3, 5)$   $(-8, 2)$
- ②  $(0, 0)$   $(-3, -3)$
- ③  $(5, -1)$   $(5, -2)$
- ④  $(-2, 4)$   $(-7, 6)$
- ⑤  $(-3, -2)$   $(-6, -2)$
- ⑥  $(7, 0)$   $(5, 1)$
- ⑦  $(-5, -2)$   $(-7, -5)$
- ⑧  $(6, -2)$   $(6, 0)$
- ⑨  $(-3, -1)$   $(-4, -5)$
- ⑩  $(-2, 3)$   $(-5, 3)$

Review: Graph on a number line.

⑪  $4x - 2 \geq 8$

Review: Change to slope-intercept form and graph using the chart method.

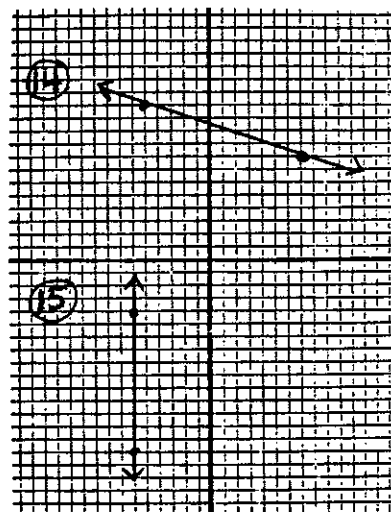
⑫  $x - 2y = 6$

Review: Graph the line that contains this point and has this slope.

⑬  $(-3, -5)$   $m = 3$

Review: Determine the slope for lines 14 and 15.

⑭  $m =$



⑮  $m =$

Review: Change this equation to slope-intercept form.

⑯  $3x - 2y = 8$

## 6. UNDERSTANDING BOTH FORMS

Determine the slope and intercepts for linear equations 1-16.

Slope - Intercept Form:

- |                |                          |
|----------------|--------------------------|
| ① $y = 3x - 6$ | ⑤ $y = 3x - 4$           |
| ② $y = 2x + 5$ | ⑥ $y = \frac{1}{3}x - 6$ |
| ③ $y = 8x$     | ⑦ $y = \frac{2}{3}x + 3$ |
| ④ $y = 4$      | ⑧ $y = 2x - \frac{2}{5}$ |

Standard Form:

- |                  |                           |
|------------------|---------------------------|
| ⑨ $4x - y = 2$   | ⑬ $3x + 3y = 3$           |
| ⑩ $6x + 2y = -5$ | ⑭ $2y = 6$                |
| ⑪ $4x + 3y = 8$  | ⑮ $6x + 2y = \frac{1}{2}$ |
| ⑫ $4x = 8$       | ⑯ $x + y = 7$             |

Review:

- ⑰ Graph on a number line:

$$-\frac{2}{3}x < 4$$

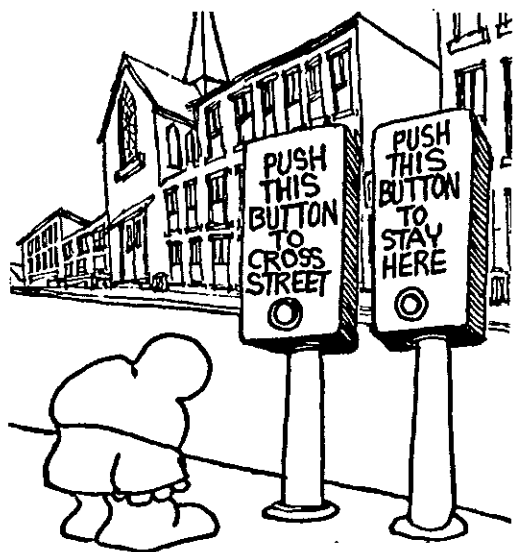
- ⑱ Graph using the chart method:

$$2x - y = 2$$

- ⑲ Graph using the slope method:

$$(-3, 1) \quad m = \text{no slope}$$

- ⑳ Determine slope:  $(-5, 2)(-3, 0)$



## 7. LINEAR EQUATIONS

For each equation, supply:

- |                |                |
|----------------|----------------|
| a) sl-int form | d) y-intercept |
| b) stand. form | e) x-intercept |
| c) slope       | f) graph       |

- |                            |   |
|----------------------------|---|
| ① $3x + y = 6$             | already in standard form                                    |
| ② $y = -4x - 8$            | already in slope-intercept form                             |
| ③ $3x - y = 4$             | make sure y has a coefficient of +1 in slope-intercept form |
| ④ $x + 2y = 6$             | see #3 above  |
| ⑤ $\frac{2}{3}x - 2y = -2$ | no fractions allowed in standard form                       |
| ⑥ $\frac{1}{2}y - 3x = -1$ | be sure to notice the y is before the x                     |
| ⑦ $x = 6 + 2y$             | not in either form  |

## 8. MORE LINEAR EQUATIONS

For each equation, supply:

- a) sl-int. form      d) y-intercept  
b) stand. form      e) x-intercept  
c) slope

No graph is required:

- ①  $2x+3y=8$       ⑤  $\frac{3}{4}x-2y=3$   
②  $y=-2x-6$       ⑥  $3x-6=0$   
③  $4x-\frac{1}{2}y=2$       ⑦  $3x=y$   
④  $2x-y=\frac{2}{3}$       ⑧  $2y=6$

Review: Graph on a numb. line:

- ⑨  $3x-2 < 4$       ⑪  $2(2x-1) < 4x-3$   
⑩  $2x+6=5$

Review: Graph (Chart Method):

⑫  $2x-y=-3$

Review: Linear equations

- ⑬  $(-6,2)(-8,1)$  slope =  
⑭ Given  $(-2,-5)$   $m=-2$ ,  
draw the graph  
⑮ Graph  $2x=6-y$  (any form)

## 9. REVIEW

Graph on a number line:

①  $4x-3=9$

②  $2x-1 < 6$

③  $2x-3 \geq 5x+6$

④  $2(3n-1) = 6n-3$

⑤  $2n-5 \leq 3(n-1)-n$

⑥  $\frac{2}{3}n = -3$

Change to slope-intercept form and graph using the chart method:

⑦  $y=3x-5$       ⑨  $2x=6-y$

⑧  $y=\frac{1}{2}x-2$       ⑩  $3x-y=8$

Determine the slope:

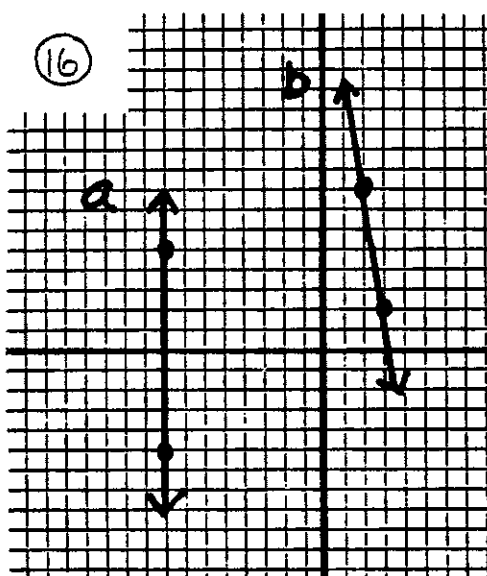
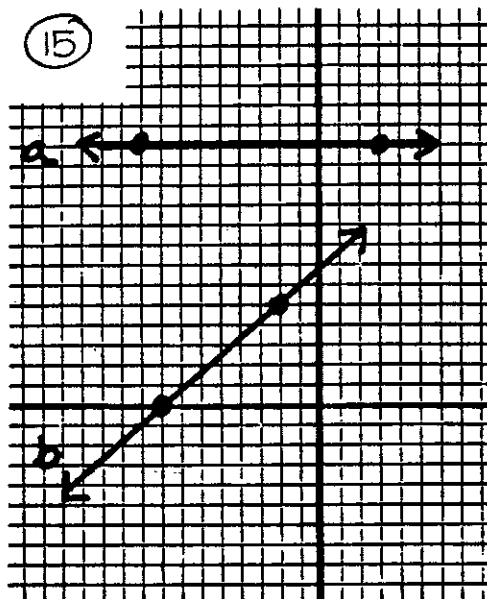
⑪  $(-5,-3)(7,-4)$       ⑬  $(8,-3)(-6,-10)$

⑫  $(-3,9)(-3,-4)$       ⑭  $(-6,-10)(-10,-10)$

Review continued on next page...



Determine the slope:



Graph using point and slope:

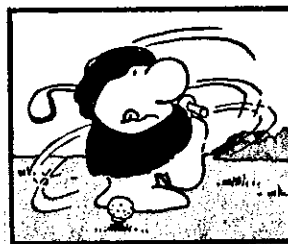
- ⑰  $(-3, 5)$   $m = -2$
- ⑱  $(5, -8)$  no slope
- ⑲  $(6, -4)$   $m = 2/5$
- ⑳  $(0, -3)$   $m = 0$

For each of the following, supply:

- a) slope-intercept form
- b) standard form
- c) slope
- d) y-intercept
- e) x-intercept

No graph is necessary for these:

- ⑳  $3x = 2y - 4$
- ㉑  $\frac{1}{3}y = 2x - 1$
- ㉒  $7 = \frac{1}{2}x + y$
- ㉓  $-3x = -2y + 4$
- ㉔  $-\frac{2}{3}x = -6 + 2y$
- ㉕  $6x - y = -3$



Graph using intercepts (either form):

- ㉖  $2x = y - 6$
- ㉗  $-2y = 8x - 4$
- ㉘  $4x - y = 2$
- ㉙  $2x + 4y = 4$

Graph (any method):

- ㉚  $-3x = 6$
- ㉛  $2x = 8$
- ㉜  $4y = -12$
- ㉝  $-3y = -15$
- ㉞  $2x - y = 0$
- ㉟  $4x + 8y = 0$
- ㊱  $y = 3x$
- ㊲  $y = -x$





# UNIT 13

## Interest & Radicals

### 1. RADICALS & CONSECUTIVE INTEGERS

The following values fall between what two consecutive integers?

- |                |                 |                |
|----------------|-----------------|----------------|
| ① $\sqrt{45}$  | ⑦ $-\sqrt{150}$ | ⑬ $-\sqrt{6}$  |
| ② $\sqrt{110}$ | ⑧ $-\sqrt{2}$   | ⑭ $-\sqrt{20}$ |
| ③ $\sqrt{6}$   | ⑨ $\sqrt{28}$   | ⑮ $-\sqrt{60}$ |
| ④ $\sqrt{125}$ | ⑩ $\sqrt{56}$   | ⑯ $-\sqrt{80}$ |
| ⑤ $-\sqrt{30}$ | ⑪ $\sqrt{13}$   |                |
| ⑥ $-\sqrt{90}$ | ⑫ $\sqrt{18}$   |                |

### 2. INTERPOLATION

Use the table of squares and square roots to determine a value for each:

- |                 |                 |                 |
|-----------------|-----------------|-----------------|
| ① $\sqrt{410}$  | ⑥ $\sqrt{1507}$ | ⑪ $\sqrt{1179}$ |
| ② $\sqrt{1034}$ | ⑦ $\sqrt{267}$  | ⑫ $\sqrt{1864}$ |
| ③ $\sqrt{2147}$ | ⑧ $\sqrt{114}$  | ⑬ $\sqrt{4129}$ |
| ④ $\sqrt{5199}$ | ⑨ $\sqrt{3055}$ | ⑭ $\sqrt{642}$  |
| ⑤ $\sqrt{9559}$ | ⑩ $\sqrt{6307}$ | ⑮ $\sqrt{1074}$ |

### SQUARES & SQUARE ROOTS

N	N <sup>2</sup>	$\sqrt{N}$	N	N <sup>2</sup>	$\sqrt{N}$
1	1	1.000	51	2601	7.141
2	4	1.414	52	2704	7.211
3	9	1.732	53	2809	7.280
4	16	2.000	54	2916	7.348
5	25	2.236	55	3025	7.416
6	36	2.449	56	3136	7.483
7	49	2.646	57	3249	7.550
8	64	2.828	58	3364	7.616
9	81	3.000	59	3481	7.681
10	100	3.162	60	3600	7.746
11	121	3.317	61	3721	7.810
12	144	3.464	62	3844	7.874
13	169	3.606	63	3969	7.937
14	196	3.742	64	4096	8.000
15	225	3.873	65	4225	8.062
16	256	4.000	66	4356	8.124
17	289	4.123	67	4489	8.185
18	324	4.243	68	4624	8.246
19	361	4.359	69	4761	8.307
20	400	4.472	70	4900	8.367
21	441	4.583	71	5041	8.426
22	484	4.690	72	5184	8.485
23	529	4.796	73	5329	8.544
24	576	4.899	74	5476	8.602
25	625	5.000	75	5625	8.660
26	676	5.099	76	5776	8.718
27	729	5.196	77	5929	8.775
28	784	5.292	78	6084	8.832
29	841	5.385	79	6241	8.888
30	900	5.477	80	6400	8.944
31	961	5.568	81	6561	9.000
32	1024	5.657	82	6724	9.055
33	1089	5.745	83	6889	9.110
34	1156	5.831	84	7056	9.165
35	1225	5.916	85	7225	9.220
36	1296	6.000	86	7396	9.274
37	1369	6.083	87	7569	9.327
38	1444	6.164	88	7744	9.381
39	1521	6.245	89	7921	9.434
40	1600	6.325	90	8100	9.487
41	1681	6.403	91	8281	9.539
42	1764	6.481	92	8464	9.592
43	1849	6.557	93	8649	9.644
44	1936	6.633	94	8836	9.695
45	2025	6.708	95	9025	9.747
46	2116	6.782	96	9216	9.798
47	2209	6.856	97	9409	9.849
48	2304	6.928	98	9604	9.899
49	2401	7.000	99	9801	9.950
50	2500	7.071	100	10000	10.000

### 3. CALCULATING SQUARE ROOTS

Round to  $\frac{1}{10}$ :

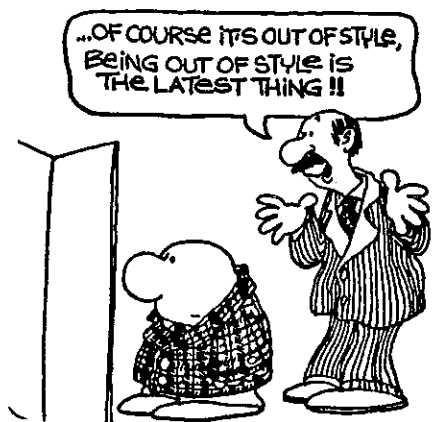
- |                 |                 |
|-----------------|-----------------|
| ① $\sqrt{210}$  | ⑤ $\sqrt{2825}$ |
| ② $\sqrt{330}$  | ⑥ $\sqrt{1650}$ |
| ③ $\sqrt{4425}$ | ⑦ $\sqrt{3790}$ |
| ④ $\sqrt{5250}$ | ⑧ $\sqrt{6000}$ |

Round to  $\frac{1}{100}$ :

- |               |              |
|---------------|--------------|
| ⑨ $\sqrt{68}$ | ⑪ $\sqrt{5}$ |
| ⑩ $\sqrt{90}$ | ⑫ $\sqrt{8}$ |

### 4. SIMPLE INTEREST

- ① \$850 @ 8% for 1 year
- ② \$1200 @ 12% for 6 months
- ③ \$5000 @ 4.5% for 2 years
- ④ \$1500 @ 10.5% for 18 months
- ⑤ \$6500 @ 9% for 5 years

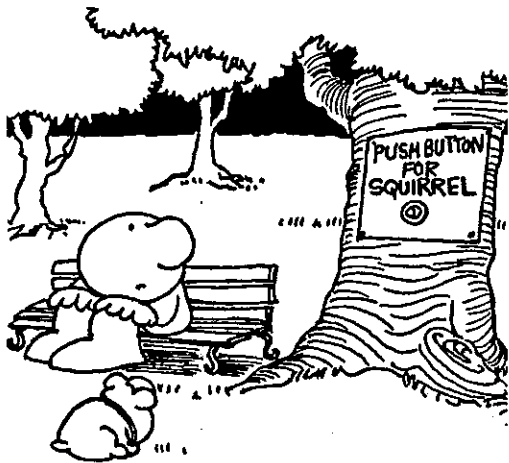


- ⑥ \$35,000 @ 8.5% for 30 months
- ⑦ \$2750 @ 11% for 3 months
- ⑧ \$4500 @ 12% for 3 yrs, 3 months
- ⑨ \$6000 @ 9.5% for 5 years
- ⑩ \$8750 @ 10.5% for 21 months

### 5. COMPOUND INTEREST

- ① \$9000 @ 5% compounded annually for 6 years
- ② \$8400 @ 9% compounded semi-annually for 2½ years
- ③ \$7500 @ 8% compounded quarterly for 15 months
- ④ \$6000 @ 9% compounded annually for 3 years
- ⑤ \$15,000 @ 8% compounded annually for 2 years
- ⑥ \$3500 @ 10% compounded semi-annually for 2 years
- ⑦ \$4000 @ 9% compounded semi-annually for 18 months
- ⑧ \$6500 @ 12% compounded quarterly for 1 year
- ⑨ \$5000 @ 10% compounded quarterly for 9 months

- ⑩ \$8500 @ 14% compounded quarterly for 33 months
- ⑪ \$6000 @ 12% compounded semi-annually for 3 years then quarterly for 4 years
- ⑫ \$10,000 @ 8% compounded semi-annually for 30 months then quarterly for 2½ years
- ⑬ \$6400 @ 6% compounded annually for 5 years then quarterly for 5 years
- ⑭ \$8200 @ 10% compounded semi-annually for 3 years then quarterly for 30 months



## 6. REVIEW

The following fall between what two consecutive integers?

- ①  $\sqrt{46}$       ③  $-\sqrt{8}$       ⑤  $\sqrt{13}$   
 ②  $\sqrt{92}$       ④  $-\sqrt{26}$       ⑥  $\sqrt{70}$

Use the table to determine a value using interpolation:

- ⑦  $\sqrt{3762}$       ⑩  $\sqrt{520}$   
 ⑧  $\sqrt{2467}$       ⑪  $\sqrt{2224}$   
 ⑨  $\sqrt{1394}$       ⑫  $\sqrt{278}$

Calculate to the nearest 1/10:

- ⑬  $\sqrt{620}$       ⑯  $\sqrt{6500}$   
 ⑭  $\sqrt{2010}$       ⑰  $\sqrt{2461}$   
 ⑮  $\sqrt{3210}$       ⑱  $\sqrt{3050}$

Calculate to the nearest 1/100:

- ⑲  $\sqrt{12}$       ⑳  $\sqrt{3}$   
 ⑳  $\sqrt{7}$       ㉑  $\sqrt{15}$

Determine simple interest:

- ㉒ \$4500 @ 6% for 3 years  
 ㉓ \$7200 @ 9% for 30 months  
 ㉔ \$6755 @ 4.5% for 2½ years  
 ㉕ \$2988 @ 11% for 5 years  
 ㉖ \$4620 @ 7.25% for 18 months  
 ㉗ \$3574 @ 9.15% for 3¼ years

Determine compound interest:

- ㉘ \$6400 @ 8% compounded annually for 4 years  
 ㉙ \$7500 @ 9% compounded annually for 6 years

③1) \$2455 @ 7% compounded semi-annually for 18 months

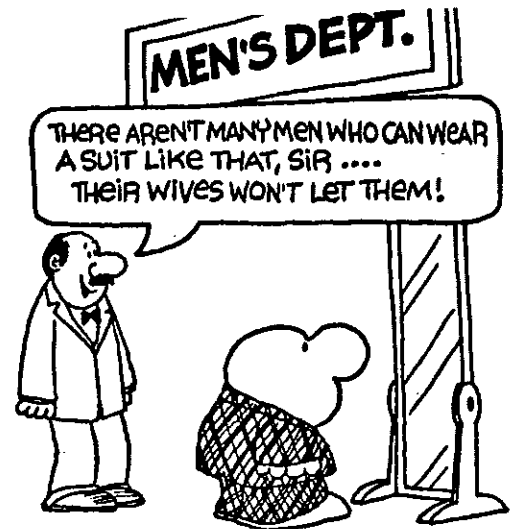
③2) \$3845 @ 9% compounded semi-annually for 30 months

③3) \$6875 @ 10% compounded quarterly for 33 months

③4) \$8210 @ 6% compounded quarterly for 2 years, 9 months

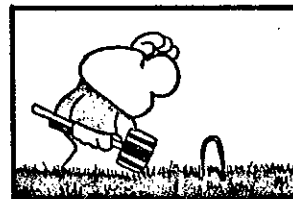
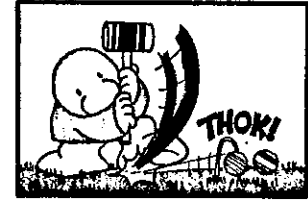
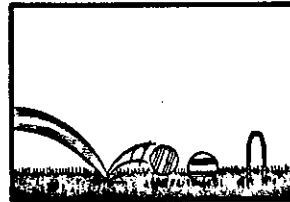
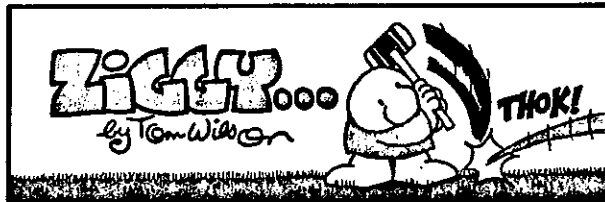
③5) \$9000 @ 8% compounded semi-annually for 3 years then quarterly for 3 years

③6) \$11,000 @ 12% compounded semi-annually for 6½ years then quarterly for 21 months



③7) \$25,000 @ 10% compounded annually for 7 years then quarterly for 3 years

③8) \$17,500 @ 14% compounded annually for 4 years then quarterly for 4 years



## UNIT 14

# Properties

### PROPERTIES

Commutative Property of Addition

$$a+b = b+a$$

$$5+12 = 12+5$$

Commutative Property of Multiplication

$$ab = ba$$

$$(8)(\frac{1}{3}) = (\frac{1}{3})(8)$$

Associative Property of Addition

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

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

Associative Property of Multiplication

$$(ab)c = a(bc)$$

$$(4 \cdot 7)(2) = (4)(7 \cdot 2)$$

Additive Inverse

$$(a) + (-a) = 0$$

$$6 + (-6) = 0$$

Multiplicative Inverse

$$(a)(\frac{1}{a}) = 1$$

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

Additive Identity

$$a + 0 = a$$

$$(13) + 0 = 13$$

Multiplicative Identity

$$(a)(1) = a$$

$$(7)(1) = 7$$

Zero Property

$$(a)(0) = 0$$

$$(4\frac{1}{2})(0) = 0$$

Distributive Property

$$a(b+c) = ab+ac$$

$$3(5+9) = 15+27$$

Closure ( $a$  &  $b$  are rational):

Addition is closed for rational numbers

$$a+b = \text{rat. numb.}$$

$$5 + \bar{7} = \text{rat. no.}$$

Multiplication is closed for rat. numbers

$$ab = \text{rat. numb.}$$

$$(\frac{2}{3})(-1) = \text{rat. no.}$$

Properties of Equality:

Reflexive Property of Equality

$$a = a$$

Symmetric Property of Equality

$$\text{If } a = b \text{ then } b = a$$

Transitive Property of Equality

$$\text{If } a = b \text{ and } b = c \text{ then } a = c$$

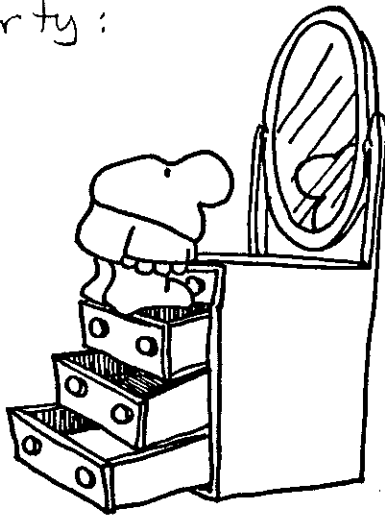
Substitution Property of Equality

$$\text{If } a = b \text{ then } a \text{ may be replaced by } b$$

## 1. PROPERTIES OF REAL NUMBERS

Identify the property:

- ①  $19 \cdot 1 = 19$
- ②  $6 + (-6) = 0$
- ③  $x + y = y + x$
- ④  $0 = (x)(0)$
- ⑤  $(8+7)+5 = 8+(7+5)$
- ⑥  $(3)(\frac{1}{3}) = 1$



- ⑦  $8(x+y) = 8x + 8y$
- ⑧ If  $K$  and  $M$  are integers,  $K+M =$  an integer
- ⑨  $(6)(-\frac{2}{3}) = (-\frac{2}{3})(6)$
- ⑩  $18 = 18 + 0$
- ⑪  $(x+y)+z = z+(x+y)$
- ⑫  $(8 \cdot 3)(6) = (8)(3 \cdot 6)$

## 2. PROPERTIES OF EQUALITY

Identify the property:

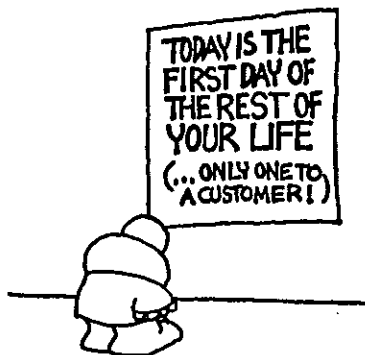
- ①  $6 + (-8) = 6 + (-8)$
- ② If  $x = y - a$  and  $y - a = c^2$  then  $x = c^2$
- ③ If  $r = 7 - 2n$  then  $7 - 2n = r$
- ④  $n(x - 3^2) = n(x - 9)$
- ⑤ If  $a = b$  then  $a^2 - 1 = b^2 - 1$
- ⑥  $4x - 6 = 4x - 6$
- ⑦ If  $a^2 - \frac{c}{3} = 2$  then  $2 = a^2 - \frac{c}{3}$
- ⑧ If  $x^2 = 2a + b$  and  $2a + b = n$  then  $x^2 = n$

## 3. ALL PROPERTIES

Identify the property:

- ①  $(n + 3a) + c^2 = n + (3a + c^2)$
- ②  $4a \cdot \frac{1}{4a} = 1$
- ③  $17 \cdot 0 = 0$
- ④  $n - 7 + b^2 = n - 7 + b^2$
- ⑤  $49 - x^2y = 7^2 - x^2y$
- ⑥  $(a+b)+c = c+(a+b)$

- ⑦  $(6 \cdot 7) \cdot 8 = 6 \cdot (7 \cdot 8)$
- ⑧  $7 - 2a = (7 - 2a) + 0$
- ⑨  $ab - 3a^2 = a(b - 3a)$
- ⑩ If  $n^2 = 12$  then  $12 = n^2$
- ⑪  $6 + (-6) = (-6) + 6$
- ⑫  $xy = yx$
- ⑬  $(-c^2) + (c^2) = 0$
- ⑭  $(1)(-6xy) = -6xy$
- ⑮  $8 + (-7) = \text{an integer}$
- ⑯ If  $n = 8$  and  $8 = c$  then  $n = c$
- ⑰ If  $s = 7$  then:  
 $3(7) - n^2 = 3s - n^2$
- ⑱  $a + (x - y) = (x - y) + a$
- ⑲  $2n(n - 3x) = 2n^2 - 6nx$
- ⑳ If  $x$  and  $y$  are whole numbers, then  $(x)(y)$  is a whole number



## TYPES OF NUMBERS

### NATURAL NUMBERS

1, 2, 3, 4... all counting numbers

### WHOLE NUMBERS

0, 1, 2, 3... zero and natural numbers

### INTEGERS

... -2, -1, 0, 1, 2... whole numbers and negative counting numbers

### RATIONAL NUMBERS

all integers and all repeating and terminating decimals Ex:  $-\frac{3}{4}$ , 2.3, -6.014, 0, 12.5

### IRRATIONAL NUMBERS

exclusive of rational numbers, includes all infinite decimals  
Ex:  $\pi$ ,  $\sqrt{3}$ ,  $-2\sqrt{5}$

### REAL NUMBERS

includes all rational and irrational numbers (all of the above)

### IMAGINARY NUMBERS

exclusive of real numbers, includes negative square roots Ex:  $\sqrt{-6}$

#### 4. TYPES OF NUMBERS

Identify as Rational (R), Irrational (IR), or Imaginary (IM):

- |                   |                   |                  |
|-------------------|-------------------|------------------|
| ① $-\sqrt{9}$     | ⑧ $\sqrt{-16}$    | ⑮ $\sqrt{1}$     |
| ② $-3\frac{1}{4}$ | ⑨ $-2.14$         | ⑯ $-\sqrt{7}$    |
| ③ $\sqrt{-5}$     | ⑩ $-\pi$          | ⑰ $\sqrt{-3}$    |
| ④ $\pi$           | ⑪ $2\frac{5}{12}$ | ⑱ $(\sqrt{5})^2$ |
| ⑤ $\sqrt{5}$      | ⑫ $\pi/3$         | ⑲ $-7/9$         |
| ⑥ $.2\bar{3}$     | ⑬ $\sqrt{-25}$    | ⑳ $-\sqrt{4}$    |
| ⑦ $3/11$          | ⑭ $.0\bar{7}$     |                  |

#### 5. REVIEW

Identify the property:

- ①  $1 = \frac{1}{7} \cdot 7$
- ②  $(-8)(-6) = \text{an integer}$
- ③ If  $n-4=7$  and  $7=22-n$  then  $n-4=22-n$
- ④  $6(a-b) = (8-2)(a-b)$
- ⑤  $3n^2-2n+1 = 3n^2-2n+1$
- ⑥  $0 = 0 \cdot 2 \cdot 6\bar{3}$
- ⑦  $0 = \pi + (-\pi)$
- ⑧  $ab^2 = b^2a$

- ⑨ If  $x^2-3=ab$  then  $ab=x^2-3$
- ⑩  $2abc-4b^2=2b(ac-2b)$
- ⑪  $(4abc) = (1)(4abc)$
- ⑫  $(2x \cdot y)c = 2x(y \cdot c)$
- ⑬  $(3+2a)+n = n + (3+2a)$
- ⑭  $x+y = y+x$
- ⑮ If  $x=y$  then  $y=x$
- ⑯  $(4a+b)+7 = 4a+(b+7)$
- ⑰ If  $n=m$  then  $4nm = 4m^2$
- ⑱  $8 \times 12$  is a whole number



Identify as Rational (R), Irrational (IR), or Imaginary (IM):

- |                  |                        |                  |
|------------------|------------------------|------------------|
| ⑲ $-7.15$        | ⑳ $-2.10\bar{3}$       | ㉑ $5$            |
| ㉒ $\sqrt{36}$    | ㉓ $-\sqrt{6}$          | ㉔ $-\sqrt{81}$   |
| ㉕ $3$            | ㉖ $3\sqrt{5}$          | ㉗ $\pi^3$        |
| ㉘ $2\frac{1}{7}$ | ㉙ $4/15$               | ㉚ $(\sqrt{3})^2$ |
| ㉛ $\pi$          | ㉜ $\sqrt{7+2\sqrt{7}}$ | ㉝ $-2$           |
| ㉞ $\sqrt{-4}$    | ㉟ $\sqrt{-1}$          | ㊱ $\sqrt{-12}$   |



## QUARTER 4

# Cumulative Review

### 1. PROBLEM SOLVING

NO CALCULATOR

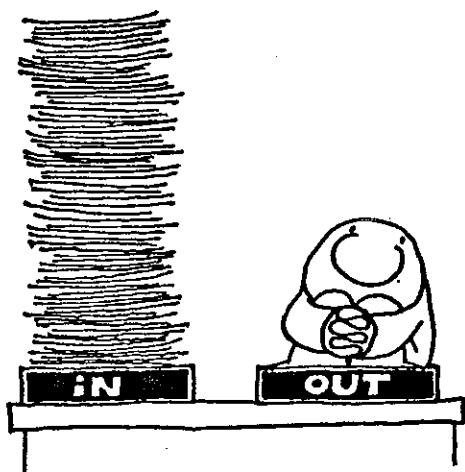
Fraction Operations:

① a)  $2\frac{1}{2} + 3\frac{3}{5}$       ③ a)  $2\frac{1}{3} \times \frac{15}{28}$   
 b)  $4\frac{1}{3} + 2\frac{3}{4}$       b)  $1\frac{1}{4} \times \frac{24}{25}$   
 c)  $1\frac{1}{4} + 4\frac{5}{6}$       c)  $2\frac{1}{2} \times \frac{4}{35}$

② a)  $8\frac{1}{4} - 3\frac{2}{3}$       ④ a)  $8 \div 1\frac{1}{4}$   
 b)  $5 - 2\frac{2}{5}$       b)  $4\frac{1}{2} \div 3$   
 c)  $4\frac{2}{5} - 1\frac{3}{4}$       c)  $6 \div 3\frac{1}{2}$

Decimal Operations:

⑤ a)  $10 - 3.14$       ⑥ a)  $.003 \times 1.15$   
 b)  $12.5 - 2.07$       b)  $2.4 \times .04$   
 c)  $5.4 - 3.75$       c)  $.06 \times .08$



Integer Operations:

⑦ a)  $(-2) + (-9)$       ⑨ a)  $(-9) \times (-7)$   
 b)  $(+6) + (-10)$       b)  $(-6) \times (+4)$   
 c)  $(-8) + (+4)$       c)  $(+12) \times (-8)$

⑧ a)  $(+7) - (-9)$       ⑩ a)  $(-15) \div (+5)$   
 b)  $(-12) - (-10)$       b)  $(+20) \div (-4)$   
 c)  $(-8) - (+5)$       c)  $(-18) \div (-9)$

Divisibility (2, 5, 10, 3, 4, 6, 9):

⑪ a) 12,435  
 b) 7,620  
 c) 5,523

Complex Fraction:

⑫ a)  $\frac{(2\frac{1}{2})}{(\frac{1\frac{1}{3}}{4})}$       b)  $\frac{(\frac{1}{2})}{(\frac{4}{1\frac{1}{2}})}$       c)  $\frac{(2)}{(\frac{1\frac{1}{4}}{5})}$

CALCULATOR ALLOWED

Central Tendency:

⑬ mean      ⑮ mode  
 ⑭ median      ⑯ range

Data (13-16):

- a) 6, -2, -5, -4, -3, 8
- b) -1, 4, 0, -5, 0, -11, 1, 4
- c) -8, -10, 2, 5, -3, -10

Renaming Division:

- ①7 a)  $\frac{4}{5} = \_ \div \_$
- b)  $\frac{7}{5} = \_ \div \_$
- c)  $\frac{9}{2} = \_ \div \_$

- ①8 a)  $\frac{2}{3} = \_ \overline{\hspace{1cm}}$
- b)  $\frac{1}{5} = \_ \overline{\hspace{1cm}}$
- c)  $\frac{2}{7} = \_ \overline{\hspace{1cm}}$

Renaming Fractions:

- ①9 a)  $\frac{18}{4} =$  mixed numeral
- b)  $\frac{12}{9} =$  mixed numeral
- c)  $\frac{20}{14} =$  mixed numeral
- ②0 a)  $3\frac{1}{8} =$  improper fraction
- b)  $2\frac{4}{5} =$  improper fraction
- c)  $3\frac{1}{2} =$  improper fraction

Give the value of "4" in:

- ②1 a) 38.1458
- b) 6.2543
- c) 81.4725

Expand:

- ②2 a) 30,000.005
- b) 20.08
- c) 300.0104

Exponents:

- ②3 a)  $5^3$
- b)  $2^5$
- c)  $4^0$
- ②4 a)  $6^0$
- b)  $3^3$
- c)  $8^0$

GCF and LCM:

- ②5 a) GCF 18, 24
- b) GCF 22, 33
- c) GCF 14, 42
- ②6 a) LCM 12, 20
- b) LCM 9, 15
- c) LCM 30, 25

Prime Factorization:

- ②7 a) 108
- b) 200
- c) 240

Primes and Composites:

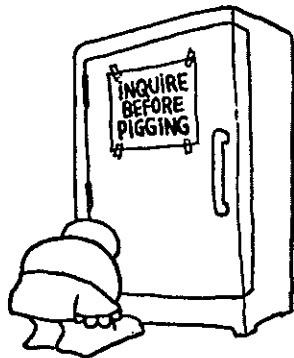
- ②8 a) Primes 15-20
- b) Primes 25-30
- c) Primes 30-35
- ②9 a) Com. 16-22
- b) Com. 35-40
- c) Com. 41-45

Round 798.9837 :

- 30) a) nearest 10  
b) nearest 1  
c) nearest 100
- 31) a) nearest  $\frac{1}{10}$   
b) nearest  $\frac{1}{10^3}$   
c) nearest  $\frac{1}{10^2}$

Comparisons:

- 32) a)  $\frac{8}{5} \square 1\frac{2}{3}$   
b)  $\frac{14}{3} \square 4\frac{3}{4}$   
c)  $\frac{9}{7} \square 1\frac{1}{4}$



- 33) a)  $2.6 \square 2.58$   
b)  $2.04 \square 2.1$   
c)  $3.4 \square 3.403$
- 34) a)  $-12 \square -15$   
b)  $-7 \square -5$   
c)  $-8 \square 0$

Appropriate Metric Units:

- 35) a) capacity of park district swimming pool  
b) weight of a person  
c) length of pencil
- 36) a) weight of a truck  
b) height of a tree  
c) capacity of auto gas tank

Metric Conversions:

- 37) a)  $2.34 \text{ kg} = \text{g}$   
b)  $400 \text{ mm} = \text{cm}$   
c)  $5.4 \text{ l} = \text{kL}$
- 38) a)  $45.2 \text{ cm} = \text{m}$   
b)  $2500 \text{ mg} = \text{kg}$   
c)  $4.5 \text{ l} = \text{mL}$

Temperature Conversions:

- 39) a)  $40^\circ\text{F} = ^\circ\text{C}$   
b)  $15^\circ\text{F} = ^\circ\text{C}$   
c)  $-6^\circ\text{F} = ^\circ\text{C}$
- 40) a)  $80^\circ\text{C} = ^\circ\text{F}$   
b)  $-10^\circ\text{C} = ^\circ\text{F}$   
c)  $6^\circ\text{C} = ^\circ\text{F}$

Comparative Purchasing:  
(include unit prices)

- 41) a) item 1: 50 cm for \$3.00  
item 2: .75 m for \$5.00
- b) item 1: 3 l for \$6.25  
item 2: 800 ml for \$1.56
- c) item 1: 24 kg for \$62.50  
item 2: 5000 g for \$12.50

Equivalence:

- 42) a)  $\frac{5}{8} = \%$   
b)  $\frac{3}{4} = \%$   
c)  $\frac{4}{5} = \%$
- 43) a)  $\frac{4}{9} = \text{dec.}$   
b)  $\frac{7}{8} = \text{dec.}$   
c)  $\frac{5}{6} = \text{dec.}$
- 44) a)  $.06 = \text{frac.}$   
b)  $.24 = \text{frac.}$   
c)  $.4 = \text{frac.}$
- 45) a)  $8\% = \text{frac.}$   
b)  $12\frac{1}{2}\% = \text{frac.}$   
c)  $1.5\% = \text{frac.}$

- 46) a)  $9.3\% = \text{decimal}$   
b)  $1.25\% = \text{decimal}$   
c)  $20.5\% = \text{decimal}$

## Problem Solving:

- (47) a) What is 2% of 120?  
b) 6 is 40% of what?  
c) What is 12% of 80?
- (48) a) A piano lesson takes  $\frac{2}{5}$  of an hour. How many lessons can be taught in 4 hours?  
b)  $\frac{2}{3}$  of the students are boys,  $\frac{1}{8}$  of the boys received an "A." What fraction of the class represents boys who received an "A" ?  
c) There is  $3\frac{1}{2}$  hours of work to be done. If 10 people share the work, how much will each have to do?
- (49) a) 9 players scored during the game. This represents 60% of the players on the team. How many players on the team?  
b) 35 colored pencils. 80% are red, blue, or black. All others are green. How many of the pencils are green?

c) 8 people can't attend the party. This is 5% of those who were invited. How many plan to attend?

- (50) a) The original price is \$16. The discount is 15%, what is the selling price?  
b) Discount is \$6. Discount is 20%. What is the selling price?  
c) The original price is \$72. The selling price is \$63. What is the rate of discount?



## 2. ALGEBRA

### Order of Operations:

- ① a)  $-4^2 - (-6) \times (-5)$   
b)  $(-2)^4 - (-2) \times (+4) + 1$   
c)  $-5^2 - (-4) \times (-3) - 1$

### Evaluating Expressions:

$$x = -1, y = -2$$

- ② a)  $3x^3y^2 - xy$   
b)  $2(x^2 - y) - y^3$   
c)  $xy + 2x^2y^3$

### Simplifying Expressions:

- ③ a)  $6x + 2y(x - y) + 3xy$   
b)  $2x(x - y) - 3(2x^2 - xy)$   
c)  $3ab - 2a(a + 2b) - a^2$

### Number Sentences:

Eq/Ineq, Op/Cl, T/F

- ④ a)  $6 - (-1)^3 \leq 7$   
b)  $2n - 3(n - 1) > 4$   
c)  $7 - 2^2 = 11$

### Repeating Decimals:

- ⑤ a)  $.2\bar{6} = \text{fraction}$   
b)  $.01\bar{5} = \text{fraction}$   
c)  $.2\bar{3} = \text{fraction}$

### Equations:

- ⑥ a)  $8 - \frac{5n}{3} = -2$   
b)  $12 + \frac{4x}{6} = 10$   
c)  $\frac{7n}{5} - 10 = 4$

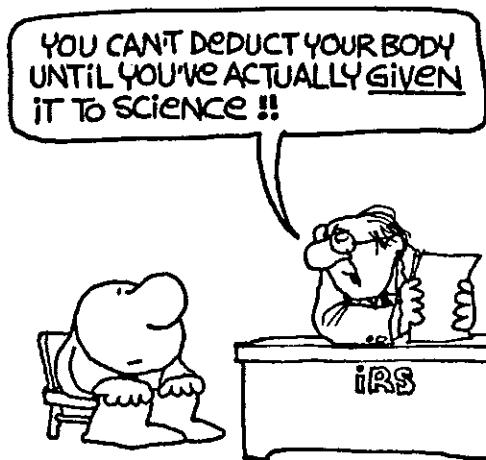
- ⑦ a)  $2(3n - 3) = 12 + 3n$   
b)  $3(5 - 4x) = 23 - 8x$   
c)  $12 - 2(n - 3) = 5(3 - n)$

### Inequalities:

- ⑧ a)  $-3x - 4 < 5$   
b)  $12 - 2(n - 1) > 5 + 3(4 + 3n)$   
c)  $-2n + 7 \leq 17$

### Integer Problems:

- ⑨ a) Find the middle of three consecutive odd integers whose sum is  $-9$ .  
b) Find the largest of four consecutive integers whose sum is  $26$ .  
c) Find the middle of three consecutive even integers if twice the largest decreased by the smallest is  $12$ .



⑩ a) Two less than three times a number is one more than four times the number. Find the number.

b) Five more than twice a number decreased by three more than the number is four. Find the number.

c) Four less than five times a number decreased by two more than twice the number is 6. Find the number.



Graph on a Number Line:  
(include the algebraic solution and number line)

⑪ a)  $-\frac{4x}{3} > -8$

b)  $4a - 2(5a + 1) \leq -14$

c)  $8 - \frac{2n}{5} < 10$

Determine Slope:

⑫ a)  $(-3, 4)$   $(-8, 14)$

b)  $(0, -7)$   $(-2, -3)$

c)  $(-6, 4)$   $(-6, -8)$

Change to Slope-Intercept Form:

⑬ a)  $5x - 3y = 15$

b)  $x - 2y = 8$

c)  $4x - 3y = -6$

Determine Slope and Intercepts:

⑭ a)  $y = -5x + 10$

b)  $y = x - 4$

c)  $y = 2x - 6$

Graph on a Coordinate Axis:

⑮ a)  $y = -2x + 8$

b)  $y = 3x - 12$

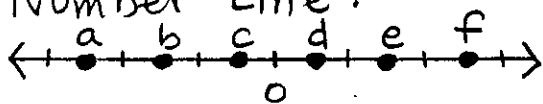
c)  $y = \frac{1}{2}x - 5$

⑯ a)  $(0, 0)$   $m = \frac{1}{5}$

b)  $(-2, 5)$   $m = -6$

c)  $(1, 4)$   $m = \frac{2}{3}$

Number Line:



- ⑰ a)  $c^2 \square -c$   
 b)  $a^2 \square b^3$   
 c)  $e - c \square c - e$

Square Roots:

- ⑱ a)  $\sqrt{90}$  is between what two consecutive integers  
 b)  $-\sqrt{10}$  is between what two consecutive integers  
 c)  $\sqrt{18}$  is between what two consecutive integers
- ⑲ a) Calculate  $\sqrt{450}$  to the nearest  $\frac{1}{10}$  and show work  
 b) Calculate  $\sqrt{5000}$  to the nearest  $\frac{1}{10}$  and show work  
 c) Calculate  $\sqrt{1100}$  to the nearest  $\frac{1}{10}$  and show work
- ⑳ a) Interpolate a value for  $\sqrt{2254}$   
 b) Interpolate a value for  $\sqrt{979}$   
 c) Interpolate a value for  $\sqrt{2147}$

## SQUARES & SQUARE ROOTS

N	N <sup>2</sup>	$\sqrt{N}$	N	N <sup>2</sup>	$\sqrt{N}$
1	1	1.000	51	2601	7.141
2	4	1.414	52	2704	7.211
3	9	1.732	53	2809	7.280
4	16	2.000	54	2916	7.348
5	25	2.236	55	3025	7.416
6	36	2.449	56	3136	7.483
7	49	2.646	57	3249	7.550
8	64	2.828	58	3364	7.616
9	81	3.000	59	3481	7.681
10	100	3.162	60	3600	7.746
11	121	3.317	61	3721	7.810
12	144	3.464	62	3844	7.874
13	169	3.606	63	3969	7.937
14	196	3.742	64	4096	8.000
15	225	3.873	65	4225	8.062
16	256	4.000	66	4356	8.124
17	289	4.123	67	4489	8.185
18	324	4.243	68	4624	8.246
19	361	4.359	69	4761	8.307
20	400	4.472	70	4900	8.367
21	441	4.583	71	5041	8.426
22	484	4.690	72	5184	8.485
23	529	4.796	73	5329	8.544
24	576	4.899	74	5476	8.602
25	625	5.000	75	5625	8.660
26	676	5.099	76	5776	8.718
27	729	5.196	77	5929	8.775
28	784	5.292	78	6084	8.832
29	841	5.385	79	6241	8.888
30	900	5.477	80	6400	8.944
31	961	5.568	81	6561	9.000
32	1024	5.657	82	6724	9.055
33	1089	5.745	83	6889	9.110
34	1156	5.831	84	7056	9.165
35	1225	5.916	85	7225	9.220
36	1296	6.000	86	7396	9.274
37	1369	6.083	87	7569	9.327
38	1444	6.164	88	7744	9.381
39	1521	6.245	89	7921	9.434
40	1600	6.325	90	8100	9.487
41	1681	6.403	91	8281	9.539
42	1764	6.481	92	8464	9.592
43	1849	6.557	93	8649	9.644
44	1936	6.633	94	8836	9.695
45	2025	6.708	95	9025	9.747
46	2116	6.782	96	9216	9.798
47	2209	6.856	97	9409	9.849
48	2304	6.928	98	9604	9.899
49	2401	7.000	99	9801	9.950
50	2500	7.071	100	10000	10.000

## Radical Operations

21) a) Simplify  $\sqrt{162}$

b) Simplify  $\sqrt{200}$

c) Simplify  $\sqrt{288}$

22) a)  $5\sqrt{6} \times 2\sqrt{3}$

b)  $2\sqrt{2} \times \sqrt{10}$

c)  $3\sqrt{3} \times 2\sqrt{15}$

## Calculating Interest:

23) a) Principal and simple interest for \$12,000 @ 7% for  $2\frac{1}{2}$  years

b) Principal and simple interest for \$8,450 @  $6\frac{1}{2}$ % for  $6\frac{1}{2}$  yrs.

c) Principal and simple interest for \$13,200 @ 8% for 2 yrs. 3 mos.

24) a) Principal and compound interest for \$16,200 @ 14% compounded quarterly for 15 months.

b) Principal and interest for \$13,400 @ 10% compounded quarterly for 3 years

c) Principal and interest for \$9,800 @ 11% compounded semi-annually for 30 mos.



## Identify the Property:

25) a)  $2n + 0 = 2n$

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

c)  $6(a+b) = 6a + 6b$

26) a)  $4n - 2 = 4n - 2$

b) If  $a = b$ , then  $5a = 5b$

c) If  $4x = y$ , then  $y = 4x$

## Types of Numbers:

Rational (R), Irrational (IR), Imaginary (IM)

27) a)  $\pi$

b)  $-4\sqrt{3}$

c)  $\sqrt{25}$

28) a)  $\sqrt{-8}$

b)  $3\sqrt{2}$

c)  $2.0\bar{7}$



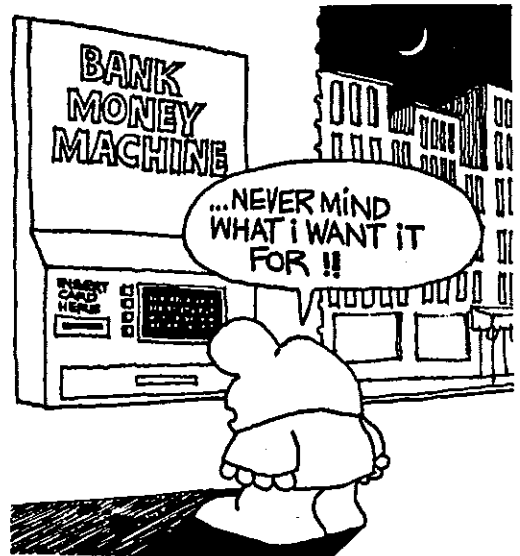
### 3. GEOMETRY

Terms and Concepts:

- ① Name a triangle with
  - a) two sides congruent ; all angles congruent
  - b) one obtuse angle ; no congruent sides
  - c) all acute angles ; all sides congruent
  
- ② Name the polygon
  - a) rhombus with four right angles ; eight sided polygon
  - b) quadrilateral with one pair of parallel sides ; a five sided polygon
  - c) parallelogram with all sides congruent ; seven sided polygon
  
- ③ How many degrees in
  - a) a quadrilateral ; each angle in a regular octagon
  - b) a pentagon ; each angle in an equilateral triangle

c) a heptagon ; each angle of a regular hexagon

- ④ Give the term for
  - a) instrument used to measure angles ; set of connected points in a plane
  - b) line segment connecting two points on a circle ; simple closed curve made of line segments
  - c) location without dimension ; ratio of circumference to diameter in a circle



- ⑤ True/False (Circles)
  - a) a diameter is the longest chord in a circle ; a circle has  $360^\circ$

b) a radius is a chord; the circumference of a circle is equal to  $\pi d$

c) a semi-circle is exactly half of a circle; a circle is a regular polygon

### ⑥ TRUE/FALSE (Triangles)

a) all equilateral triangles are also equiangular; a scalene triangle has exactly half as many degrees as two isosceles triangles

b) a right triangle cannot have an obtuse angle in it; an isosceles triangle is exclusive of an obtuse triangle

c) a scalene triangle is exclusive of a right triangle; an equiangular triangle is a regular polygon



### ⑦ TRUE/FALSE (Lines and Points)

a) the non-parallel sides of a rectangle are perpendicular; there are more points on a line than on a ray

b) the intersection of a line and a plane is a point; the point at the center of a square is equal distance from all points on the square

c) the intersection of two planes is a line; parallel lines must be in the same plane

### ⑧ TRUE/FALSE (Polygons)

a) a rhombus is a parallelogram and a square; all octagons are regular polygons

b) a parallelogram is a quadrilateral and a polygon; a pentagon has three times as many degrees as a triangle

c) a square is a rectangle, but a rectangle is not always a square; a trapezoid is exclusive of all parallelograms

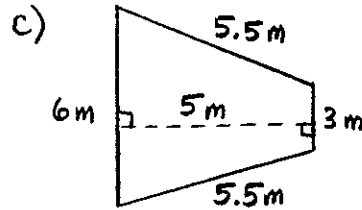
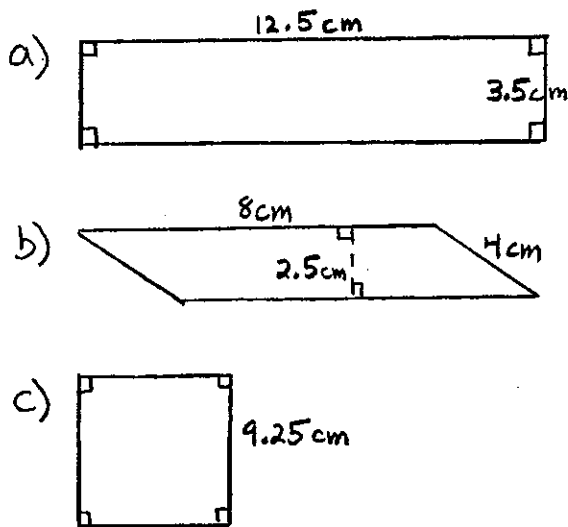
Coordinate Axis:

9 Identify the quadrant containing the point

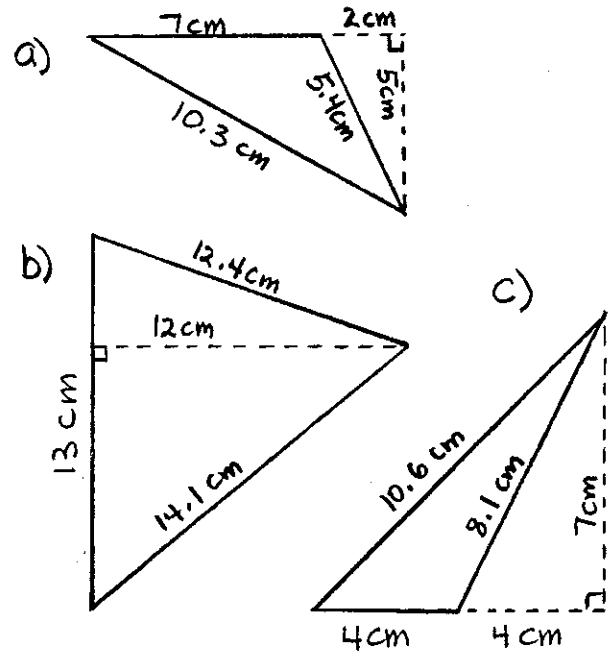
- a) (-5, -8)
- b) (4, -3)
- c) (-9, 2)

Area and Perimeter:

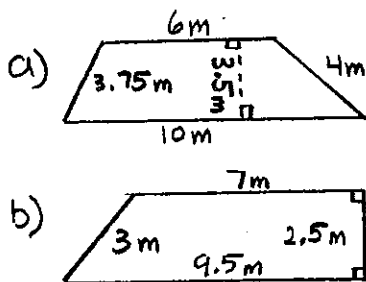
10 Calculate area and perimeter for these parallelograms



12 Calculate area and perimeter for these triangles



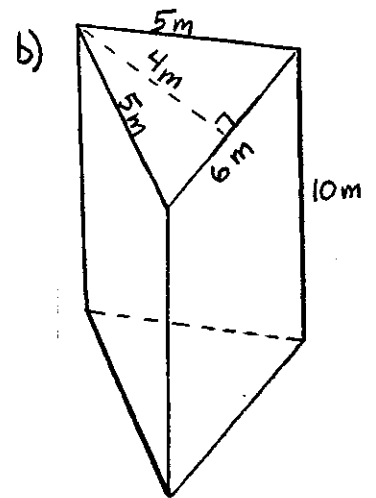
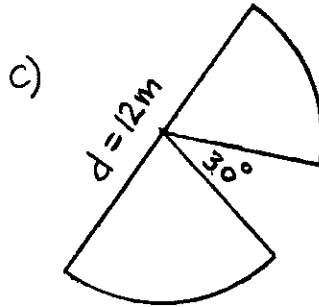
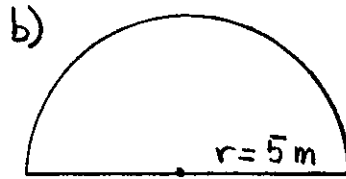
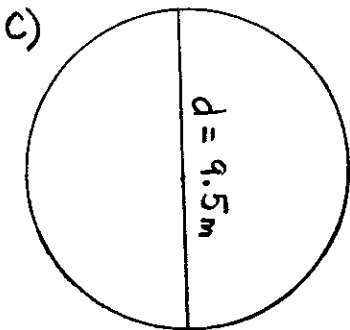
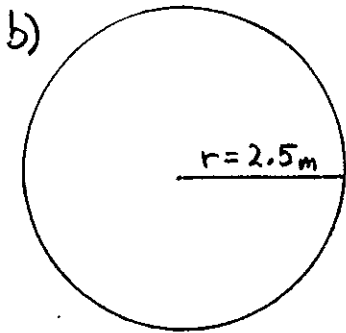
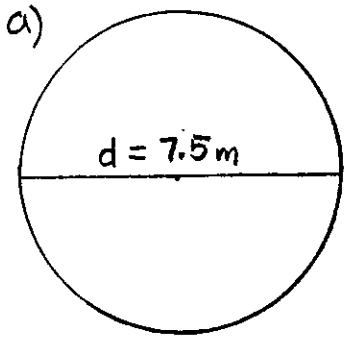
11 Calculate area and perimeter for these trapezoids



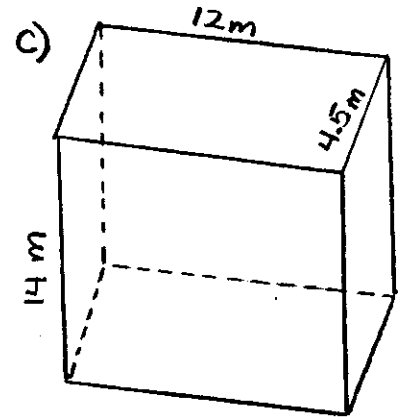
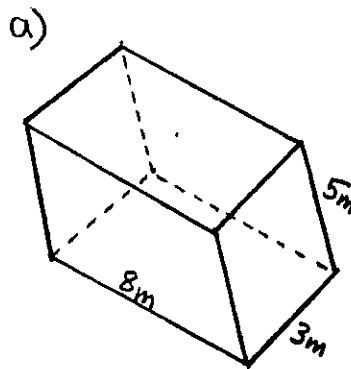
...I MISS THE GOOD OLD DAYS  
...THINGS WERE MUCH MORE LIKE THEY USED TO BE BACK THEN!



⑬ Calculate area and circumference ( $\pi$  and 3.14)

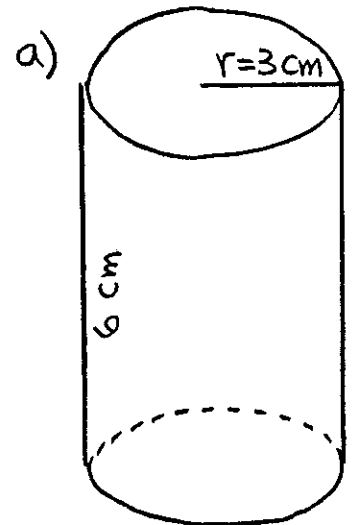
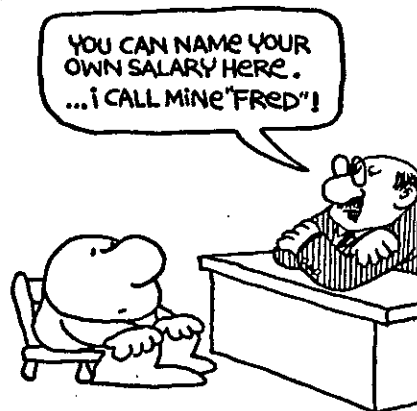
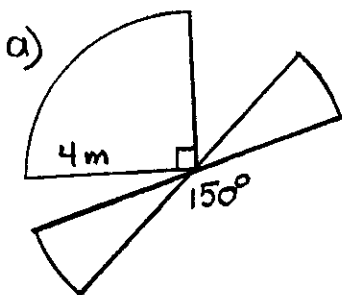


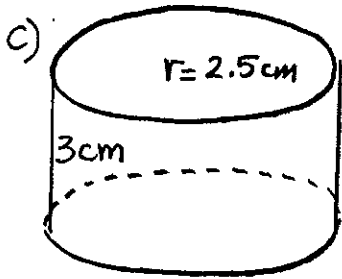
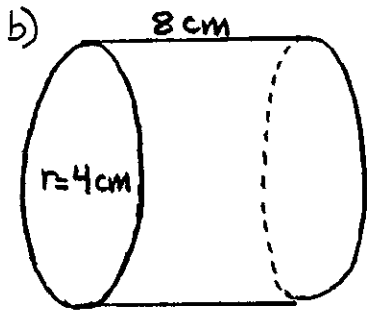
⑮ Determine volume and surface area for prisms



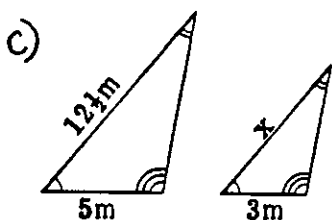
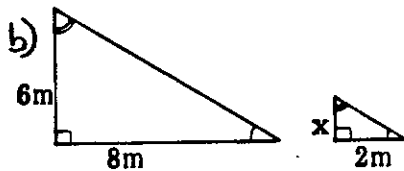
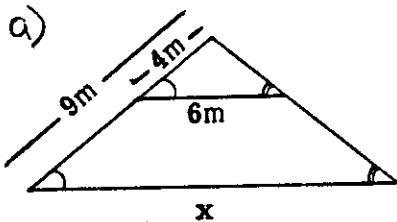
⑯ Calculate volume and surface area for cylinders (3.14 method)

⑭ Calculate area and circumference ( $\pi$  and 3.14)

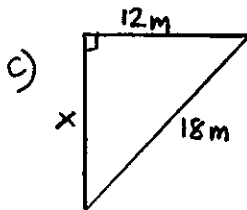
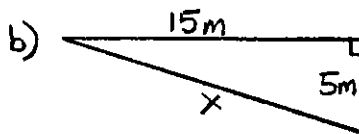
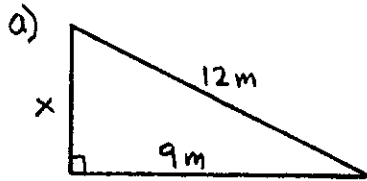




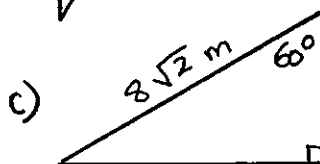
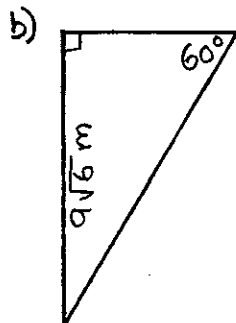
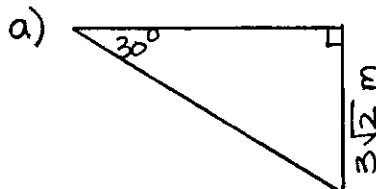
⑰ Similar Triangles  
Solve for  $x$



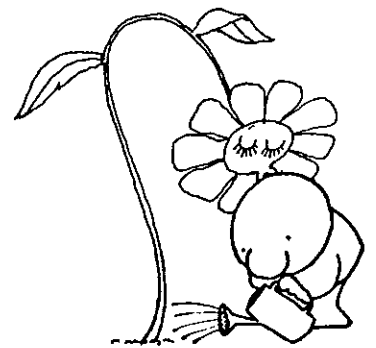
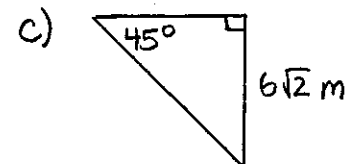
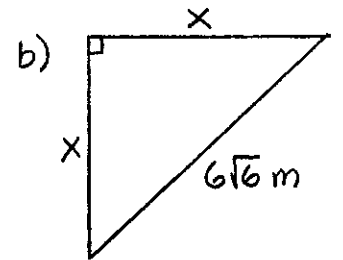
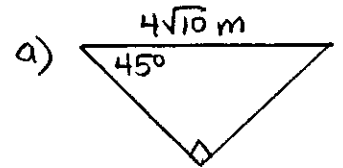
⑱ Pythagorean Theorem  
Solve for  $x$  (use radical notation)



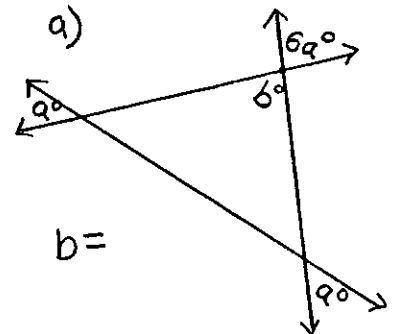
⑲ Special Rt. Triangle  
30-60-90 (find the missing sides)



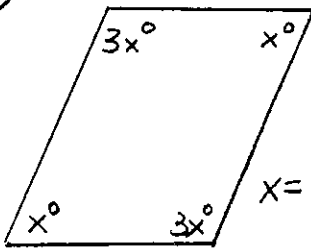
⑳ Special Rt. Triangle  
45-45-90 (find the missing sides)



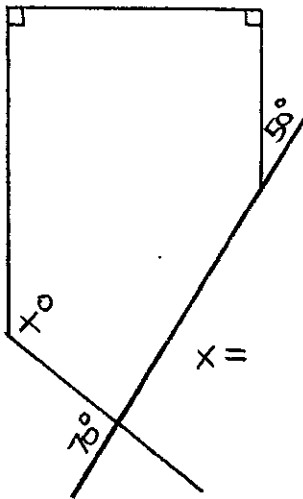
㉑ Angle Relationships



b)



c)



23) Name the angles (diagram #22)

- a) adjacent to  $\angle b$  (two answers)
- b) supplementary to  $\angle c$  (four answers)
- c) alternate interior angles (two answers of two angles each)

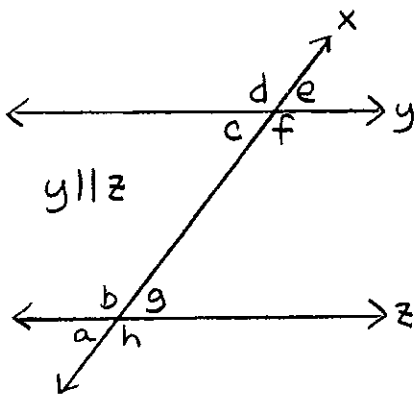
#### 4. VOCABULARY

#### Basic Curriculum

Addend  
 Capacity  
 Celsius  
 Central Tendency  
 Complex Fraction  
 Composite Number  
 Data  
 Denominator  
 Difference  
 Discount  
 Dividend  
 Divisor  
 Equivalent  
 Even Number  
 Factor  
 Fahrenheit  
 Gram  
 Greatest Common Factor  
 Improper Fraction  
 Infinite Decimal  
 Least Common Multiple  
 Liter  
 Mean  
 Median  
 Meter

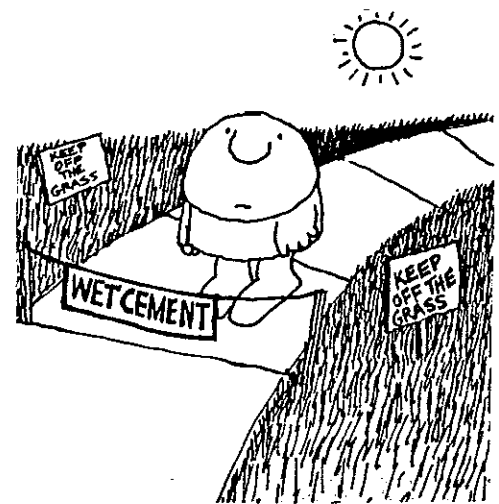
Minuend  
 mixed Numeral  
 Mode  
 Multiple  
 Numerator  
 Odd Number  
 Original Price  
 Percent  
 Prime Factorization  
 Prime Number  
 Product  
 Proportion  
 Purchase Price  
 Quotient  
 Range  
 Rate of Discount  
 Reciprocal  
 Regular Price  
 Repeating Decimal  
 Selling Price  
 Subtrahend  
 Sum  
 Terminating Decimal  
 Undefined Value

22) Name the angles



- a) vertical to  $\angle h$
- b) corresponding to  $\angle e$
- c) forms linear pair with  $\angle c$  (2 answers)

- ① Bottom value in a fraction
- ② Product of prime numbers producing the original value
- ③ The multiplicative inverse
- ④ Comparison of two ratios
- ⑤ Top number in a subtraction problem
- ⑥ Non-repeating, non-terminating decimal
- ⑦ In a division problem, the number outside the bracket, to the right of the  $\div$  sign, or in the denominator
- ⑧ Metric unit of measure (weight)
- ⑨ Middle value in a set of data
- ⑩ Price of an item after the discount is subtracted
- ⑪ A number added to another number
- ⑫ Metric unit of measure (capacity)
- ⑬ Number that can be divided evenly into another number
- ⑭ Item occurring most frequently in a set of data
- ⑮ Statistical measures (mean, median, mode, range)
- ⑯ A number with factors other than one and itself
- ⑰ Temperature scale based on water freezing at  $0^{\circ}$  and boiling at  $100^{\circ}$
- ⑱ Percent of the original price deducted to determine the selling price



- ⑲ Every other number starting with one
- ⑳ Fraction with numerator larger than denominator
- ㉑ The amount that can be held in a container
- ㉒ Solution to a subtraction problem

②③ Largest number that divides evenly into two or more given numbers

②④ Decimal value with a definite number of digits

②⑤ Any value that includes division by zero

②⑥ Value expressed by whole number and a fraction

②⑦ Set of values used in determining the measures of central tendency



②⑧ Temperature scale based on water freezing at  $32^{\circ}$  and boiling at  $212^{\circ}$

②⑨ Ratio with 100 as bottom term

③① Smallest number that original numbers divide into evenly

③① Metric unit of measure (length)

③② Beginning price of an item before discount is subtracted

③③ Average of the data

③④ Amount of money subtracted from the original price

③⑤ Decimal that repeats a pattern of digits to infinity

③⑥ Fraction containing another fraction

③⑦ Top value in a fraction

③⑧ Difference between largest and smallest values in data

③⑨ Whole number greater than one with factors of only one and itself

④① Solution to an addition problem

④① Bottom number in a subtraction problem

④② In a division problem, the number inside the bracket, left of the sign, in the numerator

④③ Having equal measures



④④ Number that can be divided evenly by the original number.

④⑥ Every other number starting with zero

④⑤ Solution to a mult. problem

④⑦ Solution to division problem

### Algebra Terms

Absolute Value  
Additive Identity  
Additive Inverse  
Associative Property  
Closed Sentence  
Closure  
Coefficient  
Commutative Property  
Compound Interest  
Constant  
Coordinate Axis  
Distributive Property  
Equation  
Evaluating Expressions  
Exponent  
Expression  
False Equation  
False Inequality  
Graphing

Horizontal  
Identity  
Imaginary Numbers  
Index  
Inequality  
Integers  
Intercept  
Interpolating  
Irrational Numbers  
Linear Equations  
Multiplicative Identity  
Multiplicative Inverse  
Natural Numbers  
Open Sentence  
Order of Operations  
Ordered Pair  
Origin  
Principal  
Quadrant

Radical  
Radical  
Ratio  
Rational Numbers  
Real Numbers  
Reflexive Property  
Simple Interest  
Simplifying Expressions  
Slope  
Slope-Intercept Form  
Standard Form  
Substitution  
Symmetric Property  
Term  
Transitive Property  
Variable  
Vertical  
Whole Numbers  
Zero Property

①  $(a+b)+c = a+(b+c)$

②  $(a)(1) = a$

③  $a = a$

④  $(ab)c = a(bc)$

⑤ If  $a = b$  and  $b = c$  then  $a = c$

⑥  $(a)(1/a) = 1$

⑦  $a+b = b+a$

⑧  $a+0 = a$

⑨ If  $a$  and  $b$  are real, then  $a+b$  is real

- ⑩  $(a)(b) = (b)(a)$
- ⑪ If  $a = b$  then  $2a = 2b$
- ⑫  $a + (-a) = 0$
- ⑬  $(a)(0) = 0$
- ⑭ If  $a = b$  then  $b = a$
- ⑮  $a(b+c) = ab + ac$
- ⑯ Interest calculated on principal only
- ⑰ Number sentence that includes a variable
- ⑱ "Power" indicating times the base number is multiplied by itself
- ⑲ Positive value of a real number (distance from 0 on a number line)
- ⑳ A fraction - indicating part of a whole
- ㉑ Counting numbers (positive integers)
- ㉒ All positive integers and zero
- ㉓ Value under the radical
- ㉔ Number to upper left of the

radical sign indicating the root to be taken

- ㉕  $(x, y)$  coordinates
- ㉖ Rise over run
- ㉗ Equation in two variables for which the graph of the solution is a straight line
- ㉘ Letter that stands for a value in an equation



- ㉙ Point where the graph of a line intersects the x or y axis
- ㉚ A value or product of coefficient and variables (Ex:  $6ab, 24, 3x^2, 29/5$ )
- ㉛ Positive and negative counting numbers plus zero

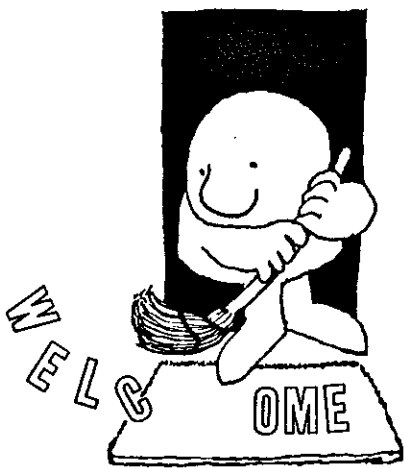
③② Term within an expression that is numerical (no variable)

③③ Form for writing a linear equation:  $Ax + By = C$

③④ Set of all infinite decimals (Ex:  $\sqrt{3}$ ,  $\pi$ )

③⑤ Showing a solution on a number line or coordinate axis

③⑥ Total amount of money invested



③⑦ Set of numbers that includes all rational and irrational numbers

③⑧ Number sentence using a sign such as:  $<$ ,  $\leq$ ,  $>$ ,  $\geq$

③⑨  $(0,0)$  on the coordinate axis

④① Equation or inequality for

which all solutions are correct (Ex:  $9 > 2$ ,  $3x = 3x$ )

④① Number used as a multiplier for a variable (Ex:  $7x$ ,  $12ab$ )

④② Number sentence showing two equal expressions

④③ Set of all numbers that are integers, fractions, terminating or repeating decimals

④④ Up and down (Ex:  $y$ -axis)

④⑤ Number sentence with no variables (Ex:  $5 - 3 = 2$ )

④⑥ Root symbol ( $\sqrt{\quad}$ )

④⑦ A term, sum or difference of terms (Ex:  $3x$ ,  $3a+2b$ ,  $5x^2+2xy+y^2$ )

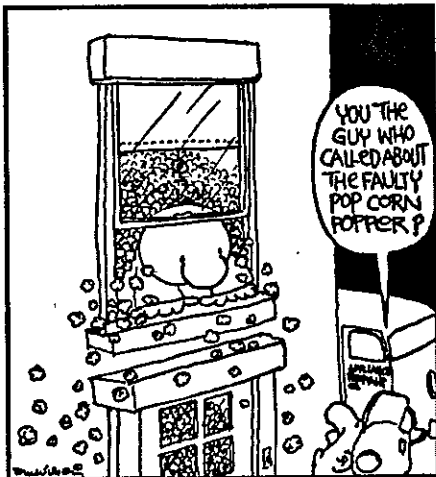
④⑧ Perpendicular number lines dividing a plane into four quadrants

④⑨ Form for writing a linear equation:  $y = mx + b$

⑤① Numbers that cannot exist in the real world (Ex:  $\sqrt{-3}$ )

⑤① Solving for the value of an algebraic expression by substituting values

- 52) Combining like terms in an expression
- 53) Across, from side to side (EX: x-axis)
- 54) Equation with no solutions
- 55) Inequality with no solutions
- 56) Interest computed on principal and interest
- 57) Rules that indicate order in which calculations are to be made
- 58) One of four regions defined by the coordinate axis
- 59) Determining a value not included in a table (such as a table of square roots)



## Geometry Terms

Acute Angle  
 Acute Triangle  
 Adjacent Angles  
 Alternate Interior Angles  
 Altitude  
 Angle  
 Arc  
 Area  
 Central Angle  
 Chord  
 Circle  
 Circumference  
 Closed Curve  
 Complementary Angles  
 Congruent  
 Corresponding Angles  
 Curve  
 Cylinder  
 Degree  
 Diameter  
 Edge  
 Equiangular Triangle  
 Equilateral Triangle  
 Exclusive  
 Face  
 Heptagon  
 Hexagon  
 Hypotenuse  
 Inclusive  
 Infinity  
 Intersection  
 Isosceles Triangle  
 Lateral Face  
 Lateral Surface

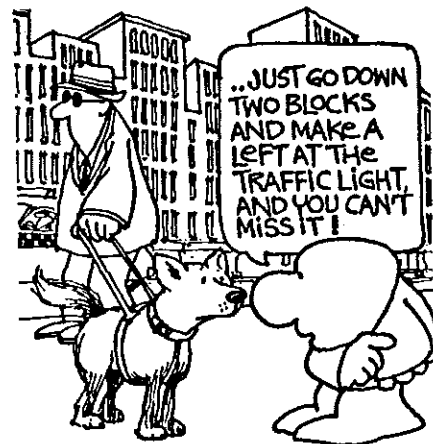
Legs  
Line  
Linear Pair  
Line of Symmetry  
Line Segment  
Obtuse Angle  
Obtuse Triangle  
Octagon  
Parallel Lines  
Parallelogram  
Pentagon  
Perimeter  
Perpendicular Lines  
Pi  
Plane

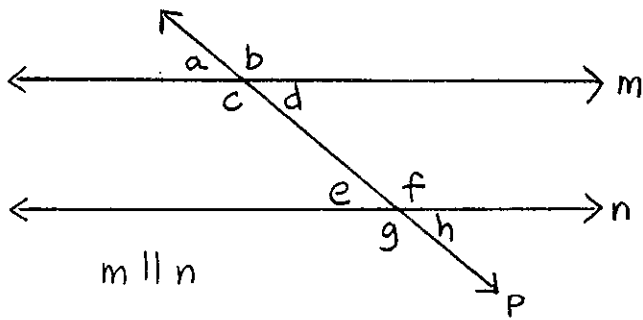
Point  
Polygon  
Protractor  
Pythagorean Theorem  
Pythagorean Triples  
Quadrilateral  
Radius  
Ray  
Rectangle  
Rectangular Prism  
Regular Polygon  
Rhombus  
Right Angle  
Right Triangle  
Scalene Triangle

Sector  
Semi-Circle  
Similar Polygons  
Simple Closed Curve  
Square  
Straight Angle  
Supplementary Angles  
Surface Area  
Transversal  
Trapezoid  
Triangle  
Triangular Prism  
Vertex  
Vertical Angles  
Volume

- ① Parallelogram with four right angles
- ② Sides adjacent to the right angle in a right triangle
- ③ Distance between two points on a circle passing through the center point
- ④ Straight set of connected points extending to infinity in two directions
- ⑤ Angles whose measures sum to  $180^\circ$
- ⑥ Angle measuring  $90^\circ$
- ⑦ Five sided polygon
- ⑧ Polygon with all sides and angles congruent
- ⑨ Unit of measure for angles
- ⑩ Concept of boundlessness in time, space, quantity
- ⑪ Distance around a polygon
- ⑫ Distance from the center point to any point on a circle
- ⑬ Section of the circumference of a circle
- ⑭ Exactly half a circle
- ⑮ Rotation measured in degrees

- (16) Line segment where two faces come together in a three dimensional figure
- (17) Three sided polygon
- (18) Triangle with no congruent sides
- (19) Simple closed curve with all points equal distance from the center point
- (20) Ratio of circumference to diameter in a circle (3.14)
- (21) Plane region of a three dimensional figure
- (22) Plane region of a three dimensional figure (not one of the bases)
- (23) Location without dimension
- (24) Seven sided polygon
- (25) Angle formed by two radii at the center of a circle
- (26) Quadrilateral with exactly one set of parallel sides
- (27) Three dimensional figure with two parallel circular bases.
- (28) "Side" surface in a prism or cylinder
- (29)  $a^2 + b^2 = c^2$  in a right triangle
- (30) Three whole numbers that can serve as side measures in a right triangle
- (31) Section of a line with definite starting and ending points
- (32) Lines in the same plane that never intersect
- (33) Section of a line with one definite starting point
- (34) Angles that relate to each other by position (Ex:  $L_a$  and  $L_e$  in the diagram on the next page)
- (35) Line that intersects parallel lines (Ex: line  $p$  in the diagram on the next page)

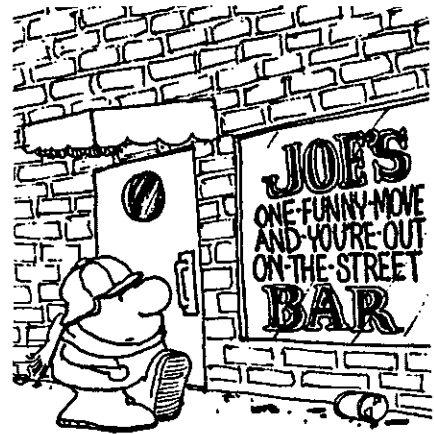




- ③⑥ Quadrilateral with two sets of parallel sides
- ③⑦ Instrument used to measure angles
- ③⑧ Measure of capacity in three dimensions (measured in cubic units)
- ③⑨ Parallelogram with all sides congruent.
- ④⑩ Triangle with all angles congruent
- ④⑪ Square units in a two dimensional figure
- ④⑫ Angles between parallel lines on opposite sides of a transversal (Ex: d and e in the diagram above)
- ④⑬ Angles whose measures sum to  $90^\circ$
- ④⑭ Equal angles on opposite

sides of intersecting lines (Ex:  $\angle g$  and  $\angle f$  in the diagram)

- ④⑮ Polygons with all measures in direct proportion to each other
- ④⑯ Triangle with all sides congruent
- ④⑰ Eight sided polygon
- ④⑱ Point or points in common between geometric figures
- ④⑲ Four sided polygon

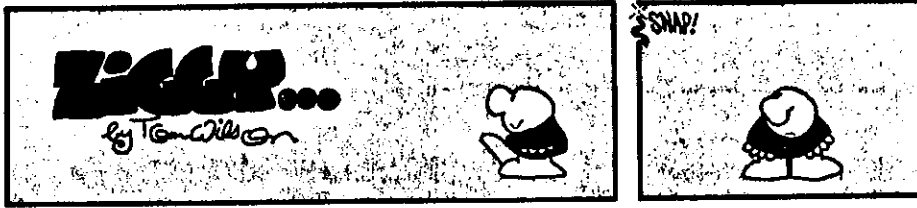


- ⑤⑰ Lines intersecting to form right angles
- ⑤⑱ Set of connected points in a plane
- ⑤⑲ Triangle with one angle greater than  $90^\circ$
- ⑤⑳ Rectangle with all sides congruent

- (54) Two figures with no overlap (cannot be considered the same figure)
- (55) Figures that can overlap and fall into a single definition
- (56) Triangle with two congruent sides
- (57) Perpendicular height of a polygon
- (58) Line dividing a region into two congruent parts
- (59) Flat surface in two dimensions (length and width)
- (60) Angle measuring greater than  $90^\circ$  and less than  $180^\circ$
- (61) Simple closed curve made entirely of line segments
- (62) Equal in size, shape, quantity
- (63) Side opposite the right angle in a right triangle
- (64) Section of a circle bounded by two radii and an arc
- (65) Six sided polygon
- (66) Angle measuring between  $0^\circ$  and  $90^\circ$
- (67) Curve with a common starting point and ending point (can intersect)
- (68) Prism with two parallel and congruent rectangles for bases
- (69) Two adjacent angles that form a straight angle (supplementary and adjacent)
- (70) The distance around a circle
- (71) Line segment from one point to another on a circle
- (72) Prism with two congruent and parallel triangles for bases
- (73) Triangle with all angles less than  $90^\circ$

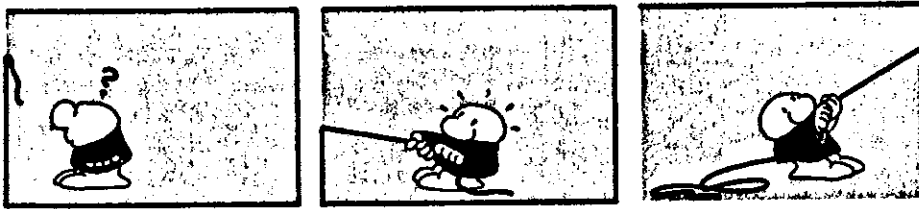






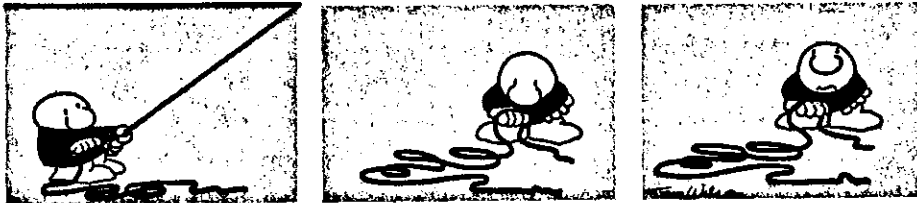
⑦④ Triangle with one right angle

⑦⑤ Closed curve that does not intersect itself



⑦⑥ Point where an angle is formed

⑦⑦ Angles next to each other (sharing a common side)



⑦⑧ Angle measuring  $180^\circ$

⑦⑨ Sum of the areas of all faces on a prism or cylinder

# MATH VOCABULARY (All Four Quarters)

Absolute Value	The positive value of a real number (distance from 0 on a number line)
Acute Angle	Angle measuring greater than 0 and less than 90 degrees
Acute Triangle	A triangle with three acute angles
Addend	A number added to another number
Additive Identity	Zero is the identity element ( $a + 0 = a$ )
Additive Inverse	The sum of any number and its additive inverse is zero (opposite)
Adjacent Angles	Angles next to each other
Alt. Interior Angles	Angles between two parallel lines on opposite sides of a transversal
Altitude	Perpendicular height of a polygon
Angle	Rotation (measured in degrees) between two rays with a common endpoint
Arc	Section of the circumference of a circle
Area	The number of square units needed to cover a surface
Associative Property	For addition: $(a+b)+c=a+(b+c)$ / For multiplication: $(ab)c=a(bc)$
Capacity	The amount that can be held within a container
Celsius	Temperature scale based on water freezing at 0 and boiling at 100 degrees
Central Angle	Angle formed by two radii of a circle
Central Tendency	Statistical measures (mean, median, mode, range)
Chord	Line segment from one point on a circle to another point on the circle
Circle	Simple closed curve with all points an equal distance from the center point
Circumference	The distance around a circle or partial circle
Closed Curve	Curve with a common starting and ending point - no loose ends (can intersect)
Closed Sentence	Equation or inequality with all terms being constants - no variables
Closure	Property indicating that all solutions for an operation are included
Coefficient	A value used as a multiplier for a variable
Commutative Property	For addition: $a + b = b + a$ / For multiplication: $ab = ba$
Complementary Angles	Angles whose measures sum to 90 degrees
Complex Fraction	A fraction containing another fraction in its numerator or denominator
Composite Number	A number with factors other than one and itself
Compound Interest	Interest calculated on principal and interest already earned
Congruent	Equal in all respects - size, shape, etc.
Constant	A term within an expression that is numerical (no variable)
Coordinate Axis	Perpendicular number lines dividing a plane into four quadrants
Corresponding Angles	Angles that relate to each other by position
Curve	Set of connected points in a plane
Cylinder	Three dimensional figure with two parallel, congruent circles as bases
Data	Set of values
Degree	Unit of measure for angles
Denominator	Bottom value in a fraction (represents the whole in a ratio)
Diameter	Distance between two points on a circle passing through the center point
Difference	Solution to a subtraction problem
Discount	Money subtracted from the original price of an item on sale
Distributive Property	Distributive Property of Multiplication over Addition: $a(b+c)=ab+ac$
Dividend	Number divided by another number (inside bracket, left of sign, numerator)
Divisor	Number that divides into another (outside bracket, right of sign, denominator)
Edge	Line segment at the intersection of two faces in a three dimensional figure
Equation	A number sentence showing two equal expressions
Equiangular Triangle	Triangle with three congruent angles (also equilateral)
Equilateral Triangle	Triangle with three congruent sides (also equiangular)
Equivalent	Having equal measures
Evaluating Expressions	Substituting specified numbers to determine the value of an expression
Even Number	Any number divisible evenly by 2 (has a units digit of 0, 2, 4, 6, or 8)
Exclusive	Not containing or overlapping anything else
Exponent (Power)	Value indicating how many times the base number is used as a factor
Expression	An algebraic value including a term or addition/subtraction of terms
Face	Flat region in a three dimensional figure
Factor	Number that can be divided evenly into another number
Fahrenheit	Temperature scale based on water freezing at 32 and boiling at 212 degrees
False Equation	Equation with no solutions (variable drops out leaving false statement)
False Inequality	Inequality with no solutions (variable drops out leaving a false statement)

Gram	Metric unit of measure for weight
Graphing	Showing a set of solutions on a number line or coordinate axis
Greatest Common Factor	The largest number that divides evenly into two or more given numbers
Heptagon	A seven sided polygon
Hexagon	A six sided polygon
Horizontal	Across (from side to side)
Hypotenuse	The side opposite the right angle in a right triangle
Identity	Equation or inequality for which all solutions are correct
Imaginary Numbers	Numbers that cannot exist in the real world (example: sq root of negative)
Improper Fraction	Fraction with numerator larger than denominator
Inclusive	Including or overlapping
Index	Number to upper left of radical sign indicating root to be taken
Inequality	Number sentence showing two expressions separated by an inequality sign
Infinite Decimal	A non-repeating, non-terminating decimal (example: pi, sq root of 2)
Infinity	Concept of boundlessness in time, space, quantity
Integers	Positive and negative counting numbers and zero
Intercept	Point of intersection between a graphed solution and one of the coordinate axis
Interpolating	Determining an approximate value not included in a table
Intersection	Point or points in common between geometric figures
Irrational Numbers	Non-repeating, non-terminating real numbers (set of all infinite decimals)
Isosceles Triangle	Triangle with two congruent sides
Lateral Face	Plane region of a three dimensional figure (not one of the bases)
Lateral Surface	All of the regions of a three dimensional figure that are not bases
Least Common Multiple	The smallest number that the original numbers can divide into evenly
Legs	Sides adjacent to the right angle in a right triangle
Line	Straight set of connecting points extending to infinity in two directions
Linear Equation	An equation in two variables for which the solution graph is a straight line
Linear Pair	Two adjacent supplementary angles
Line of Symmetry	A line dividing a region into two congruent parts
Line Segment	Section of a line with definite starting and ending points
Liter	Metric unit of measure for capacity
Mean	Average of the data (sum divided by number of items in data)
Median	Middle value in data (avg of two middle values if even number of items)
Meter	Metric unit of measure for length
Minuend	Number from which another is subtracted (top number in subtraction problem)
Mixed Numeral	Value expressed by a whole number and a fraction
Mode	Item occurring most frequently in data
Multiple	Number divisible evenly by the original number
Multiplicative Identity	One (1) is the multiplicative identity such that $a \times 1 = a$
Multiplicative Inverse	Reciprocal of the original value, produces product of (1) when multiplied
Natural Numbers	Positive integers (counting numbers starting with 1)
Numerator	Top value in a fraction (represents part of a whole in a ratio)
Obtuse Angle	An angle measuring greater than 90 and less than 180 degrees
Obtuse Triangle	Triangle with one obtuse angle
Octagon	Eight sided polygon
Odd Number	Every other number starting with 1 (has units digit of 1, 3, 5, 7, or 9)
Open Sentence	Equation or inequality containing at least one variable
Order of Operations	Rules that govern order in which calculations are to be done
Ordered Pair	Two values specifying the horizontal and vertical coordinates (x,y)
Origin	The point of intersection (0,0) between the two coordinate axis
Original Price	The beginning price of an item before a discount is subtracted
Parallel Lines	Lines in the same plane that never intersect
Parallelogram	Quadrilateral with two sets of parallel sides
Pentagon	Five sided polygon
Percent	Ratio with 100 as the bottom term (part out of 100)
Perimeter	Distance around a polygon or simple closed curve
Perpendicular Lines	Lines intersecting to form right angles
Pi	Ratio of the circumference of a circle to its diameter (approx. 3.14)
Plane	Flat surface extending to infinity in two dimensions
Point	Location without dimensions
Polygon	A simple closed curve made entirely of line segments
Prime Factorization	Product of prime numbers (in ascending order) producing the original value
Prime Number	A whole number greater than 1 with factors of only 1 and itself

Principal	Amount of money invested
Product	Solution to a multiplication problem
Proportion	Comparison of two ratios
Protractor	Instrument used for measuring angles
Purchase Price	Price of an item after the discount has been subtracted
Pythagorean Theorem	In a right triangle, sum of the legs squared equals the hypotenuse squared
Pythagorean Triples	Sets of three whole numbers that can serve as sides of a right triangle
Quadrant	One of the four regions formed by the coordinate axis
Quadrilateral	Four sided polygon
Quotient	Solution to a division problem
Radical	Symbol for square (or other specified) root - indicates principal root
Radicand	The value under the radical sign
Radius	The distance from the center point to any point on a circle (half the diameter)
Range	The difference between the highest and lowest values in data
Rate of Discount	Percent of the original price deducted to determine the selling price
Ratio	Indicates part of a whole - fractional value
Rational Numbers	Set of all numbers expressed by terminating or repeating values
Ray	Section of a line with a definite starting point
Real Numbers	Set of all rational and irrational numbers
Reciprocal	Value which multiplied by the original gives a product of 1 (mult. inverse)
Rectangle	Parallelogram with four right angles
Rectangular Prism	Prism with parallel, congruent rectangles for bases
Reflexive Property	Property of equality for any number "a" such that $a=a$
Regular Polygon	Polygon with all sides and angles congruent
Regular Price	Price of an item before discount is deducted (original price)
Repeating Decimal	Decimal that does not terminate and repeats a pattern of digits to infinity
Rhombus	Parallelogram with all sides congruent
Right Angle	Angle measuring 90 degrees formed by perpendicular lines or segments
Right Triangle	Triangle that includes one right angle
Scalene Triangle	Triangle with no congruent sides
Sector	Section of a circle bounded by two radii and an arc
Selling Price	Price of an item after discount is subtracted (purchase price)
Semi-Circle	Exactly half of a circle
Similar Polygons	Polygons with all measures in direct proportion
Simple Closed Curve	Closed curve that does not intersect itself
Simple Interest	Interest calculated on original principal only for a period of time
Simplifying Expressions	Combining like terms in an algebraic expression
Slope	Rise over run, ratio of change in "y" to change in "x" in a linear equation
Slope-Intercept Form	Form for a linear equation: $y=mx+b$ ( $m$ = slope, $b$ = y-int, $-b/m$ = x-int)
Square	Rectangle with all sides congruent
Standard Form	Form for a linear equation: $Ax+By=C$ ( $-A/B$ = slope, $C/B$ = y-int, $C/A$ = x-int)
Straight Angle	Angle measuring 180 degrees
Substitution	Property of equality in which equal terms can replace each other
Subtrahend	A number subtracted from another number (bottom number in subtraction)
Sum	Solution to an addition problem
Supplementary Angles	Angles whose measures sum to 180 degrees
Surface Area	Sum of the areas of the faces of a three dimensional geometric figure
Symmetric Property	Property of equality for "a" and "b": if $a=b$ then $b=a$
Term	Single value or product of coefficients and variables
Terminating Decimal	Decimal value with a definite number of digits
Transitive Property	Property of equality: if $a=b$ and $b=c$ then $a=c$
Transversal	Line or section of a line intersecting a set of parallel lines
Trapezoid	Quadrilateral with exactly one set of parallel sides
Triangle	Three sided polygon
Triangular Prism	Prism with two congruent, parallel triangular bases
Undefined Value	Any value that includes a division by zero
Variable	Letters or symbols representing values in an expression
Vertex	Point where an angle is formed (plural is vertices)
Vertical	Up and down, from top to bottom
Vertical Angles	Equal angles formed on opposite sides of intersecting lines
Volume	Measure of the capacity of a three dimensional figure (in cubic units)
Whole Numbers	Set of all positive counting numbers and zero
Zero Property	The product of zero (0) and any value is zero (0)