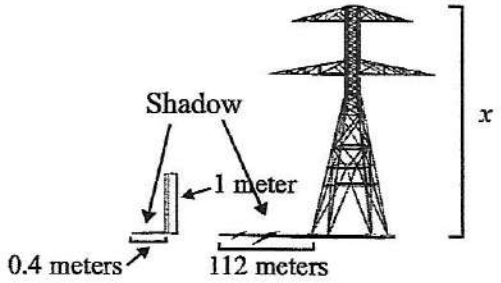
NTI # [redacted]
21

5.6 Proportion Word Problems

Example 6: A stick one meter long is held perpendicular to the ground and casts a shadow 0.4 meters long. At the same time, an electrical tower casts a shadow 112 meters long. Use ratio and proportion to find the height of the tower.



Step 1: Set up a proportion using the numbers in the problem. Put the shadow lengths on one side of the equation and put the heights on the other side. The 1 meter height is paired with the 0.4 meter length, so let them both be top numbers. Let the unknown height be x.

$$\frac{\text{shadow length}}{\text{object height}} \qquad \frac{0.4}{112} = \frac{1}{x}$$

Step 2: Solve the proportion as you did on page 86.

$112 \times 1 = 112$ $\qquad$ $112 \div 0.4 = 280$

Answer: The tower height is 280 meters.

Use ratio and proportion to solve the following problems.

1. Rudolph can mow a lawn that measures 20,000 square feet in 2 hours. At that rate, how long would it take him to mow a lawn 75,000 square feet?
2. Faye wants to know how tall her school building is. On a sunny day, she measures the shadow of the building to be 6 feet. At the same time she measures the shadow cast by a 5-foot statue to be 2 feet. How tall is her school building?
3. Out of every 5 students surveyed, 2 listen to country music. At that rate, how many students in a school of 800 listen to country music?
4. Butterfly, a Labrador retriever, has a litter of 8 puppies. Four are black. At that rate, how many puppies in a litter of 10 would be black?
5. According to the instructions on a bag of fertilizer, 5 pounds of fertilizer are needed for every 10,000 square feet of lawn. How many square feet will a 25-pound bag cover?
6. A race car can travel 2 laps in 5 minutes. At this rate, how long will it take the race car to complete 100 laps ?
7. If it takes 7 cups of flour to make 4 loaves of bread, how many loaves of bread can you make from 35 cups of flour?
8. If 3 pounds of jelly beans cost \$6.30, how much would 2 pounds cost?
9. For the first 4 home football games, the concession stand sold a total of 600 hotdogs. If that ratio stays constant, how many hotdogs will sell for all 10 home games?

NTI DAY 22

Chapter 15
Statistics

15.1 Mean

In statistics, the arithmetic mean is the same as the average. To find the arithmetic mean of a list of numbers, first add together all of the numbers in the list, and then divide by the number of items in the list.

Example 1: Find the mean of 38, 72, 110, 548.

Step 1: First add: $38 + 72 + 110 + 548 = 768$

Step 2: There are 4 numbers in the list so divide the total by 4. $768 \div 4 = 192$
The mean is 192.

Find the mean (average) of the following word problems.

1. Val's science grades are 95, 87, 65, 94, 78, and 97. What is her average?
2. Ann runs a business from her home. The number of orders for the last 7 business days are 17, 24, 13, 8, 11, 15, and 9. What is the average number of orders per day?
3. Melissa tracks the number of phone calls she has per day: 8, 2, 5, 4, 7, 3, 6, 1. What is the average number of calls she receives?
4. The Cheese Shop tracks the number of lunches they serve this week: 42, 55, 36, 41, 38, 33, and 46. What is the average number of lunches served?
5. Leah drives 364 miles in 7 hours. What is her average miles per hour?

Find the data missing from the following problems.

6. Gabriel earns 87% on his first geography test. He wants to keep a 92% average. What does he need to get on his next test to bring his average up?
7. Rian earned \$68.00 on Monday. How much money must she earn on Tuesday to have an average of \$80 earned for the two days?
8. Haley, Chuck, Dana, and Chris enter a contest to see who could bake the most chocolate chip cookies in an hour. They bake an average of 75 cookies. Haley bakes 55, Chuck bakes 70, and Dana bakes 90. How many does Chris bake?
9. Four wrestlers make a pact to lose some weight before the competition. They lose an average of 7 pounds each over the course of 3 weeks. Carlos loses 6 pounds, Steve loses 5 pounds, and Greg loses 9 pounds. How many pounds does Wes lose?
10. Three boxes are ready for shipment. The boxes average 26 pounds each. The first box weighs 30 pounds; the second box weighs 25 pounds. How much does the third box weigh?

NTI DAY 23

Chapter 15 Test

1. What is the mean of 36, 54, 66, 45, 36, 36, and 63?

A. 36
B. 45
C. 48
D. 63
E. 27

2. A neighborhood surveyed the times of day people water their lawns If you wanted to find which was the most popular time of day to water the lawn, it would be best to find the _____ of data.

F. mean
G. median
H. range
J. mode
K. none of the above

3. Examine the following two data sets:

Set #1: 49, 55, 68, 72, 98
Set #2: 20, 36, 47, 68, 75, 82, 89

Which of the following statements is true?

A. They have the same mode
B. They have the same median.
C. They have the same mean.
D. They have the same mean, median, and mode.
E. None of the above.

4. What is the median of the following set of data?

33, 31, 35, 24, 38, 30

F. 32
G. 31
H. 30
J. 29
K. 28

5. Concession stand sales for the first 6 games of the season averaged \$400.00. If the total sales of the first 5 games were \$320, \$540, \$230, \$450, and \$280, what were the total sales for the sixth game?

A. \$230
B. \$364
C. \$580
D. \$280
E. \$350

6. What is the mean of 12, 23, 8, 26, 37, 11, and 9?

F. 29
G. 18
H. 19
J. 24
K. 12

7. Which of the following sets of numbers has a median of 42?

A. {60, 42, 37, 22, 19}
B. {16, 28, 42, 48}
C. {42, 64, 20}
D. {12, 42, 40, 50}
E. {16, 18, 42, 42}

8. Kendra's has an average of 88 on her last three math test scores. She scored 98 on one test, and 82 on another test. What was Kendra's score on the third test?

F. 90
G. 100
H. 84
J. 92
K. 78

Name _____ Class _____ Date _____

NTI DAY 24

Lesson 1-2

Write *true* or *false*.

1. A, D, F are coplanar.

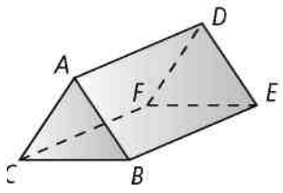
2. $\overleftrightarrow{AC}$ and $\overleftrightarrow{FE}$ are coplanar.

3. A, B, E are coplanar.

4. D, A, B, E are coplanar.

5. A and C are colinear.

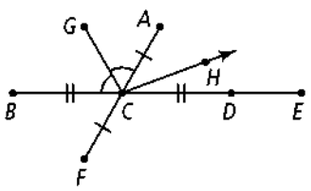
6. D, E, and B are collinear.



7. $\overleftrightarrow{AB}$ and $\overleftrightarrow{CD}$ do not intersect but $\overleftrightarrow{DC}$ intersects $\overleftrightarrow{AB}$ in one point. Make a sketch that shows this.

Lessons 1-3 and 1-4

Use the figure at the right for Exercises 8-13.



8. If $BC = 12$ and $CE = 15$, then $BE =$ ☐.

9. ☐s the angle bisector of ☐.

10. MUST SHOW WORK Algebra $BC = 3x + 2$ and $CD = 5x - 10$. Solve for x.

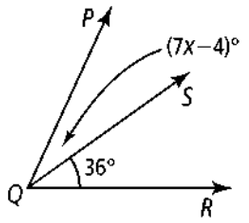
11. MUST SHOW WORK Algebra If $AC = 5x - 16$ and $CF = 2x - 4$, then $AF =$ ☐.

12. $m\angle BCG = 60$, $m\angle GCA =$ ☐, and $m\angle BCA =$ ☐.

13. $m\angle ACD = 60$ and $m\angle DCH = 20$. Find $m\angle HCA$.

14. MUST SHOW WORK Algebra In the figure at the right, $m\angle PQR = 4x + 47$. Find $m\angle PQS$.

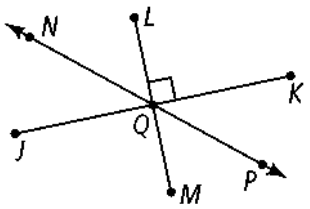
15. MUST SHOW WORK Algebra Points A, B, and C are collinear with B between A and C. $AB = 4x - 1$, $BC = 2x + 1$, and $AC = 8x - 4$. Find AB, BC, and AC.



NTI DAY 25

Lesson 1-5

Name the angle or angles in the diagram described by each of the following.



1. supplementary to $\angle NQK$

2. vertical to $\angle PQM$

3. congruent to $\angle NQJ$

4. adjacent and congruent to $\angle JQM$

5. complimentary to $\angle KQP$

6. $\angle XYZ$ and $\angle XYW$ are complementary angles. $m\angle XYZ = 3x + 9$ and $m\angle XYW = 5x + 9$. What are $m\angle XYZ$ and $m\angle XYW$? SHOW WORK

7. $\angle ABC$ and $\angle DEF$ are supplementary angles. The measure of $\angle DEF$ is twenty degrees less than three times the measure of $\angle ABC$. What are $m\angle ABC$ and $m\angle DEF$?

8. $\overrightarrow{SQ}$ bisects $\angle RST$. $m\angle QST = 2x + 18$ and $m\angle RST = 6x - 2$.

What is $m\angle RSQ$? SHOW WORK.

Lesson 1-7

Find (a) the distance between the points to the nearest tenth.

(b) the coordinates of the midpoint of the segments with the given endpoints.

YOU MUST SHOW YOUR WORK

9. $A(2, 1)$, $B(3, 0)$

10. $R(5, 2)$, $S(-2, 4)$

11. $Q(-7, -4)$, $T(6, 10)$

12. $C(-8, -1)$, $D(-5, -11)$

13. A map of a city and suburbs shows an airport located at $A(25, 11)$. An ambulance is on a straight expressway headed from the airport to Grant Hospital at $G(1, 1)$. The ambulance gets a flat tire at the midpoint M of $\overline{AG}$. As a result, the ambulance crew calls for helicopter assistance.

a. What are the coordinates of point M?

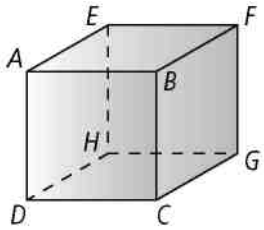
b. How far does the helicopter have to fly to get from M to G? Assume all coordinates are in miles.

Name_____ Class _____ Date_____

Extra Practice

Lesson 3-1

Use the cube to name each of the following.



1. all lines that are parallel to $\overleftrightarrow{BC}$

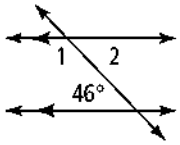
2. a pair of parallel planes

3. two lines that are skew to $\overleftrightarrow{AE}$

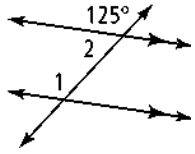
Lesson 3-2

Find $m\angle 1$ and $m\angle 2$.

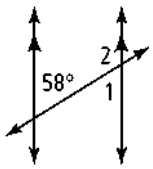
4.



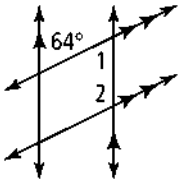
5.



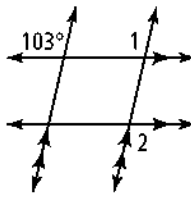
6.



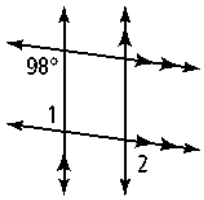
7.



8.

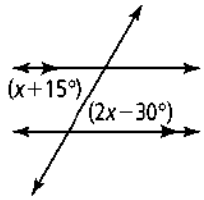


9.

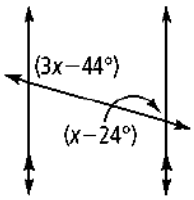


Find the value of each variable. Then find the measure of each labeled angle. SHOW YOUR WORK.

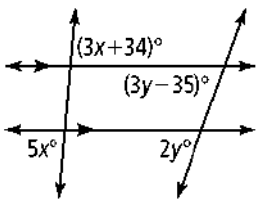
10.



11.



12.



Name_____ Class _____ Date _____

Extra Practice NTI DAY 27

Lesson 3-7

Use the given information to write an equation of each line.

1. slope −4, y-intercept 6

2. slope 7, passes through (1, −2)

Write an equation of the line that contains the given points.

3. $A(4, 2)$, $B(6, -3)$

4. $C(-1, -1)$, $D(1, 1)$

5. $F(3, -5)$, $G(-5, 3)$

Lesson 3-8

Without graphing, tell whether the lines are parallel, perpendicular, or neither. Explain.

6. $y = 4x - 8$
$y = 4x - 2$

7. $2x + 3y = 5$
$5x - 10y = 30$

8. $y = -2x + 7$
$x - 2y = 8$

9. $5x - 3y = 0$
$y = \frac{5}{3}x + 2$

Write an equation for the line parallel to the given line through the given point.

10. $y = x - 7$, $(0, 4)$

11. $y = \frac{1}{2}x + 3, (6, 3)$

12. $y = -\frac{1}{5}x, (5, -8)$

Write an equation for the line perpendicular to the given line through the given point.

13. $y = x + 2$, $(3, 2)$

14. $y = -2x$, $(4, 0)$

15. $y = \frac{1}{3}x - \frac{2}{5}, (5, -1)$

16. On a city map, Washington Street is straight and passes through points at (7, 13) and (1, 5). Wellington Street is straight and passes through points at (3, 24) and (9, 32). Do Washington Street and Wellington Street intersect? How do you know?

Name _____ Class _____ Date _____

NTI DAY 28 – Thomas Geometry

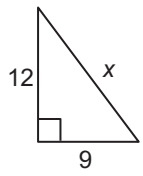
Extra Practice

Chapter 8

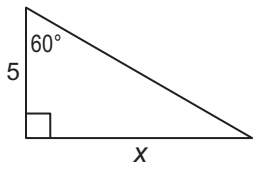
Lessons 8-1 and 8-2

Find the value of x. If your answer is not a whole number, round to the nearest tenth. SHOW YOUR WORK.

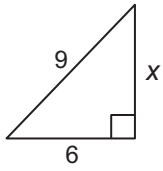
1.



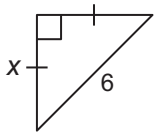
2.



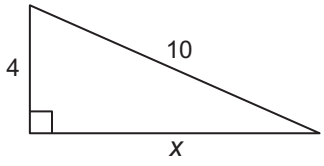
3.



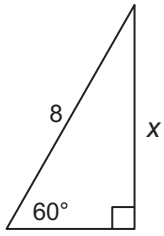
4.



5.



6.



7. A rectangular lot is 165 feet long and 90 feet wide. How many feet of fencing are needed to make a diagonal fence for the lot? Round to the nearest foot.

The lengths of the sides of a triangle are given. Classify each triangle as *acute*, *right*, or *obtuse*.

8. 3, 5, 7

9. 8, 9, 11

10. 0.5, 1.2, 1.3

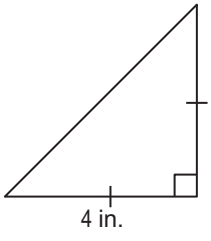
11. $\sqrt{5}$, 4, 5

12. $\sqrt{3}$, 3, $\sqrt{3}$

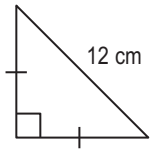
13. 24, 32, 38

Find the missing side lengths. Give answers in simplest radical form if necessary.

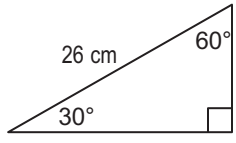
14.



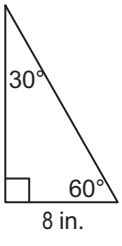
15.



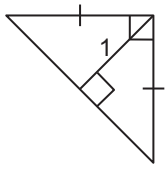
16.



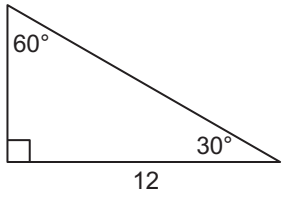
17.



18.



19.



NTI DAY 28 – Thomas Geometry

Name _____ Class _____ Date _____

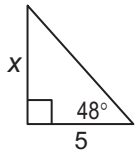
Extra Practice NTI DAY 29 & 30 THOMAS - GEOMETRY

Chapter 8

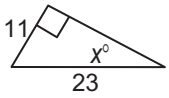
Lessons 8-3

Find the value of x. Round lengths of segments to the nearest tenth and angle measures to the nearest degree. SHOW YOUR WORK.

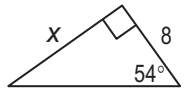
1.



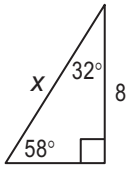
2.



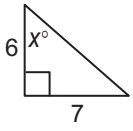
3.



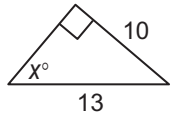
4.



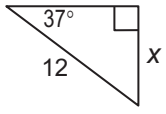
5.



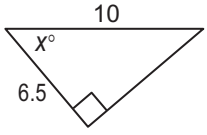
6.



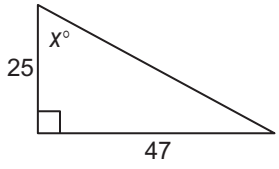
7.



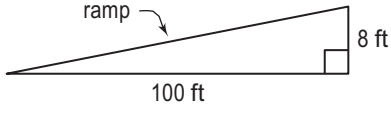
8.



9.

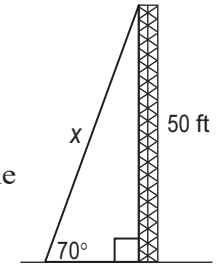


10. An architect includes wheelchair ramps in her plans for the entrance to a new museum. She wants the angle that the ramp makes with level ground to measure 4°. Will the dimensions shown in the figure work? If not, what change should she make?



11. A 12-ft ladder is propped against a vertical wall. The top end is 11 ft above the ground. What is the measure of the angle formed by the ladder with the ground?

12. How long is the guy wire shown in the figure if it is attached to the top of a 50-ft antenna and makes a 70° angle with the ground? Round to the nearest tenth.



13. A 15-ft ladder is propped against a vertical wall and makes a 72° angle with the ground. How far is the foot of the ladder from the base of the wall? Round to the nearest tenth.