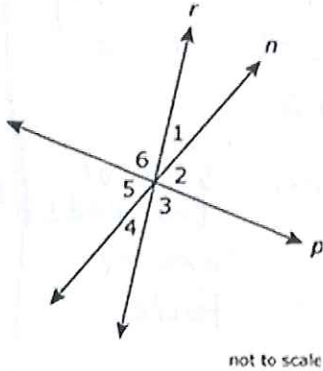


Unit 2 Review

1. The figure shows lines r , n , and p intersecting to form angles numbered 1, 2, 3, 4, 5, and 6. All three lines lie in the same plane.



Based on the figure, which of the individual statements would provide enough information to conclude that line r is perpendicular to line p ?

Select **all** that apply.

A. $m\angle 2 = 90^\circ$

B. $m\angle 6 = 90^\circ$

C. $m\angle 3 = m\angle 6$

D. $m\angle 1 + m\angle 6 = 90^\circ$

E. $m\angle 3 + m\angle 4 = 90^\circ$

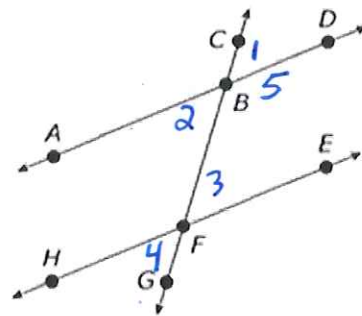
F. $m\angle 4 + m\angle 5 = 90^\circ$

2. Use the picture on the right for the following two proofs.

Given: $\angle CBD \cong \angle BFE$, Prove: $\angle ABG \cong \angle HFG$

In the figure shown, \overleftrightarrow{CF} intersects \overleftrightarrow{AD} and \overleftrightarrow{EH} at points B and F , respectively.

$\angle 1 \cong \angle 3$ Given
 $\angle 1 \cong \angle 2$ Vertical Angle
 $\angle 3 \cong \angle 4$ Vertical Angle
 $\angle 2 \cong \angle 4$ Substitution



Given: $\angle CBD \cong \angle BFE$, Prove: $m\angle BFE + m\angle DBF = 180^\circ$

$\angle 1 \cong \angle 3$ Given
 $\angle 1 + \angle 5 = 180^\circ$ Linear Pair
 $\angle 3 + \angle 5 = 180^\circ$ Substitution

3. Given $m\angle BGD = m\angle HGF = m\angle CGB = 90^\circ$

Choose the symbol to make each statement true.

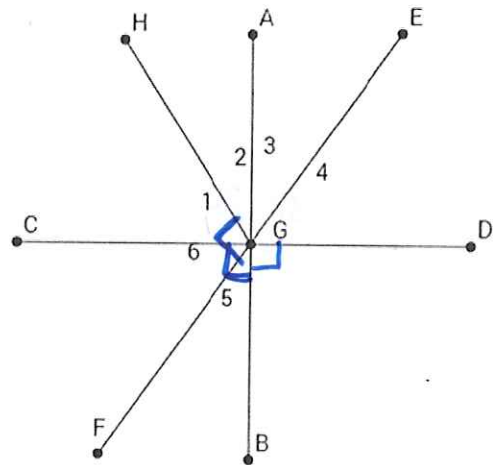
$\quad = \quad \cong \quad \neq$

$\angle 3 \cong \angle 6$

$m\angle 4 = m\angle 6$

$m\angle BGD \neq m\angle CGF$

$m\angle CGF + m\angle FGD = 180^\circ$



4. Order the length of each segment from shortest to longest given the two endpoints.

A(-6,1)B(-1,6)

C(-5, 8)D(5, 8)

E(2,7)F(4, -2)

G(7, 3)H(7, -1)

J(-4, -2)K(1, -5)

$\sqrt{50}$

10

$\sqrt{85}$

4

$\sqrt{34}$

5. Make a conjecture about the following properties, then prove it. What type of reasoning are you using in each part of that process?

- a) The sum of two even integers. *will be even*
- b) The sum of two odd integers.
- c) The product of two odd integers
- d) The product of three odd integers

c) $(2n+1)(2n+1)$ odd x odd
 $4n^2 + 4n + 1$ Multiply
 $2(2n^2 + 2n) + 1$ Factor
 \uparrow odd

d) $(2n+1)(2n+1)(2n+1)$
 $(4n^2 + 4n + 1)(2n+1)$
 $8n^3 + 8n^2 + 2n + 4n^2 + 4n + 1$
 ~~$8n^3 + 4n^2 + 14n + 1$~~
 $2(4n^3 + 2n^2 + 7n) + 1$
 \uparrow
 odd

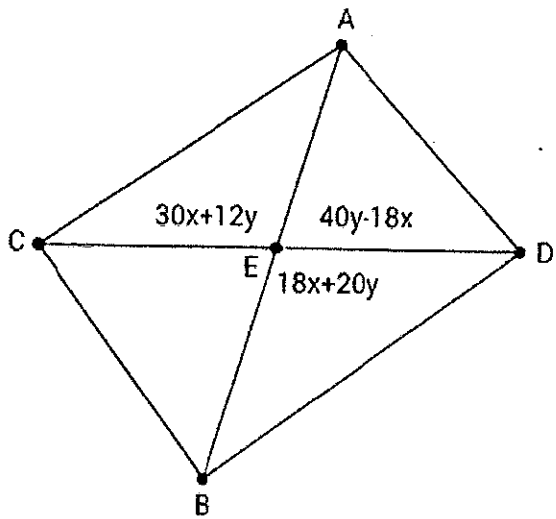
Hint: For any integer n , $2n$ is an even integer and $2n+1$ is an odd integer.

a) ~~$2(2n)$~~ $2n + 2n$ Two even integers added.
 $4n$ Combine
 $2(2n)$ Factor
 ← must be even since it is $\times 2$.

b) $2n+1 + 2n+1$ Sum of two odds
 $4n+2$ Combine
 $2(2n+1)$ Factor
 \uparrow EVEN.

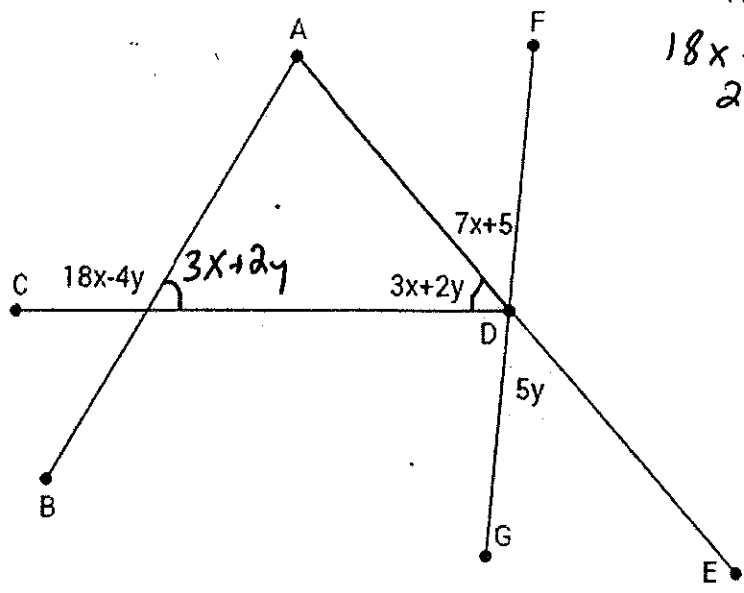
$30x + 12y = 18x + 20y$
 $12x - 8y = 0$
 \downarrow
 $x = 2$
 $(2, 3)$

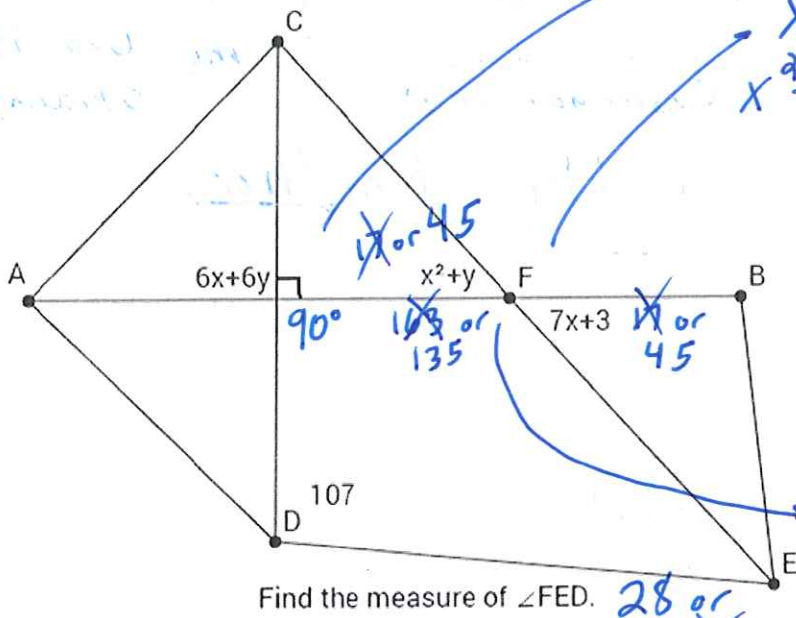
~~$30x + 12y = 18x + 20y$~~
 $40y - 18x + 18x + 20y = 180$
 \downarrow
 $y = 3$



$7x + 5 = 5y$
 $7x - 5y = -5$
 $18x - 4y + 3x + 2y = 180$
 $21x - 2y = 180$
 \downarrow
 $x = 10$
 $(10, 15)$

$-21x + 15y = 15$
 $21x - 2y = 180$
 \rightarrow
 $13y = 195$
 $y = 15$





Find the measure of $\angle FED$.

28 or ~~45~~

$$6x+6y=90 \rightarrow y = \frac{90-6x}{6} = 15-x$$

$$x^2+y=7x+3$$

$$x^2-7x+y-3=0$$

$$x^2-7x+15-x-3=0$$

$$x^2-8x+12=0$$

$$\cancel{(x-4)(x-8)}=0$$

$$(x-2)(x-6)=0$$

$$x=2, 6$$

$$x=2$$

$$2^2+y=7(2)+3$$

$$y=13$$

$$x=6$$

$$6^2+y=7(6)+3$$

$$36+y=45$$

$$y=9$$

7. For each statement, write the if-then form, the converse, inverse and contrapositive. Then say if each statement is true or false. If false, provide a counter example.

The sky is blue.

A pentagon is a polygon with 5 sides.

8. Write a biconditional statement for:

Acute angles

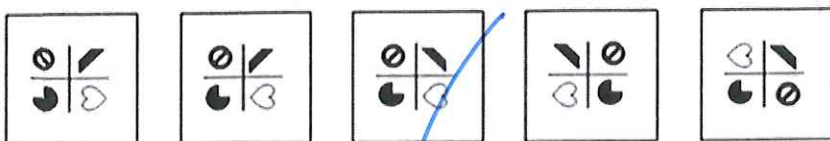
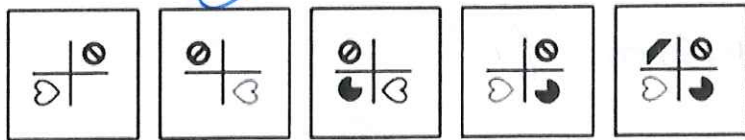
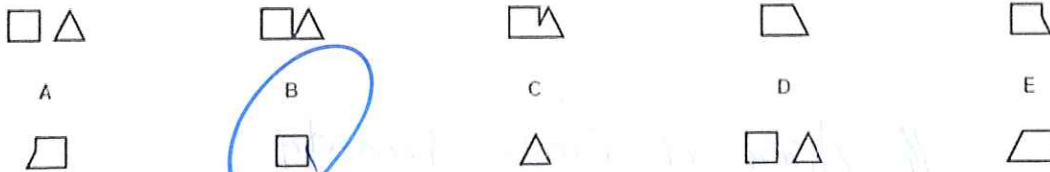
Triangles

Angles are acute if and only if they are less than 90°
 Polygons are triangles if and only if they have 3 sides.

9. Know the difference between inductive and deductive reasoning. Be able to give an example of each.

Making a prediction off a pattern / Proving it is true.

10. Use inductive reasoning to predict the next term in the pattern.



11. Form a deductive argument. An example of one is below:
 All even numbers are divisible by 2.
 8 is an even number.
 Therefore, 8 is divisible by 2.

I like all my Geo H students
 _____ is my Geo H student.
 (insert your name)

I like him/her.

12. Solve for x by writing algebraic proofs.

$$\frac{5}{3}(4x-11) = \frac{21}{4}x - \frac{11}{4}$$

$$4(36x-2) + 8 = (4x+3)^2$$

$$\frac{x+3}{40} = \frac{7}{4x}$$

13. Find the point (x,y) where the two lines intersect.

$$y = -3x + 9$$

$$y = 5x + 33$$

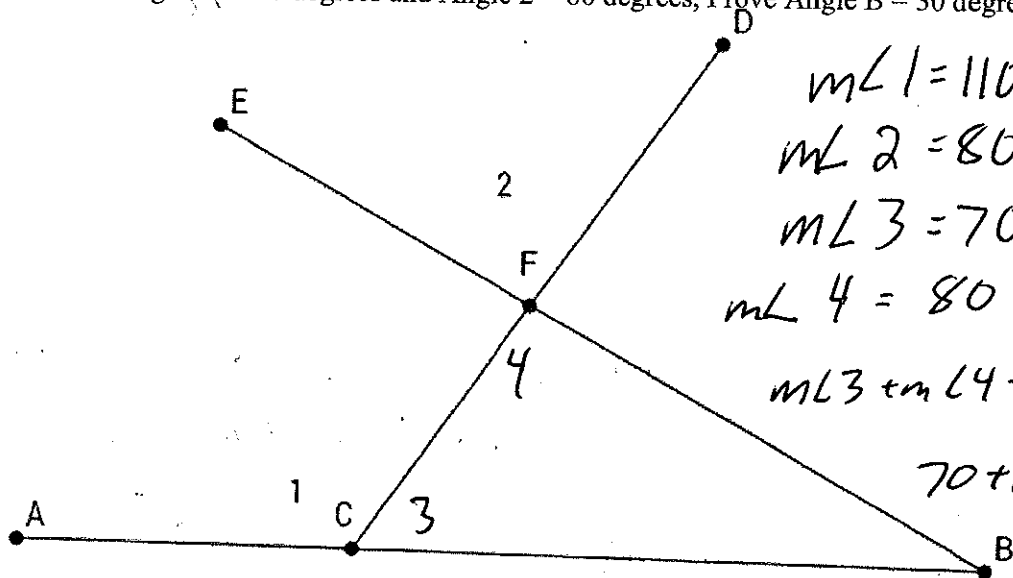
$$12x + 3y = 18$$

$$4x - 5y = -102$$

$(-3, 18)$

$(-3, 18)$

14. Given Angle 1 = 110 degrees and Angle 2 = 80 degrees, Prove Angle B = 30 degrees.



$$m\angle 1 = 110$$

Given

$$m\angle 2 = 80$$

Given

$$m\angle 3 = 70$$

Linear Pair

$$m\angle 4 = 80$$

Vertical Angles

$$m\angle 3 + m\angle 4 + m\angle B = 180^\circ$$

Triangle Sum Thm

$$70 + 80 + m\angle B = 180^\circ$$

Substitution

$$m\angle B = 30^\circ$$

subtraction

15. Prove the radius of a circle is equal to the square root of the area divided by pi.

$$A = \pi r^2$$

$$\frac{A}{\pi} = r^2$$

$$\sqrt{\frac{A}{\pi}} = r$$

Area of Circle Formula

Division POE

Exponentiation POE

(7) IF it is the sky, then it is Blue

False → Could be night

IF it is blue, then it is the sky.

False → Could be a yankee hat

IF it is not the sky, then it is not Blue.

False → Could be a yankee hat

IF it is not blue, then it is not the sky.

False → Could be night

IF it is a polygon with 5 sides, then it is a pentagon

True

IF it is a pentagon, ^{then} it is a polygon with 5 sides.

True

IF it is not a polygon w/ 5 sides, then it is not a pentagon.

True

IF it is not a pentagon, ^{then} it is not a polygon with 5 sides.

True.

18	S	R	$20x = 3$	Subtract POE
			$x = 3/20$	Division POE
$5(4x-11) = 8x-7$	Given		S	R
$20x - 55 = 8x - 7$	Distribute			
$12x = 48$	Addition POE		$\frac{x+3}{40} = \frac{x}{28}$	Given
$x = 4$	Division POE			
S	R		$28x + 84 = 40x$	Cross Multiply (Mult. POE)
$4(6x-2) + 8 = 4x+3$	Given		$84 = 12x$	Distribute POE
$24x - 8 + 8 = 4x + 3$	Distribute		$\frac{84}{12} = \frac{12x}{12}$	Subtraction POE
$24x = 4x + 3$	Combine Like Terms		$7 = x$	Division POE

12

Statements

Reasons

$$\frac{5}{3}(4x-11) = \frac{21}{4}x - \frac{11}{4}$$

Given

$$12 \left(\frac{5}{3}(4x-11) \right) = 12 \left(\frac{21}{4}x - \frac{11}{4} \right)$$

Multiplication
POE.

$$20(4x-11) = 3(21x-11)$$

Simplify
Distributive Prop.

$$80x - 220 = 63x - 33$$

Subtraction POE

$$17x = 187$$

$$\frac{17x}{17} = \frac{187}{17}$$

$$x = 11$$

Division POE

Statements

Reasons

$$4(36x-2) + 8 = (4x+3)^2$$

$$144x - 8 + 8 = 16x^2 - 24x + 9$$

$$144x = 16x^2 - 24x + 9$$

Given
FOIL/
Distribute
Combine

$$0 = 16x^2 - 168x + 9$$

Subtraction POE

$$x = \frac{168 \pm \sqrt{168^2 - 4(16)(9)}}{2(16)}$$

Quadratic
Formula

$$x = \frac{168 \pm \sqrt{168^2 - 4(16)(9)}}{2(16)}$$

$$x = 10.4, 0.05$$

Statements

Reasons

$$\frac{x+3}{40} = \frac{7}{4x}$$

Given

$$4x^2 + 12x = 280$$

Multiplication POE

$$x^2 + 3x = 70$$

Division POE

$$x^2 + 3x - 70 = 0$$

Subtraction POE

$$(x+10)(x-7) = 0$$

Factor

$$x = 7, -10$$

Zero Product Property.