Educational Packets

6-10

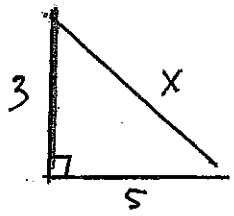
Geometry

Mrs Lewis

Educational Packets 6-10

Packet 6: Pythagorean Theorem: Complete worksheets 14 and 22. You must show your work and leave answers in reduced radical form.

Examples:

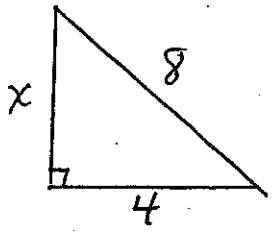


$3^2+5^2=x^2$

$9+25=x^2$

$34=x^2$

$\sqrt{34}=x$



$x^2+4^2=8^2$

$x^2+16=64$

$x^2=48$

$x=\sqrt{48}$

16.3

$x=4\sqrt{3}$

Packet 7: Simplifying Square Root Worksheet.

Simplify the radicals (square roots) in each square that are not in simplified form. Cut out squares and rearrange so that matching simplified forms are next to each other. Then complete Worksheet 212. You must show your work. Examples included.

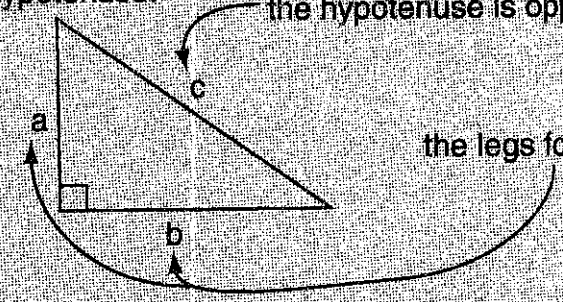
Packet 8: Complete Word search and Worksheet Angles Formed by Parallel Lines.

Packet 9: Complete Special Properties of Equilateral and Isosceles Triangles,and Using Algebra to Solve for Angle Measures. Be sure to show your work.

Packet 10: Complete the Algebra Review: Solving Equations. Look up the names for Polygons and complete the name worksheet.

The Pythagorean Theorem

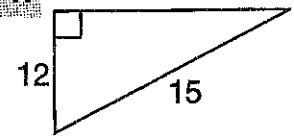
In a right triangle, the sum of the squares of the legs is equal to the square of the hypotenuse.



Pythagorean Theorem: $a^2 + b^2 = c^2$

Solve for the missing side. Use the decoder to find out what the numbers 3, 6, 10, and 15 have in common.

1.



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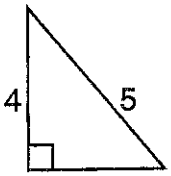

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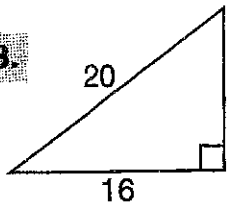

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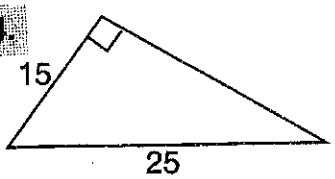

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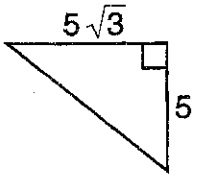

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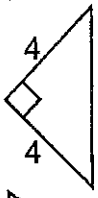

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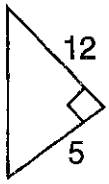

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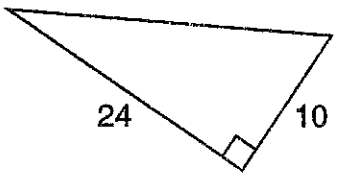

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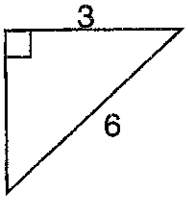

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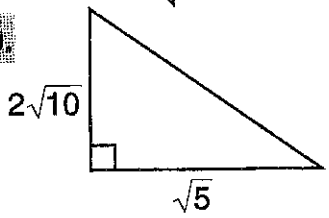

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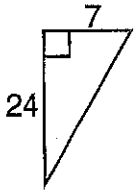

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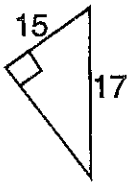

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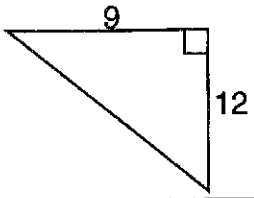

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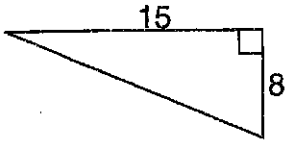


A	B	E	G	H	I	L	M	N	R	S	T	U	Y
3	$4\sqrt{2}$	$3\sqrt{3}$	8	9	10	12	13	15	17	20	$3\sqrt{5}$	25	26

10	1	9	8	2	14	9	2	3	3	

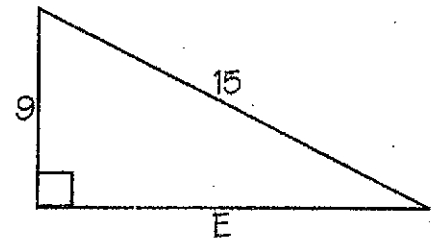
10	14	5	2	13	12	11	3	2	14	

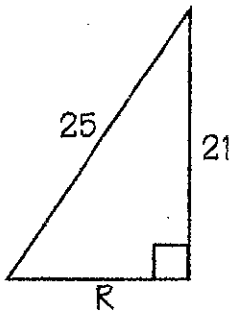
13	11	7	6	9	14	4	.

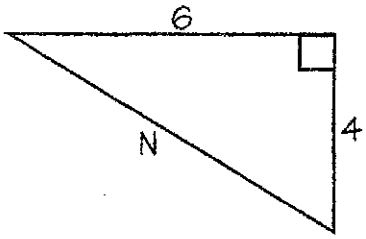
Day 6

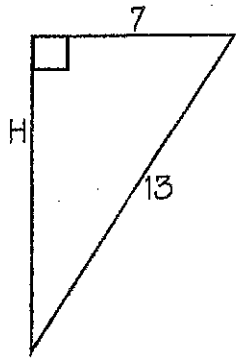
Where is the best place to play "hide and seek?"

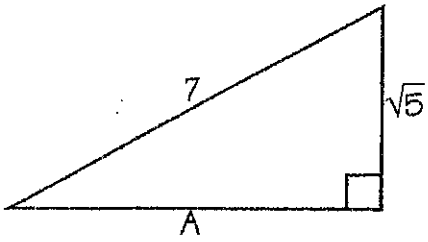
Solve for the missing sides. Make sure your answer is both exact and simplified. To figure out the joke, place the letter of each problem above the answer on the line(s) below. Some blanks will go unfilled.

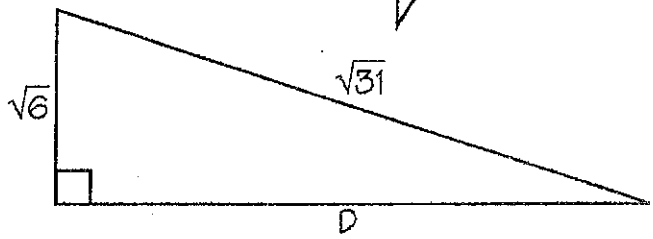


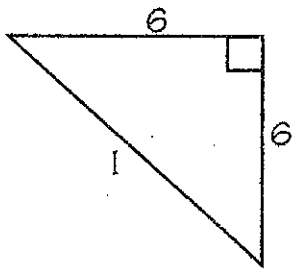


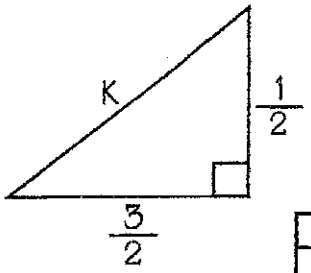


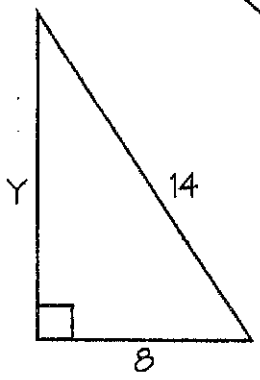


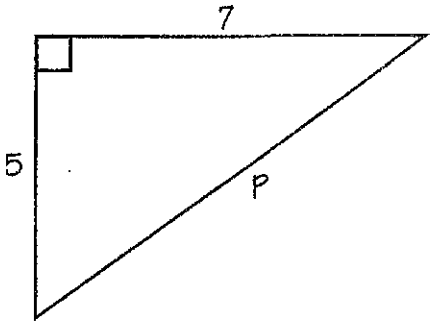












$\overline{6\sqrt{2}}$ $\overline{2\sqrt{13}}$ $\overline{\frac{\sqrt{11}}{2}}$ $\overline{2\sqrt{30}}$ $\overline{2\sqrt{33}}$ $\overline{5}$ $\overline{12}$ $\overline{2}$ $\overline{\sqrt{74}}$ $\overline{2\sqrt{11}}$ $\overline{2\sqrt{46}}$ $\overline{\frac{\sqrt{10}}{2}}$

Triangles — Pythagorean Theorem

Joke #16

Radicals

Take out perfect Squares

$\sqrt{20}$ (4) 5 ← find a multiple that's a perfect square

$2\sqrt{5}$ Take the square root of the perfect square it comes out. The number that is not a perfect square stays under the $\sqrt{\ }$

To add or Subtract - Take out Perfect Squares First. Then add or Subtract like terms

$\sqrt{18}$ (9) 2 $+ \sqrt{32}$ (16) 2

$3\sqrt{2} + 4\sqrt{2} = 7\sqrt{2}$

$2\sqrt{75}$ (25) 3 $+ \sqrt{125}$ (25) 5 $- 3\sqrt{27}$ (9) 3 $+ 4\sqrt{45}$ (9) 5

$10\sqrt{3} + 5\sqrt{5} - 9\sqrt{3} + 12\sqrt{5}$

$1\sqrt{3} + 17\sqrt{5}$

If there is a number on the outside: multiply by what you take out.

To Multiply - Multiply # on the outside, multiply #s on the inside. Then take out perfect squares.

$3\sqrt{12} \cdot 5\sqrt{6} = 15\sqrt{72}$ (36) 2 $= 90\sqrt{2}$

To Divide: Multiply top & bottom by the $\sqrt{}$ on the bottom

$$\frac{1}{\sqrt{3}} = \frac{1\sqrt{3}}{\sqrt{3}\sqrt{3}} = \frac{\sqrt{3}}{\sqrt{9}} = \frac{\sqrt{3}}{3}$$

$$\frac{3\sqrt{5}}{\sqrt{2}} = \frac{3\sqrt{5}\sqrt{2}}{\sqrt{2}\sqrt{2}} = \frac{3\sqrt{10}}{\sqrt{4}} = \frac{3\sqrt{10}}{2}$$

$$\frac{6\sqrt{2}}{9\sqrt{3}} = \frac{6\sqrt{2}\sqrt{3}}{9\sqrt{3}\sqrt{3}} = \frac{6\sqrt{6}}{9\sqrt{9}} = \frac{6\sqrt{6}}{27} = \frac{2\sqrt{6}}{9}$$

↑ Reduce #'s with #'s

Perfect Squares

$4 = 2^2$
$9 = 3^2$
$16 = 4^2$
$25 = 5^2$
$36 = 6^2$
$49 = 7^2$
$64 = 8^2$
$81 = 9^2$
$100 = 10^2$
$121 = 11^2$
$144 = 12^2$
$169 = 13^2$
$196 = 14^2$
$225 = 15^2$

Name _____

Simplifying Square Roots

Quick Review

(Given a and b are positive numbers)

1. Product Property of Square Roots $\sqrt{ab} = \sqrt{a} \cdot \sqrt{b}$ $\quad \sqrt{18} = \sqrt{2} \cdot \sqrt{9} = 3\sqrt{2}$

2. Quotient Property of Square Roots $\sqrt{\frac{a}{b}} = \frac{\sqrt{a}}{\sqrt{b}}$ $\quad \sqrt{\frac{12}{27}} = \frac{\sqrt{12}}{\sqrt{27}} = \frac{2\sqrt{3}}{3\sqrt{3}} = \frac{2}{3}$

Cut apart the puzzle pieces. Rearrange them to make a new 4 x 4 square with radical expressions and their matching simplified form next to each other. When you finish, the letters in the puzzle should spell out four rhyming words.

$3\sqrt{3}$ $\frac{\sqrt{6}}{2}$ A $\frac{\sqrt{3}}{4}$ $\sqrt{64x^3}$	$\sqrt{225}$ $\frac{2\sqrt{5}}{11}$ A $\sqrt{7}$ $\sqrt{29}$	$2\sqrt{2}$ $\sqrt{59}$ B $\sqrt{\frac{36}{9}}$ $\sqrt{64x^2}$	$\sqrt{75}$ 2 E $\sqrt{\frac{54}{36}}$ $4\sqrt{5}$
$\sqrt{169}$ $\sqrt{\frac{1}{49}}$ E $\sqrt{23}$ 15	$8x$ $\sqrt{61}$ F $\frac{5}{8}$ $\sqrt{96}$	$3x\sqrt{y}$ $\frac{5\sqrt{5}}{3}$ H $\frac{6}{5}$ $\sqrt{17}$	$\sqrt{103}$ $\sqrt{37}$ K $\sqrt{\frac{3}{4}}$ $\sqrt{8}$
$\sqrt{80}$ $\sqrt{\frac{75}{192}}$ L $\sqrt{\frac{32}{50}}$ $\sqrt{9x^2y}$	$\sqrt{71}$ $\frac{\sqrt{3}}{2}$ N $\sqrt{\frac{2}{18}}$ $5\sqrt{3}$	$9y$ $\sqrt{\frac{144}{100}}$ O $\sqrt{\frac{20}{121}}$ $\sqrt{101}$	$8x\sqrt{x}$ $\frac{4}{5}$ O $\frac{1}{7}$ $\sqrt{81y^2}$
$\sqrt{53}$ $\frac{1}{3}$ O $\sqrt{\frac{13}{25}}$ $\sqrt{27}$	$\sqrt{200}$ $\sqrt{\frac{3}{16}}$ U $\sqrt{47}$ 13	$\sqrt{97}$ $\frac{\sqrt{13}}{5}$ W $\sqrt{19}$ $10\sqrt{2}$	$4\sqrt{6}$ $\sqrt{43}$ W $\sqrt{\frac{125}{9}}$ $\sqrt{83}$

What Did Bimbo Airhead Reply When Asked, "What Is the Difference Between Ignorance and Apathy?"

Simplify each expression below. Assume that all variables represent nonnegative numbers. Cross out the box that contains your answer. When you finish, print the letters from the remaining boxes in the spaces at the bottom of the page.

(1) $\sqrt{3} \cdot \sqrt{15}$

(2) $\sqrt{10x} \cdot \sqrt{5x^3}$

(3) $7\sqrt{3} + \sqrt{48}$

(4) $\dfrac{24}{\sqrt{6}}$

(5) $-5\sqrt{3} \cdot 4\sqrt{6}$

(6) $\sqrt{2xy^2} \cdot \sqrt{10xy}$

(7) $8\sqrt{x} + 3\sqrt{y} - \sqrt{x}$

(8) $\dfrac{12}{\sqrt{30}}$

(9) $\dfrac{\sqrt{5}}{\sqrt{40}}$

(10) $\sqrt{3nt^5} \cdot \sqrt{12n^2t}$

(11) $5\sqrt{24} - 8\sqrt{150}$

(12) $\dfrac{4\sqrt{10}}{\sqrt{6}}$

(13) $3\sqrt{2n^3t^5} \cdot 5\sqrt{14n^5}$

(14) $7\sqrt{12} - 5\sqrt{27} + 6\sqrt{300}$

(15) $4\sqrt{44} + 2\sqrt{22} + 9\sqrt{99}$

(16) $\dfrac{3\sqrt{2}}{2\sqrt{75}}$

Answers for exercises 1–8:

TH $2xy\sqrt{5y}$	IDO $\frac{3\sqrt{30}}{10}$	ERE $4\sqrt{6}$	THE $\frac{2\sqrt{30}}{5}$
SO $7\sqrt{x} + 3\sqrt{y}$	DUM $11\sqrt{3}$	NOW $9\sqrt{2xy}$	BAS $3\sqrt{5}$
ON $-30\sqrt{3}$	TOP $-60\sqrt{2}$	IT $5x^2\sqrt{2}$	TCA $9\sqrt{6}$

Answers for exercises 9–16:

ONE $30n^4t^2\sqrt{7t}$	WA $-30\sqrt{6}$	NTK $\frac{2\sqrt{30}}{3}$	ISS $\frac{\sqrt{6}}{10}$
AN $24n^2t^3\sqrt{2t}$	AS $6nt^3\sqrt{n}$	AYS $59\sqrt{3}$	DID $42\sqrt{11}$
USE $35\sqrt{11} + 2\sqrt{22}$	ME $\frac{\sqrt{2}}{4}$	RE $36\sqrt{3}$	ST $\frac{4\sqrt{15}}{3}$

OBJECTIVE 3–I: To simplify products, sums, differences, and quotients containing radicals (review of preceding three pages).

Angle and Triangle Word Search

Find the words listed below in the puzzle.

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

obtuse
acute
scalene
right

equilateral
equiangular
isosceles
bisector

straight
sides
complementary
supplementary

vertical
hypotenuse
leg
adjacent

opposite
perpendicular
base
vertex

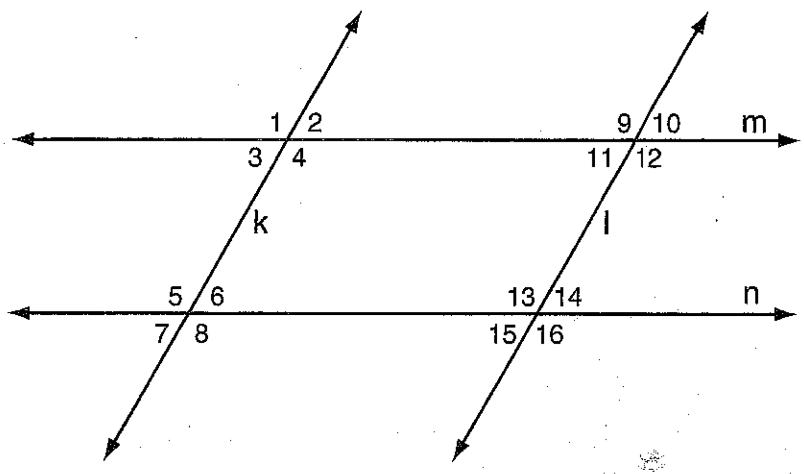
Angles Formed by Parallel Lines

If two parallel lines are cut by a transversal, the resulting angles are either congruent or supplementary.

<u>congruent angles</u>	<u>supplementary angles</u>
vertical angles	adjacent angles
corresponding angles	same–side interior angles
alternate interior angles	same–side exterior angles
alternate exterior angles	

Find the measure of the angles using the given information. Match the measure with its corresponding letter and fill in the blanks to reveal the only non–presidents to appear on U.S. currency.

1. If ∠1 = 45°, ∠2 = ________________ .
2. If ∠3 = 120°, ∠6 = ________________ .
3. If ∠13 = 130°, ∠16 = ________________ .
4. If ∠9 = 110°, ∠13 = ________________ .
5. If ∠9 = 110°, ∠14 = ________________ .
6. If ∠10 = 60°, ∠15 = ________________ .
7. If ∠4 = 75°, ∠5 = ________________ .
8. If ∠4 = 75°, ∠6 = ________________ .
9. If ∠11 = 65°, ∠14 = ________________ .
10. If ∠9 = 125°, ∠15 = ________________ .
11. If ∠10 = 52°, ∠3 = ________________ .
12. If ∠7 = 128°, ∠14 = ________________ .
13. If ∠8 = 113°, ∠13 = ________________ .
14. If ∠12 = 140°, ∠4 = ________________ .
15. If ∠16 = 100°, ∠3 = ________________ .
16. If ∠9 = 100°, ∠1 = ________________ .
17. If ∠6 = 115°, ∠11 = ________________ .



m // n

k // l

A	B	E	F	H	I	J	K	L	M	N	O	R	S	T	U	Y
52°	55°	60°	65°	70°	75°	80°	100°	105°	110°	113°	115°	120°	128°	130°	135°	140°

__ __ __ __ __   __ . __ __ __ __ __ __ __
12 1 12 11 13   10   11 13 3 5 17 13 14

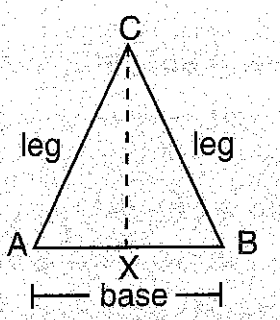
AND

__ __ __ __ __ __ __ __   __ __ __ __ __ __ __ __
10 6 13 15 11 4 7 13   9 2 11 13 16 8 7 13

Special Properties of Equilateral and Isosceles Triangles

A bisector divides something into two equal parts.

In an equilateral triangle, all sides are equal, which makes all three angles equal.



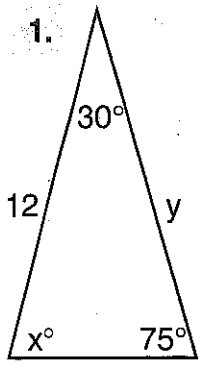
In an isosceles triangle, the bisector of the vertex angle is perpendicular to the base at its midpoint.

$\angle A$ and $\angle B$ are <u>base angles</u> and are equal.
$\angle ACB$ is the <u>vertex angle</u>.

If $\overline{CX}$ bisects $\angle ACB$, then $\overline{CX} \perp \overline{AB}$ and X is the midpoint of $\overline{AB}$ ($AX = XB$).

Solve for the variables below. Shade the answer below to uncover the name of the first electronic digital computer produced in the United States.

1.



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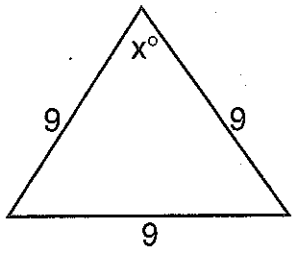

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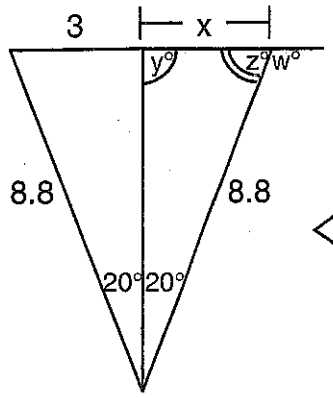

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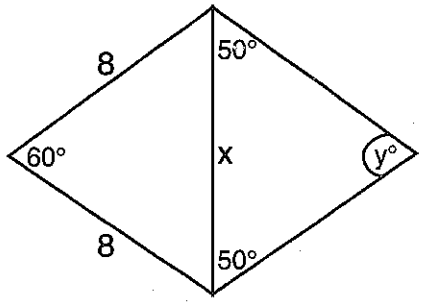

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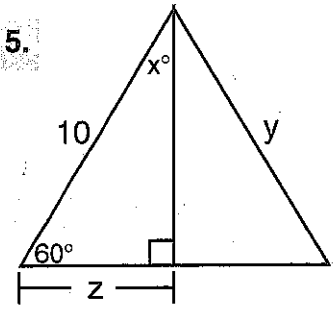

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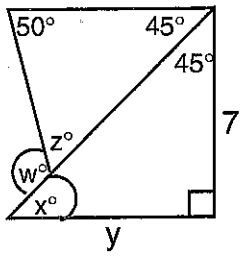

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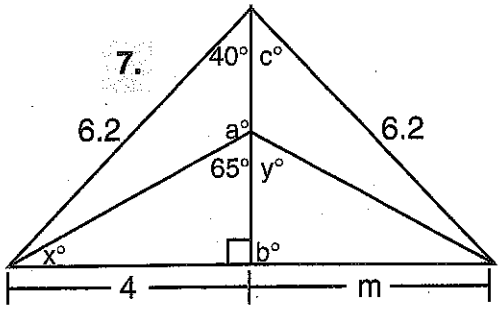
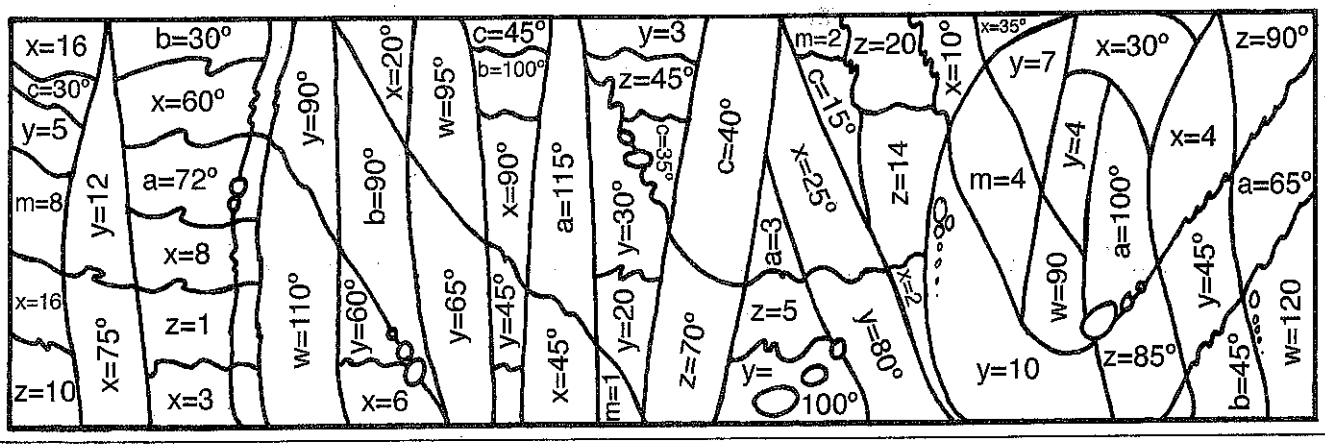
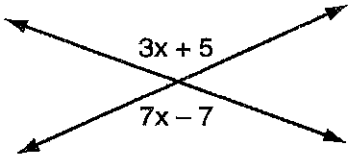




Using Algebra to Solve for Angle Measures

Determine an algebraic equation for the given diagram. Solve for x. Locate and shade your answer in the puzzle to find the number of sides on a snowflake.

1.



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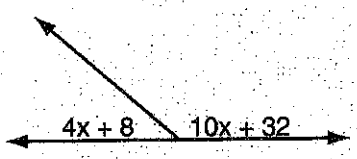

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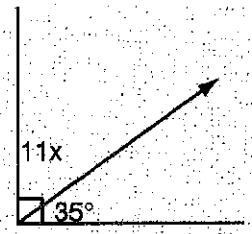

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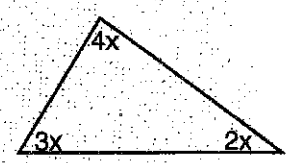

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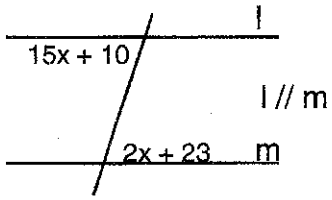

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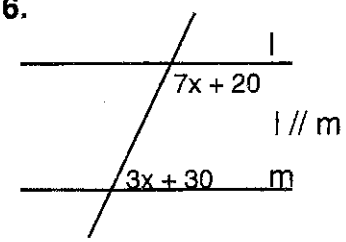

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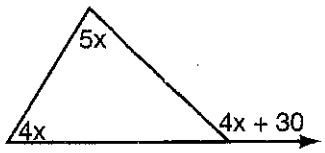

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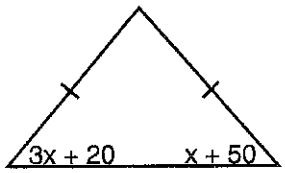

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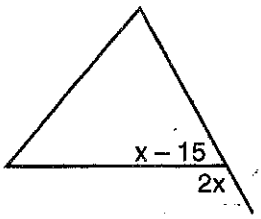

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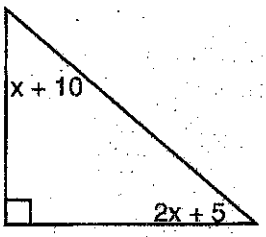

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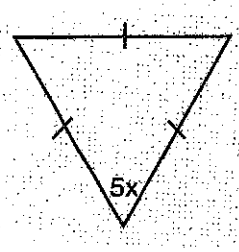

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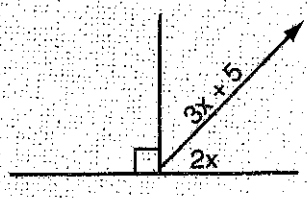

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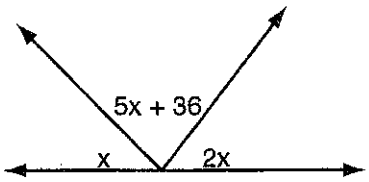

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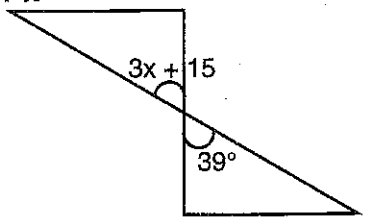

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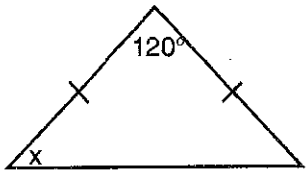

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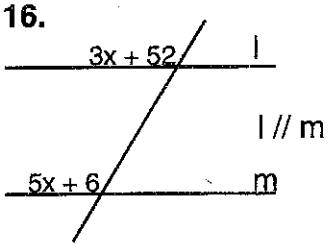
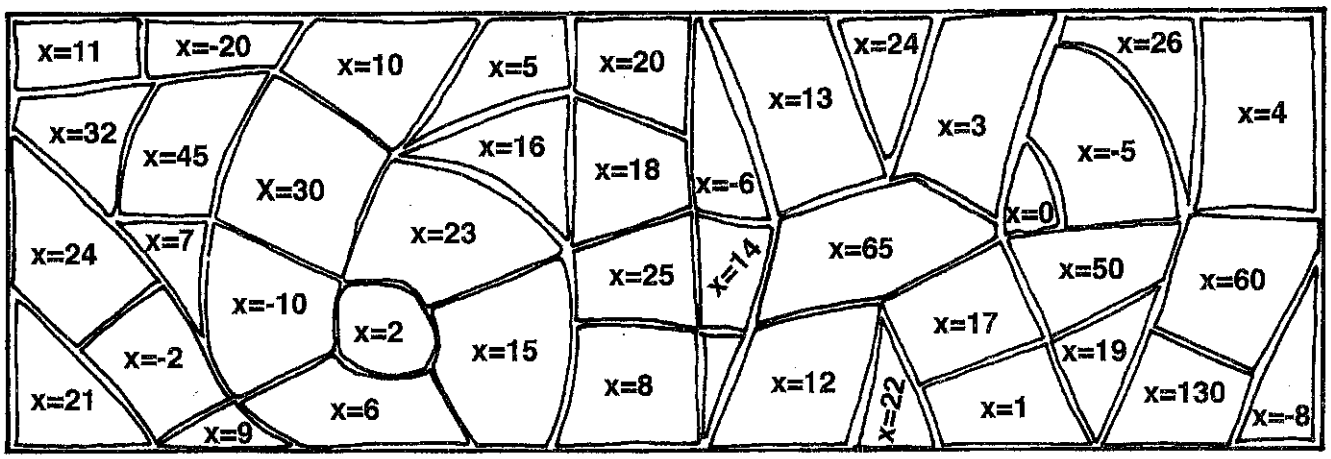




Algebra Review: Solving Equations

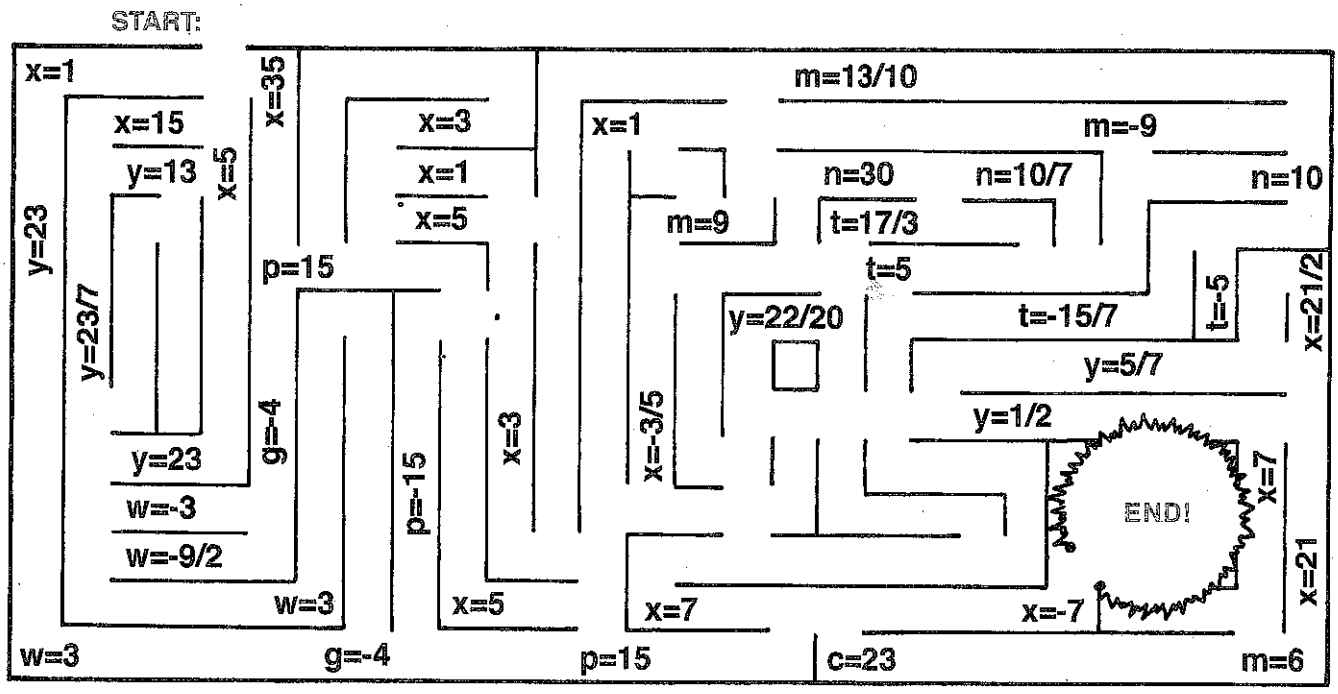
Steps for Solving Algebraic Equations

1. Simplify each side by
   —distributing
   —combining like terms
2. Move all variables to one side
3. Eliminate the constant using +/–
4. Eliminate the coefficient using x/÷

$$\begin{aligned} 9(x+1)+2 &= 4(x+8)-2x \\ 9x+9+2 &= 4x+32-2x \\ 9x+11 &= 2x+32 \\ 7x+11 &= 32 \\ 7x &= 21 \\ x &= 3 \end{aligned}$$

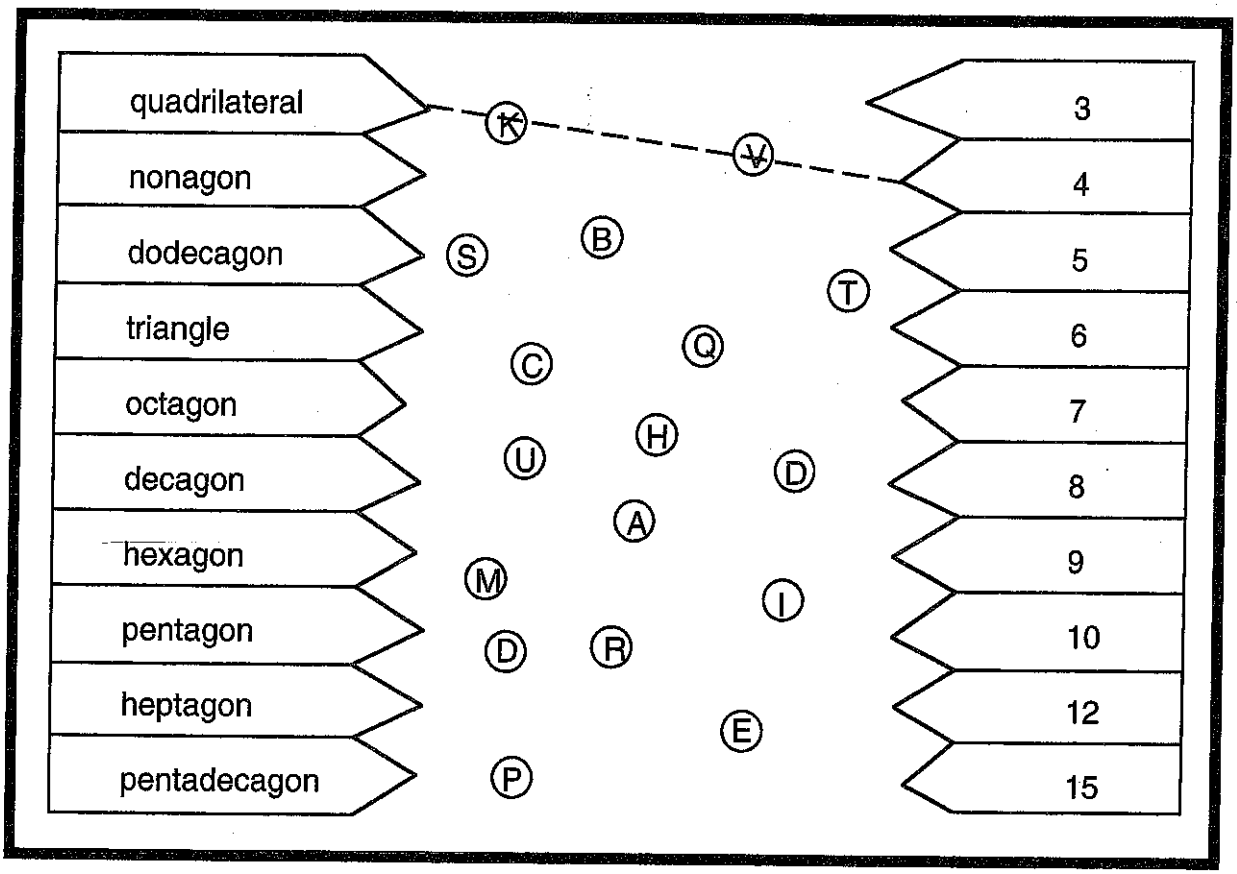
Solve the following algebraic equations. Follow the answers through the maze.

1. $3(x+5) = 2x+20$
2. $4(y-2) = 3(y+5)$
3. $9w+5 = 4(3w-1)$
4. $3g-5+9g = 4+15g+3$
5. $4(p-5) = 5(p-7)$
6. $3x+5 = 4-2x+6$
7. $4(m-3) = 6(m+1)$
8. $4(n+8)-3n = 42$
9. $2(t-7)-1 = -5(6-t)$
10. $7(2y-1)+3y = -3(y+2)+9$
11. $x = 2(10-x)+1$
12. $2(m+3)+2m = 5m$
13. $4c-3(c-8) = 47$
14. $3(x-5)-4(2x-4) = -2(x-11)$



Names for Polygons

Match each polygon name with the correct number of sides.
Letters without lines through them will spell the answer.



An equilateral, equiangular quadrilateral is called a

Angles of a Triangle

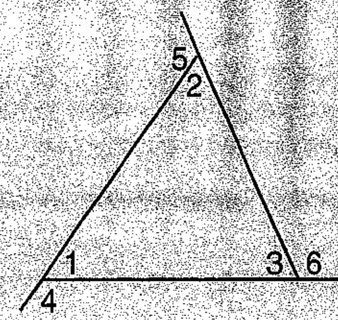
→The three angles in a triangle add to 180°: ($\angle 1 + \angle 2 + \angle 3 = 180°$).

If each side is extended in one direction, exterior angles are formed: ($\angle 4$, $\angle 5$, and $\angle 6$).

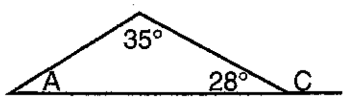
→An interior angle and its adjacent exterior angle are supplements: ($\angle 1 + \angle 4 = 180°$).

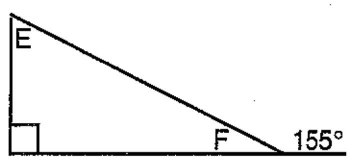
→The measure of an exterior angle is equal to the sum of its remote interior angles: ($\angle 2 + \angle 3 = \angle 4$).

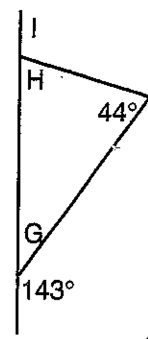
→All three exterior angles add to 360°: ($\angle 4 + \angle 5 + \angle 6 = 360°$).

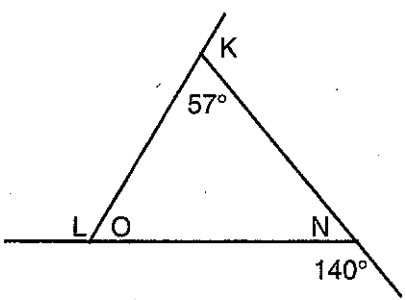


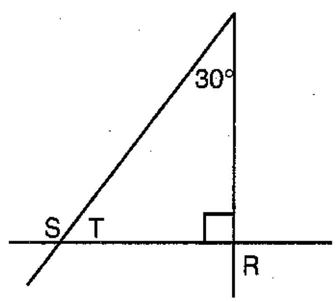
Place the letter in the blank above its measure to reveal an interesting fact about our 49th state.

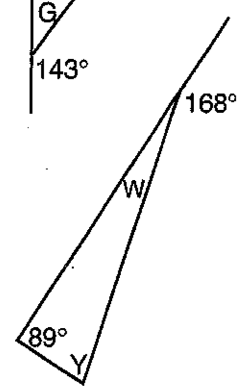












___ ___ ___   ___ ___   ___ ___ ___ ___ ___ ___ ___   ___ ___
60° 99° 65°   152° 83°   117° 120° 60° 97° 81° 40° 65°   83° 25°

___ ___ ___ ___ ___ ___   ___ ___   ___ ___ ___ ___ ___ ___
117° 97° 117° 120° 123° 117°   81° 120°   97° 83° 40° 37° 65° 90°

___ ___ ___ ___   ___ ___ ___   ___ ___ ___ ___ ___ ___
60° 99° 117° 40°   60° 99° 65°   65° 40° 60° 81° 90° 65°

___ ___ ___ ___ ___ ___ ___ ___ ___   ___ ___   ___ ___ ___
152° 83° 117° 120° 60° 97° 81° 40° 65°   83° 25°   60° 99° 65°

___ ___ ___ ___ ___   ___ ___ ___ ___ ___ - ___ ___ ___ ___ ___
97° 83° 12° 65° 90°   25° 83° 90° 60° 79° - 65° 81° 37° 99° 60°

___ ___ ___ ___ ___ ___.
120° 60° 117° 60° 65° 120°