

Zero The Math Hero

Standard Mathematical Elements - Lesson 3

Lesson 3 provides a discussion of using coordinates on a number line to find segment lengths. It also covers the proper use of a protractor to measure angles.

Lesson 3 shows how to use the following postulates:

- The Ruler Postulate - used to find the length of segments on a number line.
- The Segment Addition Postulate - used to add or subtract segment lengths.
- The Protractor Postulate - used to find angle measures.
- The Angle Addition Postulate - used to add or subtract angle measures.

Lesson 3 uses problem solving to find missing segment lengths and angle measures. Problems involving algebra are also incorporated into the lesson.

Zero the Math Hero – Lesson 3

Lesson 3 – Definitions

coordinates - the numbers that match with points on a number line

protractor - a device used to measure angles

opposite rays - two collinear rays that share a common endpoint

Lesson 3 – Postulates

Postulate 5 (The Ruler Postulate) - For all points on a line, you can assign real numbers so that any two points can have coordinates 0 and 1. To find the length of any segment on that line, subtract their coordinates and take the absolute value.

Postulate 6 (The Segment Addition Postulate) - To find the length of a segment that has a point between its endpoints, add the lengths of its smaller segments.

Postulate 7 (The Protractor Postulate) - In a plane, any two opposite rays can be paired with the real numbers 0 and 180, and any other ray above that line with that common endpoint can be paired with any other real number between 0 and 180 (just like a protractor). To find the measure in degrees for angles formed by these rays, subtract the numbers and take the absolute value.

Postulate 8 (The Angle Addition Postulate) - If a point lies in the interior of an angle, then two smaller angles can be formed by drawing another ray with a common endpoint through that point. The sum of the two smaller angles will equal the whole angle measure. If two angles form a straight angle, then their sum must be 180 degrees.

Name: _____

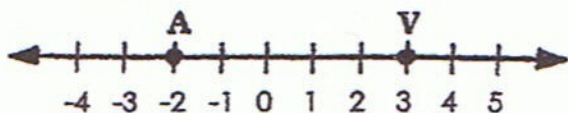
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Lesson 3 - Practice Problems

Segment Lengths - Angle Measures

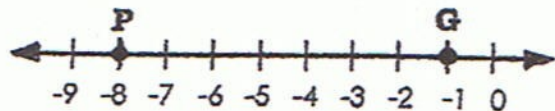
1. Find the length of segment AV.

A. 6 B. 7 C. 5 D. -5



1. _____

2. Find GP.

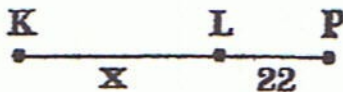


2. _____

3. Find WT if the coordinate of W is -44 and the coordinate of T is 27.

3. _____

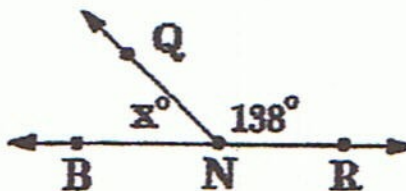
4. Find KL if KP is 56.



4. _____

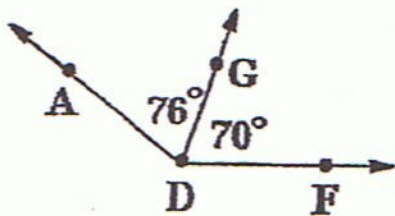
5. What is the measure of $\angle BNQ$?

5. _____



6. Find $m\angle ADF$.

6. _____



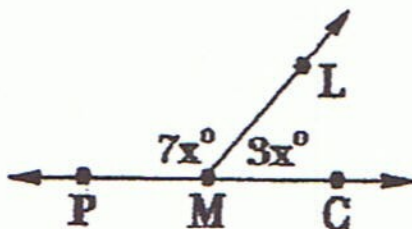
Name: _____

Date: _____

Lesson 3 - Practice Problems - Continued

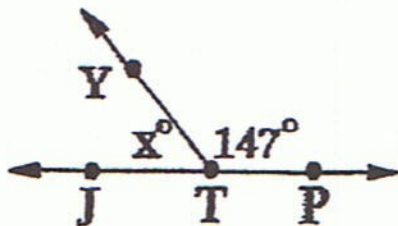
Segment Lengths - Angle Measures

7. Find
- $m\angle CML$
- .



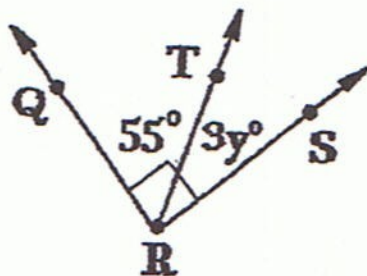
7. _____

8. If
- $m\angle YTP$
- is
- 147°
- , what is
- $m\angle JTY$
- ?



8. _____

9. Find the value of
- y
- .



9. _____

10. Use the answer for
- question 9
- to find
- $m\angle TRS$
- .

10. _____

Tell if the given points are coplanar or not.

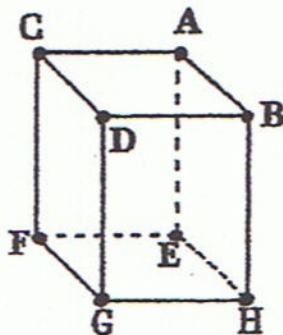
11. _____ F, B, C

14. _____ F, B, D, E

12. _____ A, B, E

15. _____ A, B, D, E

13. _____ D, B, C, E



Quiz – Terms and Postulates
Zero the Math Hero – Lesson 3

Name: _____

Date: _____

Lesson 3 – Terms

Directions: Fill in each blank with the letter that corresponds to the correct answer, A-C.

- _____ a device used to measure angles **A. coordinates**
- _____ two collinear rays that share a common endpoint **B. protractor**
- _____ the numbers that match with points on a number line **C. opposite rays**

Lesson 3 – Postulates

Directions: Each postulate is missing one or two words, indicated by “(?)”. Use the letter choices beneath each statement to indicate the correct missing word.

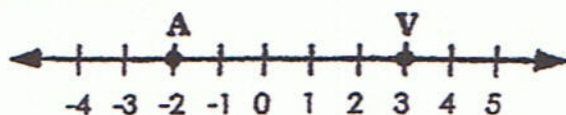
- _____ **Postulate 5 (The Ruler Postulate)** - For all points on a line, you can assign real numbers so that any two (?) can have coordinates zero and one.
A. points B. planes C. rulers D. lines
- _____ **(Postulate 5 continued)** To find the length of any (?) on that line, subtract their coordinates and take the absolute value.
E. ray F. figure G. segment H. points
- _____ **Postulate 6 (The Segment Addition Postulate)** - To find the length of a segment that has a point between its endpoints, add the (?) of its smaller segments.
I. points J. lengths K. rays L. lines
- _____ **Postulate 7 (The Protractor Postulate)** - In a plane, any two (?) rays can be paired with the real numbers 0 and 180, and any other ray above that line with that common endpoint can be paired with any other real number between 0 and 180 (just like a protractor).
M. similar N. congruent O. opposite P. collinear
- _____ **(Postulate 7 continued)** To find the measure in degrees for angles formed by these rays, (?) the numbers and take the absolute value.
Q. add R. subtract S. multiply T. divide
- _____ **Postulate 8 (The Angle Addition Postulate)** If a point lies in the interior of an angle, then two (?) angles can be formed by drawing another ray with a common endpoint through that point.
U. larger V. equal W. noncoplanar X. smaller
- _____ **(Postulate 8 continued)** The sum of the two smaller angles will equal the whole angle measure. If two angles form a (?) angle, then their sum must be 180 degrees.
A. right B. straight C. coplanar D. collinear

Lesson 3 - Practice Problems

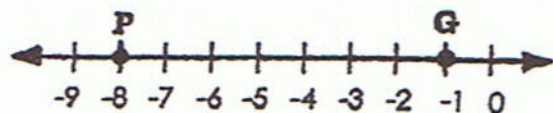
Segment Lengths - Angle Measures

1. Find the length of segment AV.

A. 6 B. 7 C. 5 D. -5

1. C (5)

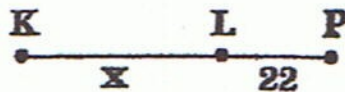
2. Find GP.

2. 7

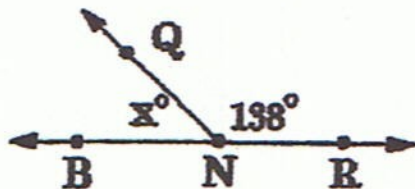
3. Find WT if the coordinate of W is -44 and the coordinate of T is 27.

3. 71

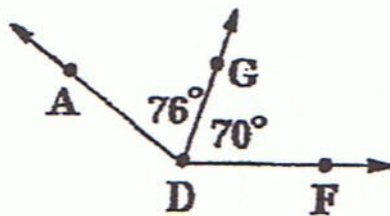
4. Find KL if KP is 56.

4. 34

5. What is the measure of
- $\angle BNQ$
- ?

5. 42°

6. Find
- $m\angle ADF$
- .

6. 146°

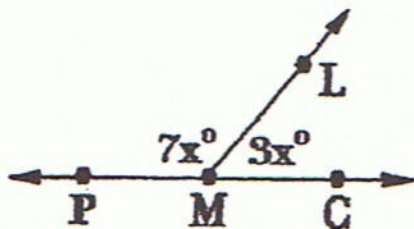
Name: ANSWER KEY

Date: _____

Lesson 3 - Practice Problems - Continued

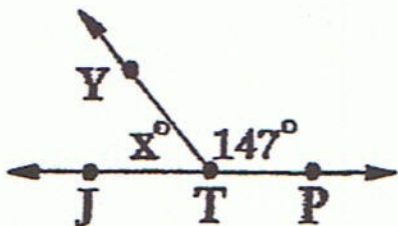
Segment Lengths - Angle Measures

7. Find m° CML.



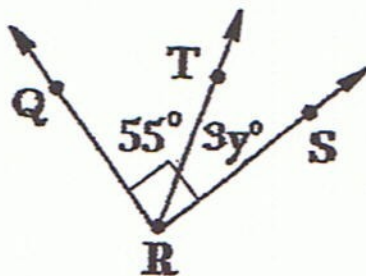
7. 54°

8. If m° YTP is 147° , what is m° JTY?



8. 33°

9. Find the value of y .



9. $\frac{35}{3}$
(or $11\frac{2}{3}$)

10. Use the answer for question 9 to find m° TRS.

10. 35°

Tell if the given points are coplanar or not.

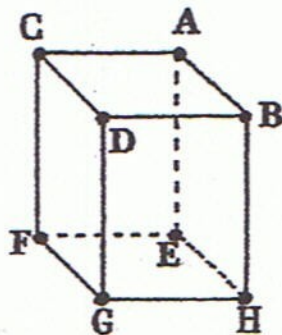
11. YES F, B, C

14. YES F, B, D, E

12. YES A, B, E

15. No A, B, D, E

13. No D, B, C, E



Quiz — Terms and Postulates
Zero the Math Hero – Lesson 3

Name: ANSWER KEY

Date: _____

Lesson 3 – Terms

Directions: Fill in each blank with the letter that corresponds to the correct answer, A-C.

1. B a device used to measure angles A. coordinates
2. C two collinear rays that share a common endpoint B. protractor
3. A the numbers that match with points on a number line C. opposite rays

Lesson 3 – Postulates

Directions: Each postulate is missing one or two words, indicated by "(?)". Use the letter choices beneath each statement to indicate the correct missing word.

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5. G **(Postulate 5 continued)** To find the length of any (?) on that line, subtract their coordinates and take the absolute value.
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