Strath Haven Middle School

Summer Math Packet

Students Entering 8th Grade

Enriched

NAME: Answer Key

Dear Students and Parents,

When schools work together with families to support learning, children are inclined to succeed in school. Three decades of research have shown that parental participation in schooling does improve student learning!

Please encourage and help your child to work on this packet over the summer. Attached is a pacing guideline to help with planning. Please refer to the page numbers listed at the BOTTOM RIGHT hand side of the packet

The answer key is also located on our website. The completed packet should be given to your son/daughter's math teacher on Friday September 18th.

Dates	What am I doing?	Check if Pages are complete
June 15th- June 18th	Page 1	
June 22nd - June 25th	Page 2-3	
June 29th - July 2nd	Page 4-6	
July 6th - July 9th	Page 7-8	
July 13th - July 16th	Page 9-10	
July 20th - July 23rd	Page 11-12	
July 27th - July 30th	Page 13	
August 3th - August 7th	Page 14-15	
August 10th - August 14th	Page 16	
August 17th - August 21st	Page 17-18	
August 24th - August 28th	Page 19-20	

INTEGERS: All students should be able to add, subtract, multiply, and divide integers. Calculators are not permitted.

1) $-10 + (-10)$
-20

2) $-6 + (-10)$
-16

3) $-8 + 15$
7

4) $-13 + (-3) + 2$
-14

5) $-3 - 6$
-9

6) $-2 - (-9)$
7

7) $13 - 19$
-6

8) $-14 - 16 + 4$
-26

9) 4×-4
-16

10) -15×-2
30

11) -12×-7
84

12) $-4 \times -3 \times -6$
-72

13) $-15 \div -3$
5

14) $25 \div 5$
5

15) $-56 \div 7$
-8

16) $-100 \div -5$
20

EXPONENTS

1) 3^2
9

2) 5^3
125

3) 1^7
1

4) 0^8
0

5) 8^4
4096

ORDER OF OPERATIONS: Simplify the following expressions using the order of operations.

1) $7 \bullet 4 \div 2$
14

2) $2^2 \bullet 8 - 10$
22

3) $(5+4) \bullet 7$
63

4) $(5+3)^2 - 4$
60

5) $36 - 5^2 + 7$
18

6) $4 + 6(5-2) \div 3$
10

7) $\dfrac{15-7}{3+1}$
2

8) $\dfrac{9+3}{3+3^2}$
1

FRACTIONS: Solve the following problems with fractions. Calculators are not permitted.

1) $\frac{7}{10} + \frac{1}{10} = \frac{4}{5}$

2) $\frac{5}{6} - \frac{1}{6} = \frac{2}{3}$

3) $3\frac{1}{4} + 1\frac{3}{4} = 5$

5) $1\frac{2}{5} + 6\frac{8}{15} = 7\frac{14}{15}$

6) $5\frac{1}{9} - 2\frac{5}{6} = 2\frac{5}{18}$

7) $\frac{1}{3} \times \frac{4}{5} = \frac{4}{15}$

8) $12 \times \frac{3}{4} = 9$

9) $5\frac{3}{4} \times 10\frac{2}{3} = 61\frac{1}{3}$

10) $\frac{3}{4} \div \frac{5}{8} = 1\frac{1}{5}$

11) $9 \div 4\frac{2}{3} = 1\frac{13}{14}$

12) $4\frac{1}{6} \div 3\frac{2}{5} = 1\frac{23}{102}$

SIMPLIFYING EXPRESSIONS

1) $3x + 2x + 7x$

$12x$

2) $5x + 2b + 3x + 5b$

$8x + 7b$

3) $3 + 2x + 4 + 2x$

$7 + 4x$

4) $6y + 5 - y$

$5y + 5$

5) $8a + 4 - 4a$

$4a + 4$

6) $15 + 4x - 7$

$8 + 4x$

7) $6x + 2 + 3x + 4$

$9x + 6$

8) $2n + 12 + 3n - 3$

$5n + 9$

9) $3(x + 4) + 2$

$3x + 14$

EQUATIONS: Solve for x.

1) $x - 8 = 24$

$X = 32$

2) $x + 4 = 38$

$X = 34$

3) $x - 16 = -24$

$X = -8$

7) $3x = 39$

$X = 13$

8) $9x = 117$

$X = 13$

9) $-2x = -400$

$X = 200$

10) $\frac{x}{3} = 20$

$X = 60$

11) $\frac{x}{4} = 15$

$X = 60$

12) $\frac{x}{-5} = -14$

$X = 70$

13) $8 = -5r + 18$

$r = 2$

14) $3x + 14 = -1$

$X = -5$

16) $-3x + 1 = -5$

$X = 2$

FRACTIONS, DECIMALS, PERCENTS

FRACTION	DECIMAL	PERCENT
$\frac{1}{4}$	0.25	25%
$\frac{9}{20}$	0.45	45%
$\frac{3}{10}$	0.3	30%
$\frac{2}{5}$	0.4	40%
$\frac{4}{5}$	0.8	80%
$\frac{1}{2}$	0.5	50%

The Distributive Property

Simplify each expression.

1) $6(1 - 5m)$

$6 - 30m$

2) $-2(1 - 5v)$

$-2 + 10v$

3) $3(4 + 3r)$

$12 + 9r$

4) $3(6r + 8)$

$18r + 24$

5) $4(8n + 2)$

$32n + 8$

6) $-(-2 - n)$

$2 + n$

7) $-6(7k + 11)$

$-42k - 66$

8) $-3(7n + 1)$

$-21n - 3$

9) $-6(1 + 11b)$

$-6 - 66b$

10) $-10(a - 5)$

$-10a + 50$

11) $-3(1 + 2v)$

$-3 - 6v$

12) $-4(3x + 2)$

$-12x - 8$

13) $(3 - 7k) \cdot -2$

$-6 + 14k$

14) $-20(8x + 20)$

$-160x - 400$

15) $(7 + 19b) \cdot -15$

$-105 - 285b$

16) $(x + 1) \cdot 14$

$14x + 14$

Combining Like Terms

Simplify each expression.

1) $-6k + 7k$

K

2) $12r - 8 - 12$

12r - 20

3) $n - 10 + 9n - 3$

10n - 13

4) $-4x - 10x$

-14x

5) $-r - 10r$

-11r

6) $-2x + 11 + 6x$

4x + 11

7) $11r - 12r$

-r

8) $-v + 12v$

11v

9) $-8x - 11x$

-19x

10) $4p + 2p$

6p

11) $5n + 11n$

16n

12) $n + 4 - 9 - 5n$

-4n - 5

13) $12r + 5 + 3r - 5$

15r

14) $-5 + 9n + 6$

9n + 1

15) $n-4-9$

$n-13$

16) $4n-n$

$3n$

17) $-3x-9+15x$

$12x-9$

18) $-9k+8k$

$-k$

19) $-16n-14n$

$-30n$

20) $15n-19n$

$-4n$

21) $-4+7(1-3m)$

$-4+7-21m$

$=3-21m$

22) $-5n+3(6+7n)$

$-5n+18+21n$

$=16n+18$

23) $-2n-(9-10n)$

$-2n-9+10n$

$=8n-9$

24) $10-5(9n-9)$

$10-45n+45$

$=-45n+55$

25) $9a+10(6a-1)$

$9a+60a-10$

$=69a-10$

26) $-9(6m-3)+6(1+4m)$

$-54m+27+6+24m$

$=-30m+33$

27) $-10(1-9x)+6(x-10)$

$-10+90x+6x-60$

$=96x-70$

28) $5(-2n+4)+2(n+3)$

$-10n+20+2n+6$

$=-8n+26$

29) $-3(10b+10)+5(b+2)$

$=-30b-30+5b+10$

$=-25b-20$

30) $-7(n+3)-8(1+8n)$

$-7n-21-8-64n$

$=-71n-29$

Two-Step Equations With Integers

Solve each equation.

1) $\frac{r}{10} + 4 = 5$

$r = 10$

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

$n = -4$

3) $3p - 2 = -29$

$p = -9$

4) $1 - r = -5$

$r = 6$

5) $\frac{k - 10}{2} = -7$

$k = -4$

6) $\frac{n - 5}{2} = 5$

$n = 15$

7) $-9 + \frac{n}{4} = -7$

$n = 8$

8) $\frac{9 + m}{3} = 2$

$m = -3$

9) $\frac{-5 + x}{22} = -1$

$x = -17$

10) $4n - 9 = -9$

$n = 0$

11) $\frac{x + 9}{2} = 3$

$x = -3$

12) $\frac{-12 + x}{11} = -3$

$x = -21$

13) $\frac{-4 + x}{2} = 6$

$x = 16$

14) $-5 + \frac{n}{3} = 0$

$n = 15$

15) $\frac{p}{4} + 8 = 7$

$\frac{p}{4} = -1$

$p = -4$

16) $9 + \frac{n}{4} = 15$

$\frac{n}{4} = 6$

$n = 24$

17) $6 + \frac{x}{2} = 4$

$\frac{x}{2} = -2$

$x = -4$

18) $\frac{b+11}{3} = -2$

$b + 11 = -6$

$b = -17$

19) $\frac{a-10}{3} = -4$

$a - 10 = -12$

$a = -2$

20) $-12r + 4 = 100$

$-12r = 96$

$r = -8$

21) $\frac{m}{16} - 9 = -8$

$\frac{m}{16} = 1$

$m = 16$

22) $-7 + 4r = -15$

$4r = -8$

$r = -2$

23) $\frac{m-13}{2} = -8$

$m - 13 = -16$

$m = -3$

24) $-5x + 13 = -17$

$-5x = -30$

$x = 6$

25) $\frac{k+10}{-2} = 5$

$k + 10 = -10$

$k = -20$

26) $\frac{p+8}{-2} = 10$

$p + 8 = -20$

$p = -28$

27) $-14r - 19 = 303$

$-14r = 322$

$r = -23$

28) $\frac{x}{-4} - 5 = -8$

$\frac{x}{-4} = -3$

$x = 12$

Multi-Step Equations

Solve each equation.

1) $6a + 5a = -11$

$a = -1$

2) $-6n - 2n = 16$

$n = -2$

3) $4x + 6 + 3 = 17$

$x = 2$

4) $0 = -5n - 2n$

$n = 0$

5) $6r - 1 + 6r = 11$

$r = 1$

6) $r + 11 + 8r = 29$

$r = 2$

7) $-10 = -14v + 14v$

no solution!

8) $-10p + 9p = 12$

$p = -12$

9) $42 = 8m + 13m$

$m = 2$

10) $a - 2 + 3 = -2$

$a = -3$

11) $18 = 3(3x - 6)$

$x = 4$

12) $30 = -5(6n + 6)$

$n = -2$

13) $37 = -3 + 5(x + 6)$

$37 = -3 + 5x + 30$

$10 = 5x$

$x = 2$

14) $-13 = 5(1 + 4m) - 2m$

$-13 = 5 + 20m - 2m$

$-18 = 18m$

$m = -1$

15) $4(-x + 4) = 12$

$-4x + 16 = 12$

$-4x = -4$

$x = 1$

16) $-2 = -(n - 8)$

$-2 = -n + 8$

$-10 = -n$

$n = 10$

17) $-6(1 - 5v) = 54$

$-6 + 30v = 54$

$30v = 60$

$v = 2$

18) $8 = 8v - 4(v + 8)$

$8 = 8v - 4v - 32$

$40 = 4v$

$v = 10$

19) $10(1 + 3b) = -20$

$10 + 30b = -20$

$30b = -30$

$b = -1$

20) $-5n - 8(1 + 7n) = -8$

$-5n - 8 - 56n = -8$

$-61n = 0$

$n = 0$

21) $8(4k - 4) = -5k - 32$

$32k - 32 = -5k - 32$

$37k = 0$

$k = 0$

22) $-8(-8x - 6) = -6x - 22$

$64x + 48 = -6x - 22$

$70x = -70$

$x = -1$

23) $8(1 + 5x) + 5 = 13 + 5x$

$8 + 40x + 5 = 13 + 5x$

$40x + 13 = 13 + 5x$

$35x = 0$

$x = 0$

24) $-11 - 5a = 6(5a + 4)$

$-11 - 5a = 30a + 24$

$-35 = 35a$

$a = -1$

Write each phrase as an algebraic expression.

1.) 7 less than m $m-7$	2.) The quotient of 3 and y $3 \div y$ or $\frac{3}{y}$
3.) 7 years younger than Jessica $j-7$ j = Jessica's age	4.) 3 times as many marbles as Bob has $3b$ b = # of marbles Bob has
5.) Let t = the number of tomatoes Tye planted last year. This year she planted 3 times as many. Write an algebraic expression to show how many tomatoes Tye planted this year. $3t$	6.) Last week Jason sold x number of hot dogs at the football game. This week he sold twice as many as last week, and then he sold 10 more. Write an expression to show how many hot dogs Jason sold this week. $2x+10$

Evaluate the following expressions using the given values for a, b, and c. Show each step!

1.) Evaluate $6 + 3b$ if $b = 7$

$$6 + 3(7)$$
$$= 6 + 21$$
$$= \boxed{27}$$

2.) Evaluate $6a^2$ if $a = 4$

$$6a^2$$
$$= 6(4^2)$$
$$= 6(16)$$
$$= \boxed{96}$$

3.) Evaluate $5(6) - c$ if $c = 7$

$$5(6) - c$$
$$= 30 - 7$$
$$= \boxed{23}$$

4.) Evaluate $\frac{b^4}{4}$ if $b = 2$

$$\frac{b^4}{4} = \frac{2^4}{4} = \frac{16}{4}$$
$$= \boxed{4}$$

5.) Evaluate $\frac{7.5m}{5}$ if $m = 2$

$$\frac{7.5(2)}{5} = \frac{15}{5} = \boxed{3}$$

6.) Evaluate $\frac{(n)^2}{3}$ if $n = 9$

$$\frac{(n)^2}{3} = \frac{9^2}{3} = \frac{81}{3}$$
$$= \boxed{27}$$

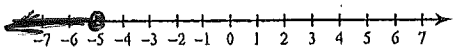
Write an inequality for each of the following:

1.) Five times a number is greater than 25. $5x > 25$	2.) The sum of a number and 6 is at least 15. $x + 6 \geq 15$
3.) 24 divided by some number is less than 7. $\frac{24}{x} < 7$	4.) Five dollars less than two times Chris' pay is at most $124. $2x - 5 \leq 124$
5.) In Ohio, you can get your license when you turn 16. Write an inequality to show the age of all drivers in Ohio. $x \geq 16$	6.) Suppose a DVD costs $19 and a CD costs $14. Write an inequality to find how many CDs you can buy along with one DVD if you have $65 to spend. $19 + 14x \leq 65$

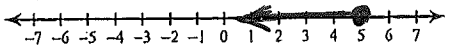
Graphing Inequalities

Draw a graph for each inequality.

1) $n \leq -5$

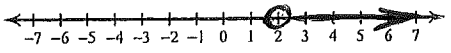


2) $n \leq 5$

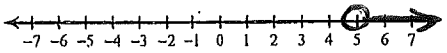


3) $x < 1$

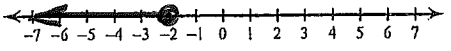
4) $r > 2$



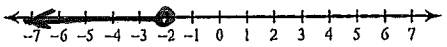
5) $n > 5$



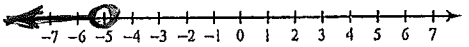
6) $r \leq -2$



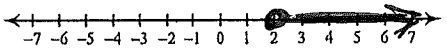
7) $k \leq -2$



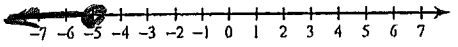
8) $m < -5$



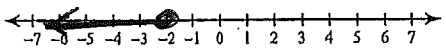
9) $x \geq 2$



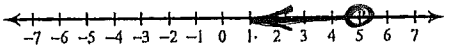
10) $-5 \geq v$ same as $v \leq -5$



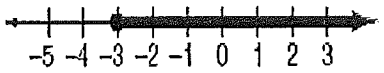
11) $-2 \geq v$ same as $v \leq -2$



12) $x < 5$

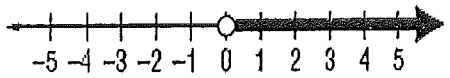


1.) Write an inequality for the graph.



$x \geq -3$

2.) Write an inequality for the graph.



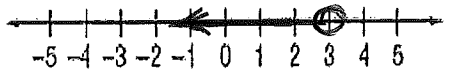
$x > 0$

3.) Graph the inequality.

$b \geq -1$

4.) Graph the inequality.

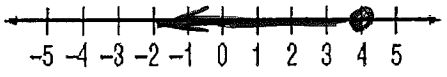
$z < 3$



5.) Solve the inequality, then graph it on the number line.

$y + 9 \leq 13$

$y \leq 4$



6.) Solve the inequality, then graph it on the number line.

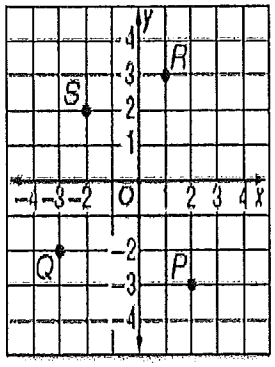
$4x - 6 > -10$

$4x > -4$

$x > -1$

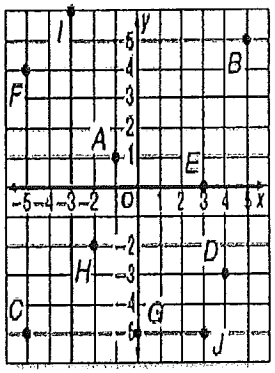
1.) Name the ordered pair for each point graphed at the right. Then identify the quadrant in which each point lies.

	Coordinates	Quadrant
P	(2, -3)	IV
Q	(-3, -2)	III
R	(1, 3)	I
S	(-2, 2)	II



2.) Find each of the points below on the coordinate plane. Then identify the quadrant in which each point lies.

	Coordinates	Quadrant
A	(-1, 1)	II
J	(3, -5)	IV
B	(5, 5)	I
H	(-2, -3)	III



3.) Graph and label each point on the coordinate plane.

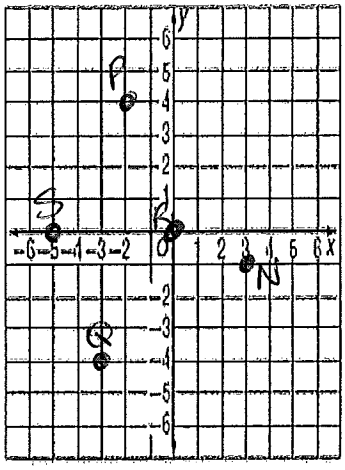
N (3, -1)

P (-2, 4)

Q (-3, -4)

R (0, 0)

S (-5, 0)



4.) Graph and label each point on the coordinate plane.

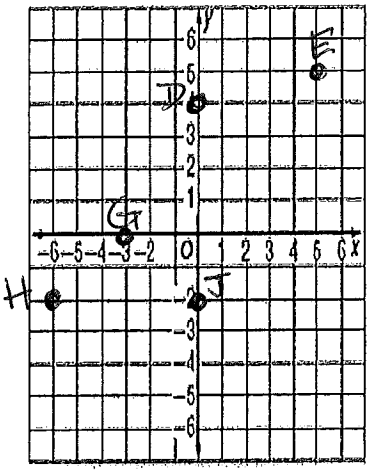
D (0, 4)

E (5, 5)

G (-3, 0)

H (-6, -2)

J (0, -2)



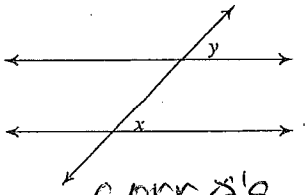
1.) Write 15^4 as a product of the same factor. $15 \cdot 15 \cdot 15 \cdot 15$	2.) Write 2^7 as a product of the same factor. $2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2$
3.) Evaluate 7^3. $7 \cdot 7 \cdot 7 = \boxed{343}$	4.) Evaluate 8^4. $8 \cdot 8 \cdot 8 \cdot 8 = \boxed{4096}$
5.) Write $9 \cdot 9 \cdot 9 \cdot 9 \cdot 9$ in exponential form. 9^5	6.) Write $12 \cdot 12 \cdot 12$ in exponential form. 12^3

1.) Evaluate: $13^2 =$ 169	2.) Evaluate: $\sqrt{81} =$ 9
3.) Evaluate: $(-4)^3 =$ $-4 \cdot -4 \cdot -4$ $16 \cdot -4 = \boxed{-64}$	4.) Evaluate: $\sqrt{100} =$ 10
5.) Evaluate: $(-2)^2 =$ $-2 \cdot -2 = \boxed{4}$	6.) Evaluate: $\sqrt{36}$ 6

Parallel Lines and Transversals

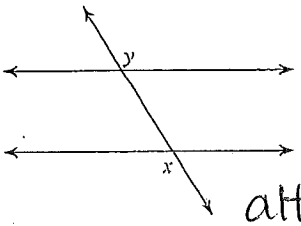
Identify each pair of angles as corresponding, alternate interior, alternate exterior, or consecutive interior.

1)



corr ∠'s

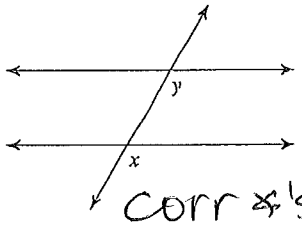
2)



same-side interior

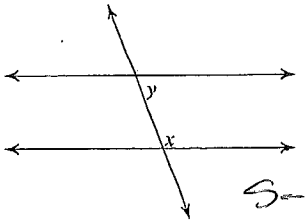
alt-ext ∠'s

3)



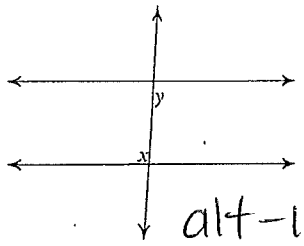
corr ∠'s

4)



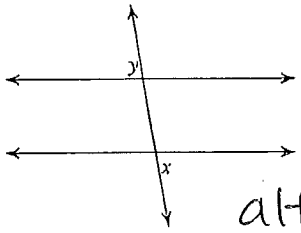
S-S int ∠'s

5)



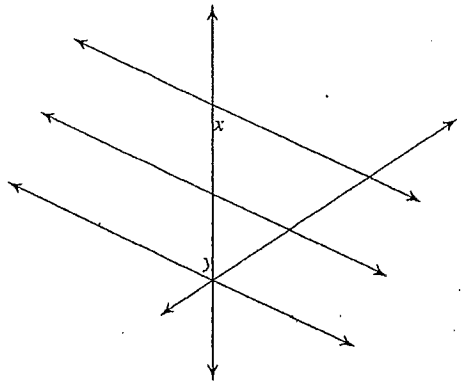
alt-int ∠'s

6)



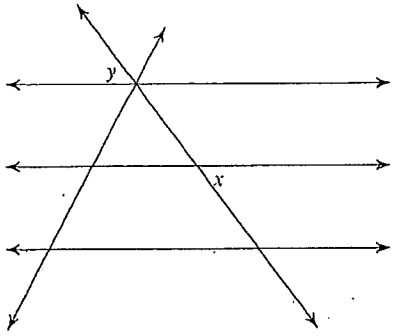
alt-ext ∠'s

7)



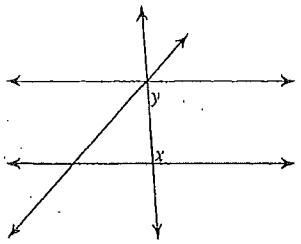
alt-int ∠'s

8)



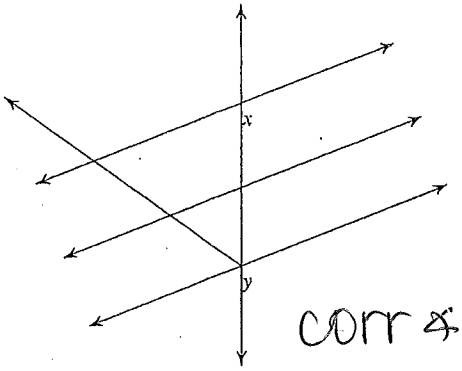
alt-ext ∠'s

9)



S-S Int ∠'s

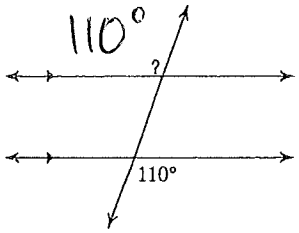
10)



corr ∠'s

Find the measure of each angle indicated.

11)



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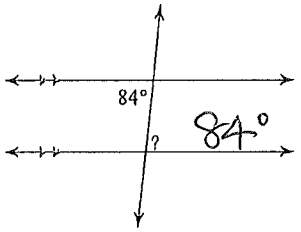
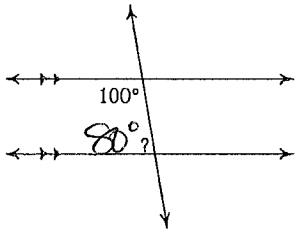
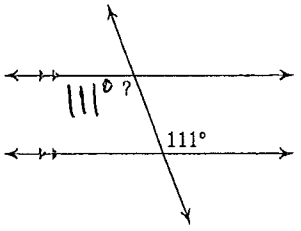


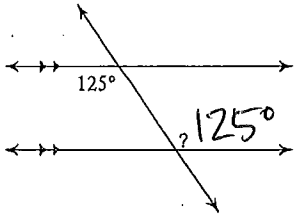
13)



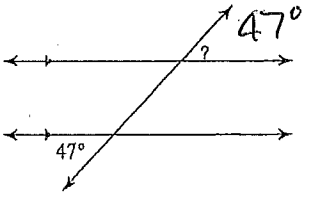
14)



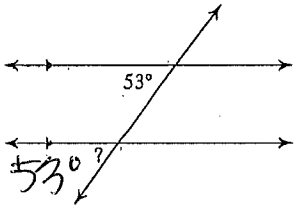
15)



16)



17)



18)