King
Honors Geometry Summer Work

KING
KING LOW HEYWOOD THOMAS

Name: _____

Classroom Supplies:
Before the school year starts please make sure you have the following supplies:

1. TI-84 Graphing calculator
2. Compass (for drawing the arcs in the constructions below)
3. Straight edge

Part 1:

Constructions: Please use a compass and straight edge to complete the constructions by following the written directions and the animations at the provided links. You will have only one final picture for each construction.

Part 2: Complete the algebra problems on a separate sheet of paper. Write the original problem and show all your work in an organized manner. Box/circle your final answer.

Examples

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$y = x - 6$

$y = 12 - x$

substitution

$x - 6 = 12 - x$

$2x = 18$

$\boxed{x = 9}$

page 76 #2

$(4x + 5)(5x + 3)$

$20x^2 + 12x + 25x + 15$

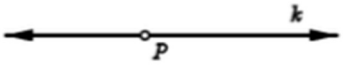
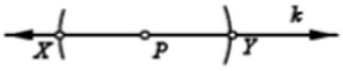
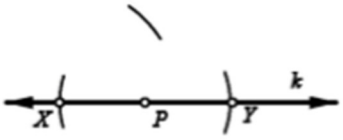
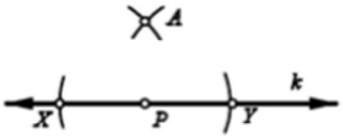
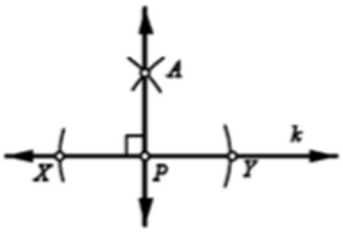
$\boxed{20x^2 + 37x + 15}$

Part 1: Constructions

1. Construct a perpendicular line to a given point on a line. Animation demonstration: https://www.mathsisfun.com/geometry/construct-perponline.html

Written instructions:

Given point P on line k, construct a line through P, perpendicular to k.

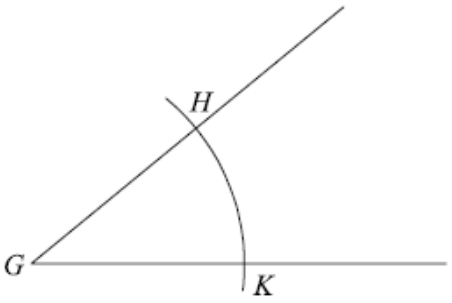
1. Begin with line k, containing point P.	
2. Place the compass on point P. Using an arbitrary radius, draw arcs intersecting line k at two points. Label the intersection points X and Y.	
3. Place the compass at point X. Adjust the compass radius so that it is more than (½)XY. Draw an arc as shown here.	
4. Without changing the compass radius, place the compass on point Y. Draw an arc intersecting the previously drawn arc. Label the intersection point A.	
5. Use the straightedge to draw line AP. Line AP is perpendicular to line k.	

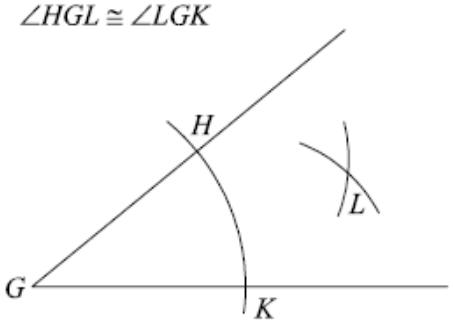
2. Construct an angle bisector of a given angle. Animation demonstration: https://www.mathsisfun.com/geometry/construct-anglebisect.html

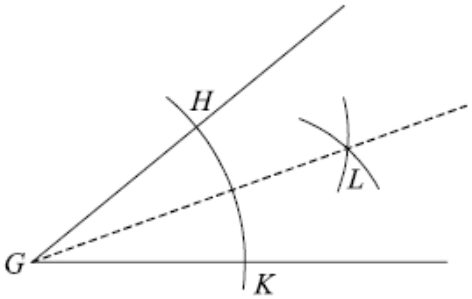
Written instructions:

***CONSTRUCTION #3**: Construct the bisector of an angle.*

1. Set the compass at G, draw any convenient arc that intersects the sides of $\angle G$. Label these points H and K.
2. Set the compass at H and draw an arc that is inside $\angle G$.
3. Use the same setting, put the compass at K and draw an arc that intersects the previous arc. Label this L.
4. Use a straightedge to draw $\overrightarrow{GL}$.
5. $\angle HGL \cong \angle LGK$







Part 2: Algebra Problems

Directions: Please complete all problems on a separate sheet of paper and graphs on graph paper. You many use any resources to help you complete this assignment, but the work must be your own. The assignment will be collected on the first day of class and graded. Please prepare for a quiz within the first week of returning to school.

1. Simplify. $(-3x^2y^4)^3$

2. Simplify. $9n^2\left(\frac{1}{3}n\right)^4$

3. A picture is 1 in longer than it is wide. It is put into a frame $\frac{1}{2}$ in wide. If the area of the frame itself is 8 in^2, how big is the picture?

4. Factor $2x^3y - 50xy$ completely.

5. Factor $m^2 - 9n^2 + 2m - 6n$ completely.

6. Solve by factoring: $8a^2 - 17a + 2 = 0$.

7. Find the LCD for $\frac{4n}{9n-6}$ and $\frac{2n}{15(3n-2)^2}$.

8. In a ceramic class, the ratio of students making projects they intend to keep to students making projects they intend to give away as gifts is 3:5. If there are 24 students in the class, how many students intend to keep the projects they are making?

9. Jen is drawing a map. If she lets 1.5 cm represent 175 km, how long should she draw a segment that represents 875 km?

10. Solve. $\frac{1}{a-1} + \frac{3}{3a-1} = 0$

11. Simplify. $(5x^3)^{-2}$

12. Find the slope of the line that passes through $(4,4)$ and $(-4,6)$.

13. Write an equation in slope-intercept form of the line that is parallel to $y = -\frac{1}{3}x$ and that has y-intercept 5.

14. Solve by substitution method. $\begin{cases} 2x + y = 6 \\ 3x - 2y = 2 \end{cases}$

15. Simplify. $\sqrt{121a^3b^{10}}$

16. In a right triangle, the hypotenuse is 19 m long, and one of the shorter sides is 8 m long. Find the length of the other side to the nearest hundredth.

17. Can a right triangle have sides 15 m, 36 m, and 20 m long?

18. Simplify. $\sqrt{16} + 3\sqrt{8} - 2\sqrt{2}$

19. Multiply. $(4 + \sqrt{7})(4 - \sqrt{7})$

20. Rationalize the denominator and simplify. $\frac{\sqrt{3}}{\sqrt{3}-2}$

21. Solve. $\sqrt{5x + 1} - 6 = 8$

22. a) Solve by completing the square. $3x^2 - 6x - 9 = 0$

    b) Solve by using quadratic formula. $3x^2 - 6x - 9 = 0$

    Suppose $y = 3x^2 - 6x - 9$

    c) Find the vertex of the graph.

    d) Find the equation of the axis of symmetry of the graph.

    e) Is the vertex a maximum or minimum?

    f) What is the discriminant of $3x^2 - 6x - 9 = 0$? Describe the number and nature of the roots.

    g) Graph $y = 3x^2 - 6x - 9$.

23. Factor completely.
    a) $2x^2 - 4x$ b) $x^2 + 24x + 144$ c) $x^3 - 4x$

24. The sides of a rectangle in the coordinate plane are parallel to the axes. Two of the vertices of the rectangle are $(3, -2)$ and $(-4, -7)$. Find the coordinates for the other two vertices. Find the area of the rectangle.

25. There are 396 people in a theater. If the ratio of adult women to adult men is 2:3, and the ratio of adult men to children is 1:2, how many adult men are in the theater?