Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date \_\_\_\_\_\_\_\_\_\_\_\_

Geometry – Pd \_\_ Constructions

**Constructions Day 3**

Recall: An *\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_* is a line segment with one endpoint on any vertex of a triangle that extends to the opposite side of the triangle and bisects the angle. Since there are three vertices in every triangle, there are *\_\_\_\_\_\_\_\_\_\_\_* angle bisectors of a triangle. The point of concurrency of the angle bisectors of a triangle is known as the \_\_\_\_\_\_\_\_\_\_\_\_\_\_ of a triangle. To construct the incenter of a given triangle construct the angle bisector on \_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ vertices. The incenter will always be located \_\_\_\_\_\_\_\_\_\_\_\_\_\_ a given triangle. The point of concurrency (the incenter) is the center of the circle that is inscribed within a given triangle.

**The Incenter**  Regents Common Core

1) Using a compass and a straightedge, construct the incenter of $∆ABC$.

The Incenter:

- The incenter is formed by connecting the three angle bisectors

- The three angle bisectors of a triangle are concurrent at a point

equidistant from the ***sides*** of a triangle.

Directions: Using the above information, complete the following questions. Don’t forget justifications.

1) The incenter of $∆TUS$ is located at point P. If CP = 4x + 9 and PB = 6x – 11, find the value of x and

 the length of CP and PD. Justify all calculations.



2) Point P is the incenter of $∆FGH$. If m<TFP = 3x + 15, and m<UFP = 5x – 13, find the value of x.

 Justify all calculations.



3) The incenter of $∆CDE$ is point P. If m<SDP = 7x + 5 and m<UDP = 9x – 5, find the value of x

 and m<SDP. Justify all calculations.



4) P is the incenter of $∆XYZ$. If m<SZP = 7x + 7, and m<SZT = 16x + 4, find the value of x and m<SZT.

 Justify all calculations.

Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date \_\_\_\_\_\_\_\_\_\_\_\_

Geometry – Pd \_\_ Constructions

**Constructions Day 3 HW**



1) Construct the incenter of $∆TOM$. 2) Construct an equilateral triangle to DE.



\_\_\_\_\_ 3) P is the incenter of $∆XYZ$. If m<RYP = 2x + 20, and m<TYP = x + 40,

 what is the m<RYT?

 (1) 20 (2) 40

 (3) 60 (4) 120



\_\_\_\_\_ 4) Which geometric principle is used in the construction shown below?

 (1) The intersection of the angle bisectors of a triangle is the

 center of the inscribed circle.

 (2) The intersection of the angle bisectors of a triangle is the

 center of the circumscribed circle.

 (3) The intersection of the perpendicular bisectors of the sides

 of a triangle is the center of the inscribed circle.

 (4) The intersection of the perpendicular bisectors of the sides

 of a triangle is the center of the circumscribed circle.

\_\_\_\_\_ 5) The incenter of $∆ABC$ is located at point G. If EG = 3x + 14 and

 DG = 5x – 8, what is the length of GF?

 (1) 5 (2) 11

 (3) 22 (4) 47

\_\_\_\_\_ 6) A straight edge and compass were used to create the following construction.

 Which statement is false?

 (1) $m<ABD=m<DBC$

 (2) $\frac{1}{2}\left(m<ABC\right)=m<ABD$

 (3) $2\left(m<DBC\right)=m<ABC$

 (4) $2\left(m<ABC\right)=m<CBD$



\_\_\_\_\_ 7) The diagram shows the construction of an equilateral triangle.

 Which statement justifies this construction?

 (1) $<A + <B + <C=180$

 (2) $<A= <B= <C$

 (3) $AB=BC=AC$

 (4) $AB+BC>AC$

***Review Section!!***

\_\_\_\_\_ 8) What is the slope of a line perpendicular to the line whose equation is $3x-7y+14=0?$

 (1) $\frac{3}{7}$ (2) $-\frac{7}{3}$

 (3) 3 (4) $-\frac{1}{3}$



\_\_\_\_\_ 9) Line m and point P are shown in the graph. Which equation represents

 the line passing through P and parallel to line m?

 (1) $y-3=2\left(x+2\right)$

 (2) $y+2=2\left(x-3\right)$

 (3) $y-3= -\frac{1}{2}\left(x+2\right)$

 (4) $y+2= -\frac{1}{2}\left(x-3\right)$

\_\_\_\_\_ 10) In $∆ABC$, m<A = 3x + 1, m<B = 4x – 17, and m<C = 5x – 20. Which type of triangle is $∆ABC?$

 (1) right (2) scalene

 (3) isosceles (4) equilateral

\_\_\_\_\_ 11) Transversal EF intersects AB and CD as shown. Which statement

 could always be used to prove AB // CD?

 (1) $<2≅<4$ (2) $<3 $and $<6$ are supplementary

 (3) $<7≅<8$ (4) $<1 $and $<5$ are supplementary

**Constructions Day 3 HW**

1) 2)

**3) (4) 4) (1) 5) (4) 6) (4) 7) (3)**

**8) (2) 9) (2) 10) (3) 11) (2)**

8) What is the slope of a line perpendicular to the line whose equation is $3x-7y+14=0?$



9) Line m and point P are shown in the graph. Which equation represents

 the line passing through P and parallel to line m?

10) In $∆ABC$, m<A = 3x + 1, m<B = 4x – 17, and m<C = 5x – 20. Which type of triangle is $∆ABC?$



11) Transversal EF intersects AB and CD as shown. Which statement

 could always be used to prove AB // CD?

 (1) $<2≅<4$ (2) $<3 $and $<6$ are supplementary

 (3) $<7≅<8$ (4) $<1 $and $<5$ are supplementary