

Geometry Chapter 3: Constructions

STUDY GUIDE

You will need a compass and straightedge for the test. You may NOT use any notes or a textbook for the test. The test will consist of the following:

Learning Target 3A: I can duplicate line segments and angles.

- 1 question on duplicating a line segment
- 1 question on duplicating an angle

Learning Target 3B: I can define and create a perpendicular bisector.

- 1 question on constructing a **perpendicular bisector**
- 1 question on the **perpendicular bisector** theorem (a point on the perpendicular bisector is equidistant from the endpoint of the line segment it bisects).
- 1 question on constructing a **median**
- 1 question on constructing a **midsegment**

Learning Target 3C: I can define and construct a perpendicular to a line through a given point including an altitude.

- 1 question on constructing a **perpendicular** to a line through a given point
- 1 question on constructing an **altitude**

Learning Target 3D: I can bisect an angle.

- 1 question on constructing an **angle bisector**

Learning Target 3E: I can define and construct parallel lines.

- 1 question on constructing **parallel lines** (you can use either the corresponding angle OR the rhombus method)

Learning Target 3F: I can define and the following points of concurrency: 1) the incenter 2) the circumcenter and 3) the orthocenter

- 3 questions asking you to construct each of the points of concurrency (**incenter, circumcenter and orthocenter**)
- 2-3 questions asking you to define/explain the properties of the 3 points of concurrency (example: the circumcenter is equal distance from all 3 vertices of a triangle etc.)

Learning Target 3G: I can define and use the properties of the centroid.

- 1 question asking you to define and explain how to construct the centroid. (Remember the centroid is the center of gravity of a triangle)
- 1 question asking you to find the lengths of different segments of the medians .

Learning Target 3H: I can use the properties of slope to determine if lines are parallel or perpendicular.

- 2 questions asking you to determine if a given set of points or lines are parallel or perpendicular
- 2 questions asking you to write an equation in slope-intercept form ($y = mx + b$) for a line parallel/perpendicular to another line through a given point.
- 2 word problems that involve finding the slopes/equations for lines that are parallel/perpendicular

The test will be a total of 22 questions. The first 16 questions will be on constructions, all of which are constructed response. The last 6 questions will be on coordinate geometry where you need to use the properties of slope, linear equations, and parallel and perpendicular lines. The parallel and perpendicular line section will be a mix of multiple choice and constructed response.

Resources:

1. Your notes, homework assignments and especially the many quizzes.
2. The textbook chapter 3 (you can also access the textbook online at <http://math.kendallhunt.com/> with the classpass password of southgeo.
3. Math Open Reference (http://south.mpls.k12.mn.us/links_for_constructions.html or <http://www.mathopenref.com/constcopysegment.html>) has videos on how to construct different constructions as well as definitions on the points of concurrency
4. Review Sessions: Monday, November 21st from 3 to 4:30 pm after school for period 6 AND Monday, November 28th from 3 to 4:30 pm after school for period 3. Both reviews will be in **Room 238.**
5. Answer Key: If you finish the review over the weekend or Thanksgiving break and want to check your answers. Email me at: ariel.trangle@mpls.k12.mn.us for the answer key or with questions.

Other Important Reminders:

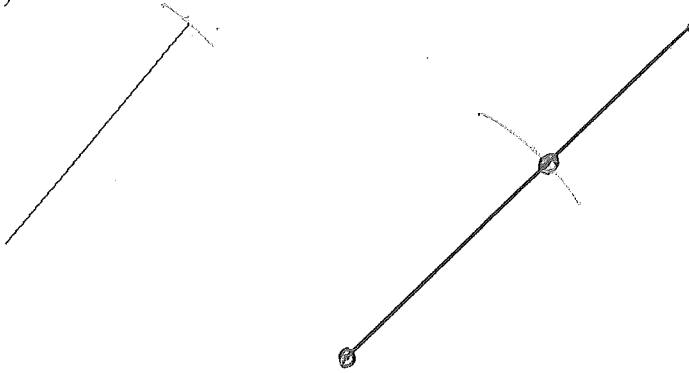
1. Your entire notebook with all warm-ups, notes, example problems and investigations from chapter 3 is due at the beginning of class the day of the test. **NO LATE CLASSWORK WILL BE ACCEPTED.**
2. The chapter 3 review is due at the beginning of class the day of the test. The review is a classwork assignment. **NO LATE CLASSWORK WILL BE ACCEPTED.**

Chapter 3 Review Questions

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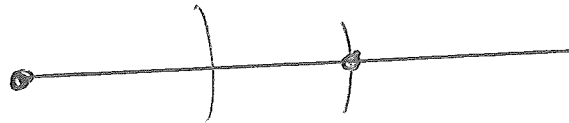
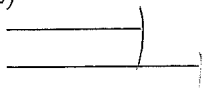
Construct a line segment congruent to each given line segment.

1)



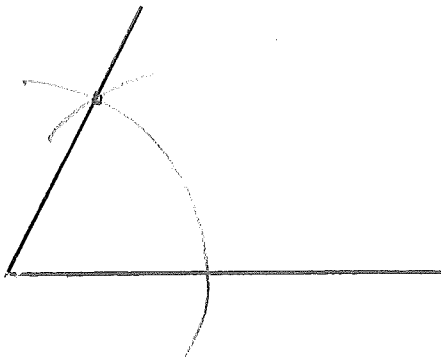
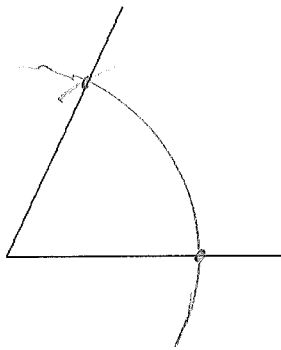
Construct a line segment whose length is equal to the sum of the lengths of the given line segments.

2)

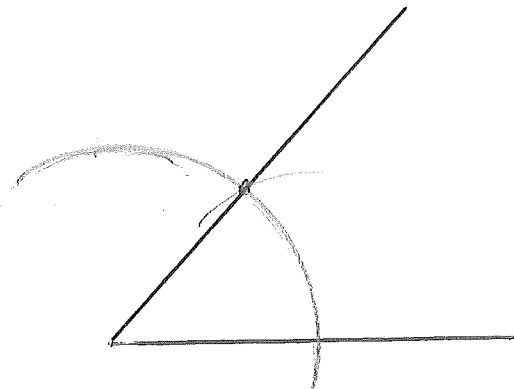
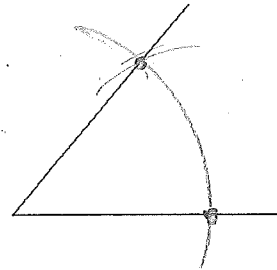


Construct a copy of each angle given.

3)

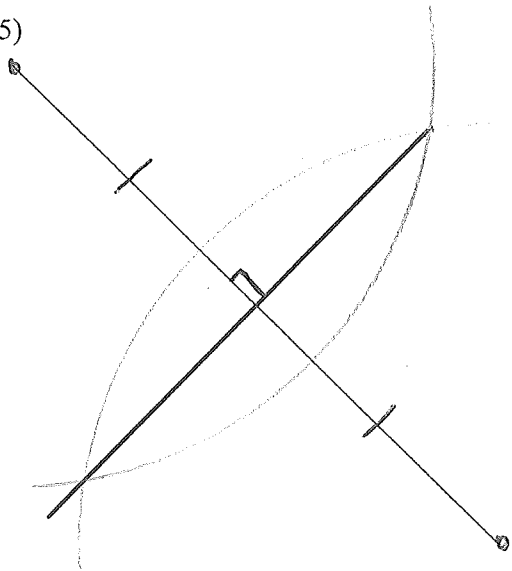


4)



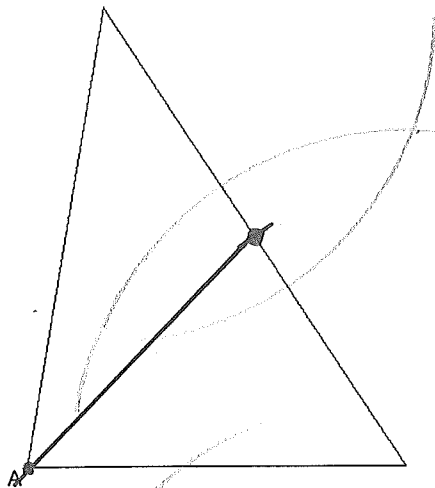
Construct the perpendicular bisector of each.

5)



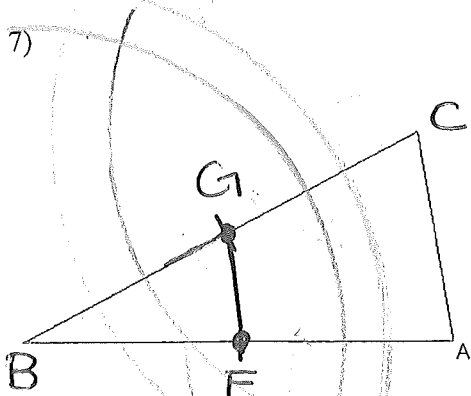
For each triangle, construct the median from vertex A.

6)



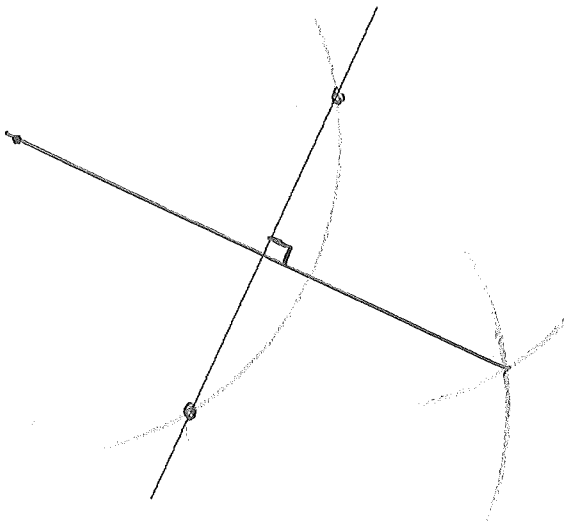
For the triangle below construct a midsegment. Name your midsegment FG where F is the midpoint of AB and G is the midpoint of BC.

7)



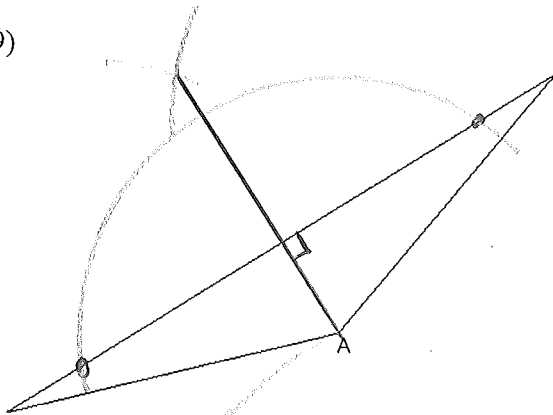
Construct a line segment perpendicular to the segment given through the point given.

8)



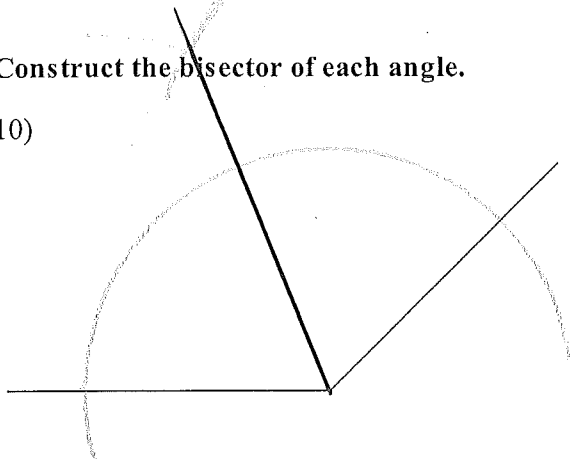
For each triangle, construct the altitude from vertex A.

9)

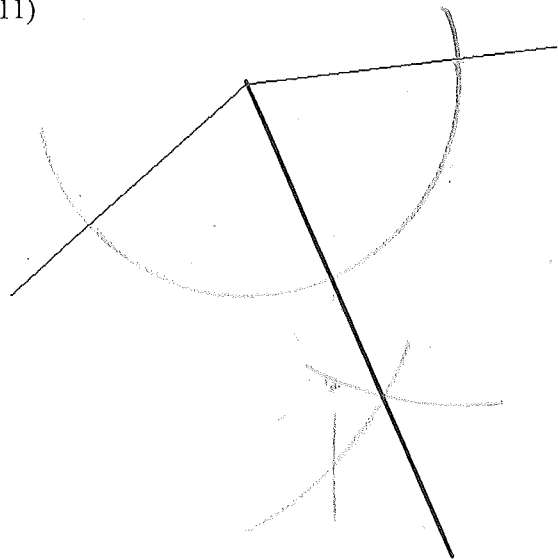


Construct the bisector of each angle.

10)

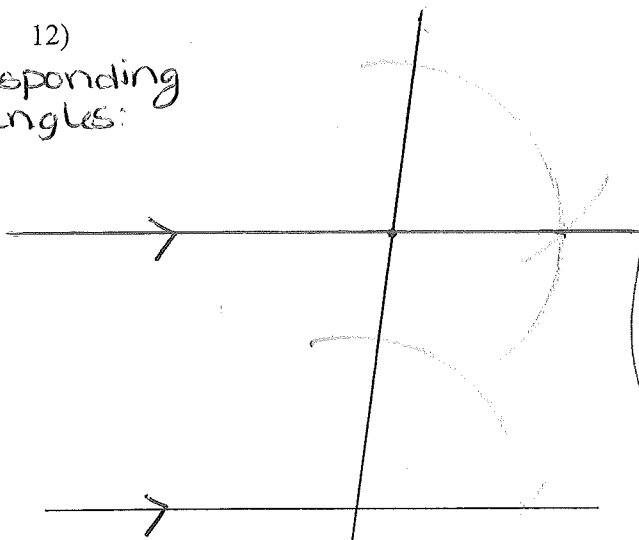


11)

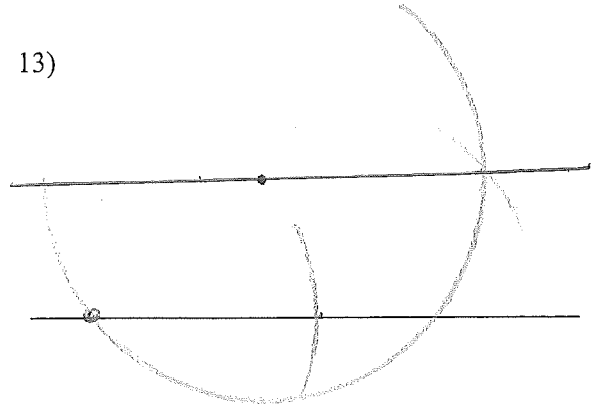


Construct a line segment through the given point parallel to the given line segment. Use either the rhombus or corresponding angle method with a transversal.

12)
Corresponding angles:

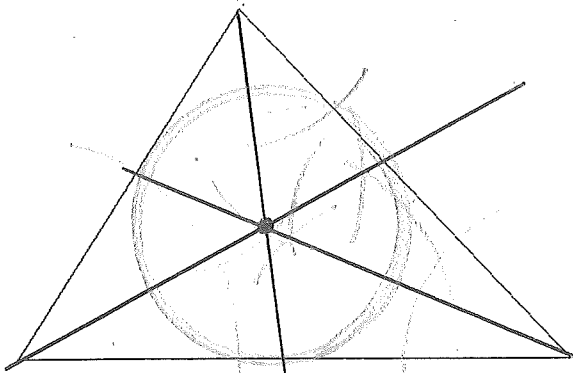


13)



Locate the incenter of each triangle. Then use the incenter to inscribe a circle INSIDE the triangle

14)

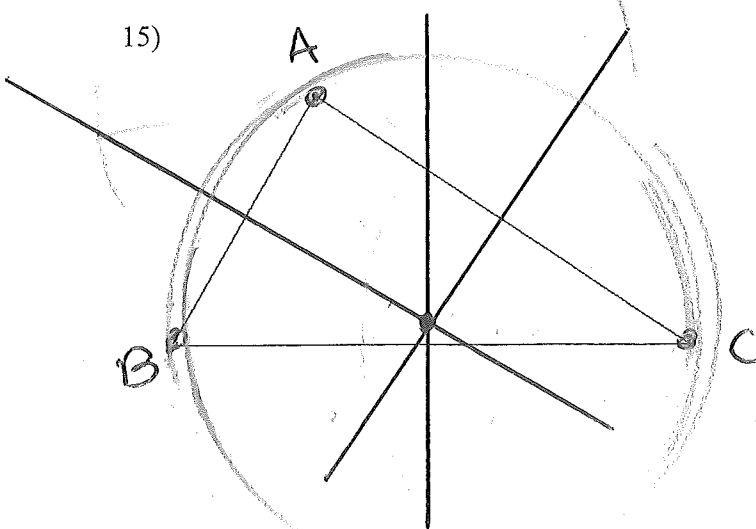


- 3 angle bisectors

- Center of the largest circle that fits inside a triangle

Locate the circumcenter of each triangle. Then use the circumcenter to circumscribe a circle around the outside of the triangle.

15)



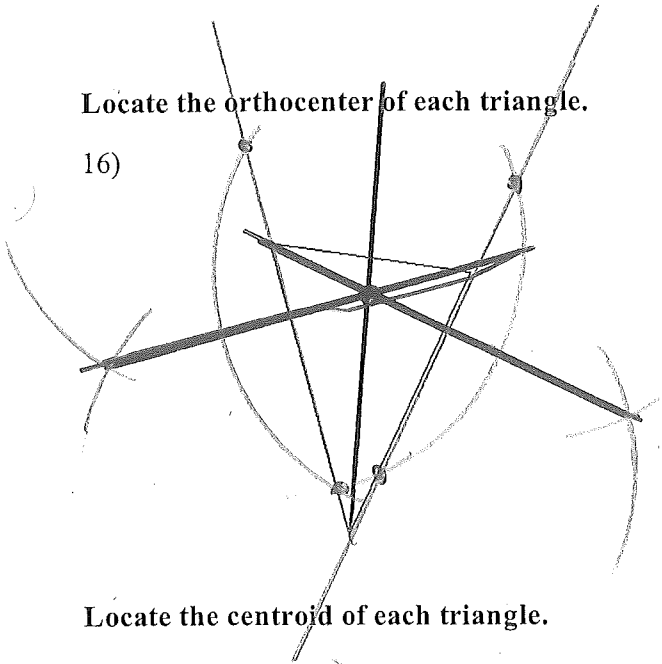
- equal distance from all 3 vertices

- 3 perpendicular bisectors

- center of the circle that circumscribe the Δ through all 3 vertices

Locate the orthocenter of each triangle.

16)

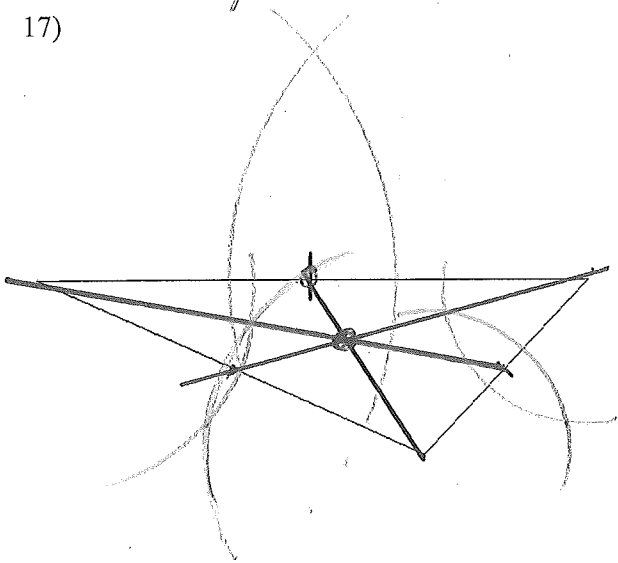


- where the
3 altitudes
meet

- can be in or
outside the
triangle

Locate the centroid of each triangle.

17)



18) What point of concurrency is the center of gravity and allows you to balance a triangle with only the tip of a finger?

Centroid,
the point where
a triangle's 3
medians
intersect

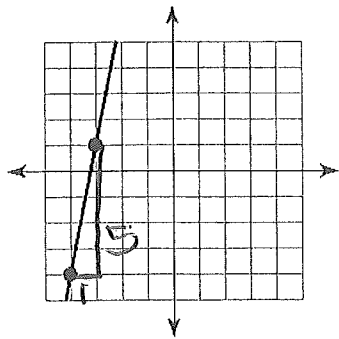
19) Three small northern Minnesota towns need access to a hospital. Neither is large enough to support or build a hospital independently. Where should the town build the hospital so that it is equal distance from all 3 towns? What point of concurrency should be used to find the location? How do you find the point?

* The circumcenter

* construct 3 ~~an~~
perpendicular bisectors
+ find their point of concurrency

Find the slope of each line.

20)



$$m = \boxed{5}$$

$$\frac{\text{rise}}{\text{run}} = \frac{5}{1} = 5$$

Find the slope of the line through each pair of points.

21) $(-17, -12), (10, -8)$

$$\frac{-8 - (-12)}{10 - (-17)} = \boxed{\frac{4}{27}}$$

Find the slope of a line parallel to each given line.

22) $y = \frac{3}{2}x - 4$

$$\boxed{\frac{3}{2}}$$

23) $y = 2x - 3$

$$\boxed{2}$$

Find the slope of a line perpendicular to each given line.

24) $y = -6x + 3$

$$\boxed{\frac{1}{6}}$$

25) $y = \frac{2}{3}x + 3$

$$\boxed{-\frac{3}{2}}$$

Write the slope-intercept form of the equation of the line described.

26) through: $(2, -3)$, parallel to $y = -3x + 1$

$$-3 = -3(2) + b$$

$$-3 = -6 + b$$

$$+6 \quad +6 \quad 3 = b$$

28) through: $(-4, 3)$, perp. to $y = \frac{4}{3}x$

$$y = mx + b$$

$$3 = \frac{-3}{4} \left(\frac{-4}{1} \right) + b$$

$$3 = \frac{12}{4} + b$$

$$3 = 3 + b$$

$$0 = b$$

$$\boxed{y = -\frac{3}{4}x}$$

27) through: $(2, 1)$, parallel to $y = -\frac{2}{3}x$

$$1 = \frac{2}{3} \left(\frac{2}{1} \right) + b$$

$$1 = \frac{4}{3} + b$$

$$+4/3 \quad +4/3$$

$$7/3 = b$$

$$y = \frac{2}{3}x + \frac{7}{3}$$

29) through: $(2, 4)$, perp. to $y = -\frac{2}{3}x + 1$

$$y = mx + b$$

$$4 = \frac{3}{2} \left(\frac{2}{1} \right) + b$$

$$4 = \frac{6}{2} + b$$

$$4 = 3 + b$$

$$-3 \quad -3$$

$$1 = b$$

$$\boxed{y = \frac{3}{2}x + 1}$$