<table>
<thead>
<tr>
<th>Day</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Points, Lines and Planes</td>
</tr>
<tr>
<td>2</td>
<td>Segments, Rays, Parallel Lines and Planes</td>
</tr>
<tr>
<td>3</td>
<td>Measuring Segments</td>
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</table>
| 4   | Measuring Angles  
    | Basic Constructions |
| 5   | The Coordinate Plane  
    | Perimeter, Circumference and Area |
| 6   | Quiz |
| 7   | Conditional Statements  
    | Biconditionals and Definitions |
| 8   | Deductive Reasoning  
    | Reasoning in Algebra |
| 9   | Proving Angles Congruent |
| 10  | Review |
| 11  | Test |
1. The most basic figure in geometry: ● It is know as a ____________.
   a. It is represented by a dot, but it really has no _______ or ________.
   b. Points are named with ________________ letters! Example: ●
   c. Every geometric figure is made up of points!
   d. Two different types of arrangements of points (on a piece of paper).
   e. A group of points that “line up” are called ________________ points.

2. The second basic figure in geometry is a ________________.
   a. Explanation: A series of points that extends ________________ in 2 opposite directions.
   ● ● ● ● ● ● ●    
   b. We use ________________ at the end of the line to save time (and space!)
   c. Naming lines (two options)
      i. Option 1: List any two points with a line (with arrows) over it:
     ii. Option 2: With an italicized (scripted) lowercase letter:

3. The third basic figure in geometry is called a ________________.
   a. Explanation: a flat surface with no thickness that extends forever in all directions.
   How we ______________ a plane.
   b. Naming – Option 1: The word “Plane” followed by any _____ points in the plane.
     Option 2: The word “Plane” followed by a ________________ italic letter.
4. The 3 basic shapes of geometry (__________, ____________, and ____________) are the “undefined terms of geometry” because they are so basic, we can’t define them.

5. At your seat: Describe the two different sets of points, name them if possible.

Set #1:  
Set #2:  

6. Set #1: ________________ points because all points lie in the same ____________.
7. Set #2: ________________ points, not all points lie in the same ____________.

8. Question: What is your name? How do you know?
   a. A ________________ is an accepted statement or fact.
   b. A synonym for the word ________________ is the word ____________.

9. Fact: Through any two points there is exactly _____ line.

10. Fact: If two lines intersect, then they intersect in exactly one ____________.

11. Fact: If two planes intersect, then they intersect in exactly one ____________.
1. Lines that do not intersect are called ________________________ lines
   a. Only when the lines are ____________________!

2. When lines are ____________________ and they don’t’ intersect, they are called ____________.

3. Look at our line...

4. Each of these “new” figures are called ____________.

   Called the _____________________, when written it MUST come ______________

* What do two rays that face opposite directions and have the same endpoint create?

   Definition (Opposite Rays): two ______________________ rays with the same endpoint.

   Always, sometimes, never... Two opposite rays ______________ form a line.
5. What do we get if we “cut” the line twice? This is called a ______________________.

\[\begin{array}{c}
X \\
\quad \\
Y
\end{array}\]

Written ________, spoken “__________.”

Called ____________________. Now order does _______ matter. Why?


b. **Line**: Extends forever in __________ direction(s).

c. **Ray**: Extends forever in __________ direction(s).

d. **Segment**: Extends forever in __________ direction(s).

7. What’s the difference between the two pairs of planes shown below?

8. Two planes that do not ______________________ are said to be _______________ planes.

9. Look at the figure below and describe the connection between line \(t\) and plane ABC.

More Questions

a. Name a pair of parallel planes.

b. Name a pair of skew lines.

c. Name a pair of parallel lines.

d. Name a ray.
1. What’s the distance between your house and the your school?

![House](image1)

2. Is your house and your school in a “straight line?”
   
   e. Answer: __________ _____ _______________ establish a (straight) line.
   
   f. The ________________ Postulate:
      
      i. Any two points can be put onto a number line and measured.

![Number Line 1](image2)

3. A number line is like an endless ruler...

![Number Line 2](image3)

4. Find the length of each segment listed below:

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
</tr>
</thead>
<tbody>
<tr>
<td>-8</td>
<td>-7</td>
<td>-6</td>
<td>-5</td>
<td>-4</td>
<td>-3</td>
<td>-2</td>
</tr>
<tr>
<td>-1</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>6</td>
<td>7</td>
<td>8</td>
<td></td>
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</tbody>
</table>

   AB = _______    BE = _______    CF = _______    DG = _______
   
   BG = _______    BA = _______    DF = _______

5. How do you find the distance between two points on a number when the units are variables?

![Segments](image4)

*** Distance formula on a number line:

\[
\text{Distance} = |x - y|
\]

1st point  2nd point
6. Two segments that have the same length are said to be __________________________.

g. The symbol               means “________________________.”

Definition: Congruent figures have the same _____________________ & _____________________.

Why do we only need to check one of these for segments?

* “Tick Marks” are used to indicate _________________________ segments.

7. Is there a place between your house and Conestoga where you are equally far from both?

The “halfway” point is called the ________________.

8. Length of our stick:

Note: The stick can be broken any way you want, but the two pieces must add up to _____.

Does this seem obvious? What do we call something that we accept as obvious?

This illustrates the ___________________ __________________ ________________.

Solve for x.

(2x + 4) ft.

6 ft.  14 ft.
Fill in the boxes below… use all resources available (friends, books, etc.)

<table>
<thead>
<tr>
<th>Angle Type</th>
<th>Draw an Example</th>
<th>Describe or Define</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute Angle</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Obtuse Angle</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Right Angle</td>
<td></td>
<td></td>
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<tr>
<td>Straight Angle</td>
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<tr>
<td>Congruent Angles</td>
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<tr>
<td>Complimentary Angles</td>
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<td>----------------------</td>
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<tr>
<td>Supplementary Angles</td>
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<tr>
<td>Angle Addition Postulate</td>
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<tr>
<td>Vertical Angles</td>
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<tr>
<td>Adjacent Angles</td>
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<td></td>
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<tr>
<td>Angle Bisector</td>
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</tbody>
</table>
Directions: Use the figure below to answer questions 1-5.

1. Name an angle complimentary to $\angle AGB$.

2. Name an angle supplementary to $\angle AGB$.

3. What type of angle is $\angle AGD$?

4. What angle is vertical to $\angle BGC$? What is its measure?

5. Name an angle that is congruent to $\angle AGB$.

6. In the figure below $\overline{SX}$ bisects $\angle RST$. Find the measure of $\angle RST$. 

[Diagram with points labeled A, B, C, D, E, F, G, X, R, S, T, and angle measurements]
7. Use the figure below to find $m\angle WYZ$.

8. In the figure below, $m\angle ABC = 43 + x$. Find $x$.

9. What postulate did you need to use to solve the problem in #8?

10. ∠1 is twice the size of its compliment. What are the degree measures of both angles?
1. The coordinates of point A is (6, 6) and point B is (3, 2). Plot the points below.

2. What is the length of segment AB (round to nearest tenth if necessary)?

3. What is the midpoint of segment AB?

Honors Level Question: The endpoint of a segment is (2, 3) and the midpoint is (3, -4). What is the other endpoint?
1. What is the perimeter and area of a rectangle with a height of 6 and base of 14?

2. What is the area of a circle with a circumference of $14\pi$?

3. What is the perimeter of the figure created on the coordinate plane with the points... A(-4, -1), B(4, 5), C(4, -2)

Wrap Up: Confidence Meter for tomorrow’s quiz? 1 2 3 4 5 6 7 8 9 10
Conditionals can be represented visually using a __________ diagram.

**Conditional:** If you live in Berwyn, then you live in Pennsylvania.

*Diagram:*

- **Pennsylvania**
- **Berwyn**

  - conclusion
  - hypothesis

Example #1: If an animal is a reptile, then it is cold-blooded.

**Conditional:** If an angle’s measure is 90 degrees, then the angle is right.

**Converse:** If an angle is right, then its measure is 90 degrees.

When both the conditional and the converse are true, you can combine them into one statement.

known as a _________________.

Make up a Biconditional…
**U1 D8: Deductive Reasoning & Reasoning in Algebra**

**Directions:** Make a valid conclusion from each set of statements below.

1. If a student wants to go to college, then a student must study hard.
   Rashid wants to go to the University of North Carolina.
   
   **Conclusion:**

2. If an animal is a red wolf, then its scientific name is *Canis rufus*.
   If an animal is named *Canis rufus*, then it is endangered.
   
   **Conclusion:**

3. If you read a good book, then you enjoy yourself.
   If you enjoy yourself, then your time is well spent.
   
   **Conclusion:**

4. If there is lightning, then it is not safe to be out in the open.
   Maria sees lightning from the soccer field.
   
   **Conclusion:**

The **Law of Detachment:**

The **Law of Syllogism:**

These laws are forms of ______________ reasoning, which is strong reasoning based on facts.

Inductive reasoning is more of a “guess,” and is based on continuing a ________________.
1. We can use deductive reasoning to perform proofs.
   a. Remember, a theorem **must be proven**!

2. Example: An Algebraic Proof. Solve $\frac{1}{2}x + 6 = 10$

<table>
<thead>
<tr>
<th>Statements (Steps to Solve)</th>
<th>Reasons (What you did)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. $\frac{1}{2}x + 6 = 10$</td>
<td>1.</td>
</tr>
<tr>
<td>2. $\frac{1}{2}x = 4$</td>
<td>2.</td>
</tr>
<tr>
<td>3. $x = 8$</td>
<td>3.</td>
</tr>
</tbody>
</table>

3. Properties you are probably familiar with...
   a. Addition Property of Equality
   b. Subtraction Property of Equality
   c. Multiplication Property of Equality
   d. Division Property of Equality
   e. The Distributive Property
   f. Simplifying

4. For the two examples below, describe the difference in the operations. Which reason would you use for each?

| a) If $8 + 2x + 3 = 23$, then $2x + 11 = 23$ | b) If $3x - 5 = 13$, then $3x = 18$ |

5. Properties you probably are not familiar with
   a. The Reflexive Property
   b. The Symmetric Property
   c. The Transitive Property
d. Substitution Property

a) The Reflexive Property: Think of when you look in a mirror and you see your reflection.

Any time you have a number (angle, side length, etc.), you can always write that it is equal (or congruent) to itself.

Examples: \(10 = 10\), \(x = x\), \(\overline{AB} \cong \overline{AB}\), \(m\angle ABC = m\angle ABC\)

When will this be used? Whenever two figures share something.

b) The Symmetric Property: Think of when you solve equations and the \(x\) is on the right.

You might like to always have your \(x\) on the left hand side, and you probably learned that you are allowed to switch sides – this is the symmetric property.

When solving an equation, if you end with this: \(6 = x\)

You can switch it to this: \(x = 6\)

Other examples: \(\overline{CD} \cong \overline{FG}\) switches to \(\overline{FG} \cong \overline{CD}\) \(\angle 1 \cong \angle 2\) switches to \(\angle 2 \cong \angle 1\)

c) The Transitive Property (Substitution): Think of your two closest friends...

Is friends with

Kelly

AND

Jane

is friends with

Jane

is friends with

Beth

\(\text{(Jane is the link between Kelly and Beth)}\)
Example #1: Fill in each reason on the right that matches with the statement on the left

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td>1. $5(x+3)=5-9$</td>
<td>1.</td>
</tr>
<tr>
<td>2. $5x+15=5-9$</td>
<td>2.</td>
</tr>
<tr>
<td>3. $5x+15=-4$</td>
<td>3.</td>
</tr>
<tr>
<td>4. $5x=-19$</td>
<td>4.</td>
</tr>
<tr>
<td>5. $x=-\frac{19}{5}$</td>
<td>5.</td>
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</tbody>
</table>

Example #2: Geometric Proof.

Given: $XY = 42$

<p>| | |</p>
<table>
<thead>
<tr>
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<tbody>
<tr>
<td>1. $XZ + ZY = XY$</td>
<td>1.</td>
</tr>
<tr>
<td>2. $3(n+4)+3n = 42$</td>
<td>2.</td>
</tr>
<tr>
<td>3. $3n+12 + 3n = 42$</td>
<td>3.</td>
</tr>
<tr>
<td>4. $6n+12 = 42$</td>
<td>4.</td>
</tr>
<tr>
<td>5. $6n = 30$</td>
<td>5.</td>
</tr>
<tr>
<td>6. $n = 5$</td>
<td>6.</td>
</tr>
</tbody>
</table>

Other Reasons you might use...

- Definition of a midpoint
- Definition of an angle bisector
- Vertical angles property

Wrap Up: Partner Quizzo

Partner A: use your notes and quiz your partner B about reasons we learned today.

Once you have successfully described 3 reasons, switch places...

Reasons are comprised of properties, postulates, theorems, definitions, and sometimes a few other things.
1. Vocabulary Review:
   
h. An accepted fact is known as a _________________.
   i. An educated guess is known as a _________________.
   j. A proven fact is known as a _________________.

2. Let’s prove a theorem:
   
k. **The Vertical Angles Theorem:** Vertical angles are congruent.

![Diagram of intersecting lines with angles labeled 1, 2, 3, and 4.]

   i. **Given:** Intersecting lines that form angles 1 – 4.

   Sometimes this is stated for you, sometimes you must “get it” from a picture.

   ii. **Prove:** $\angle 1 \cong \angle 2$

   Usually it is just what the theorem says
   Sometimes interpreted to your picture.

3.

<table>
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<tr>
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<tbody>
<tr>
<td>1.</td>
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<td>2.</td>
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<td>3.</td>
<td>3.</td>
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<td>4.</td>
<td>4.</td>
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<td>5.</td>
<td>5.</td>
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<tr>
<td>6.</td>
<td>6.</td>
</tr>
</tbody>
</table>
The type of proofs we’ve done so far are called ______ ________________________ proofs.
You can also do ________________________ proofs by writing your steps out as sentences
(this is usually more difficult – especially for beginners).

4. Congruent Supplements Theorem: If two angles are supplements of the same angle
(or of congruent angles), then the two angles are congruent.

Given: ∠1 and ∠2 are supplementary & ∠3 and ∠2 are supplementary
Prove: ∠1 ≅ ∠3

<table>
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<tr>
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<td>1.</td>
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<td>2.</td>
<td>2.</td>
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<tr>
<td>3.</td>
<td>3.</td>
</tr>
<tr>
<td>4.</td>
<td>4.</td>
</tr>
<tr>
<td>5.</td>
<td>5.</td>
</tr>
</tbody>
</table>

(The proof above can also be done as a paragraph proof)

#31 from tonight’s Homework:

Wrap up: List all “Reasons” on board
12. Fill in the blanks below with *always*, *sometimes*, or *never*.

   a. \( \overline{AC} \) is in Plane Q, so point B is ______________________ in Plane Q.
   b. Two planes that do not intersect are ______________________ parallel.
   c. \( \overline{JK} \) are \( \overline{JM} \) ______________________ the same ray.
   d. Three points are ______________________ coplanar.
   e. Intersecting lines are ______________________ parallel.

13. \( \angle A \) and \( \angle B \) are complimentary. \( \angle A \) is twice as big as \( \angle B \), what are the measure of the two angles?

14. \( \overline{BD} \) bisects \( \angle ABC \); \( \angle ABD = 6x + 2 \) and \( \angle DBC = 3x + 26 \). Draw the figure and find \( m\angle ABC \).

15. Point X is the midpoint of W and Y. \( XW = 3x + 8 \) and \( XY = 9x - 10 \). What is the length of WY?

16. The area of a circle is \( 36\pi \), what is the circumference of that circle?
17. A rectangle has coordinates A(5, 3), B(5, -2), C(1, -2), D(1, 3). What is the area of rectangle ABCD?

18. M is the midpoint of segment AB. A(5, 9) and M(11, 19). What are the coordinates of B?

19. Line AB is in Plane Q. Line t intersects plane Q at point A. Draw and label the figure.

20. Solve for \( x \) and \( y \) in the figure below.

22. In the conditional below, underline the hypothesis, and circle the conclusion.
   If two segments have equal measures, then they are congruent.

23. Write the converse of the condition from #11.

24. Define/Describe a biconditional. Give a mathematical example

25. Write a valid conclusion or write “no valid conclusion for the statements below.”
   a. **Conditional:** If M is the midpoint of AB, then AM = BM.
      i. **Given:** M is the midpoint of AB
      ii. **Conclusion:**

   b. **Conditional:** Given 3 random points, they are always coplanar.
      i. **Given:** Points X, Y, Z
      ii. **Conclusion:**
26. Find the measures of the indicated angles below.

\[ \angle BFD = \quad \]  
\[ \angle CFE = \quad \]  
\[ m\angle AFB = 55; m\angle BFC = \quad \]  
\[ m\angle CFD = 42; m\angle DFE = \quad \]  

Note: \( \overline{AE} \perp \overline{FC}, \overline{BF} \perp \overline{FD} \)

27. Complete the proof below...

Given: \( MI = LD \)  
Prove: \( ML = ID \)

<table>
<thead>
<tr>
<th>Statements</th>
<th>Reasons</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. ( MI = LD )</td>
<td>1.</td>
</tr>
<tr>
<td>2. ( IL = IL )</td>
<td>2.</td>
</tr>
<tr>
<td>3. ( MI + IL = LD + IL )</td>
<td>3.</td>
</tr>
<tr>
<td>4. ( MI + IL = ML and LD + IL = ID )</td>
<td>4.</td>
</tr>
<tr>
<td>5. ( ML = ID )</td>
<td>5.</td>
</tr>
</tbody>
</table>

28. Solve for \( x \), then find \( m\angle CBD \) given that \( m\angle ABD = (43+x)^\circ \).
Solving Problems Involving Angles

There will be three main options for problems with angles: \( \angle 1 = \angle 2 \), \( \angle 1 + \angle 2 = 90^\circ \), \( \angle 1 + \angle 2 = 180^\circ \).

1. Set the two expressions equal to each other: \( \text{(Angle 1)} = \text{(Angle 2)} \)

2. Add the two angles up and set them equal to 90: \( \text{(Angle 1)} + \text{(Angle 2)} = 90 \).

3. Add the two angles up and set them equal to 180: \( \text{(Angle 1)} + \text{(Angle 2)} = 180 \).
EXAMPLES: Problems Involving Angles

1. Angles are equal to each other.

\[
\begin{align*}
8x + 5 & = 4x + 21 \\
4x + 5 & = 21 \\
4x & = 16 \\
x & = 4
\end{align*}
\]

\[
\begin{align*}
10x + 1 & = 6x + 21 \\
4x + 1 & = 21 \\
4x & = 20 \\
x & = 5
\end{align*}
\]

2. Angles add up to 90°.

\[
\begin{align*}
4x + 15 + 6x + 25 & = 90 \\
10x + 40 & = 90 \\
10x & = 50 \\
x & = 5
\end{align*}
\]

\[
\begin{align*}
4x + 15 + 15 & = 90 \\
4x + 30 & = 90 \\
4x & = 60 \\
x & = 15
\end{align*}
\]

\[
\begin{align*}
2x + 40 + 3x + 15 & = 90 \\
5x + 55 & = 90 \\
5x & = 35 \\
x & = 7
\end{align*}
\]

3. Angles add up to 180°.

\[
\begin{align*}
8x + 20 + 7x + 10 & = 180 \\
15x + 30 & = 180 \\
15x & = 150 \\
x & = 10
\end{align*}
\]

\[
\begin{align*}
5x + 31 + 7x + 17 & = 180 \\
12x + 48 & = 180 \\
12x & = 132 \\
x & = 11
\end{align*}
\]