

**The Philosophy and Geometry
of René Descartes
Worksheet #1**

1 (unity) _____

a _____

b _____

Do each the following constructions (with just a straight edge and a compass), using Descartes' geometric method, given the above line segments.

Make sure your answer is a line segment that has been colored in so that it stands out.

Note: Answers are at the end of this document.

1) $a + b$

2) $b - a$

3) $a \cdot b$

4) $a \div b$

5) $b \div a$

6) a^2

7) \sqrt{a}

8) $\sqrt{b-1}$

9) $\frac{a^3}{3b}$

**The Philosophy and Geometry
of René Descartes
Worksheet #2**

k _____

j _____

h _____

Do each the following constructions (with just a straight edge and a compass), using Descartes' geometric method, given the above line segments.

Make sure your answer is a line segment that has been colored in so that it stands out.

Note: Answers are at the end of this document.

1) $x^2 = -jx + k^2$

2) $x^2 = -kx + j^2$

3) $x^2 = jx + k^2$

4) $x^2 = hx + k^2$

5) $x^2 = kx - j^2$

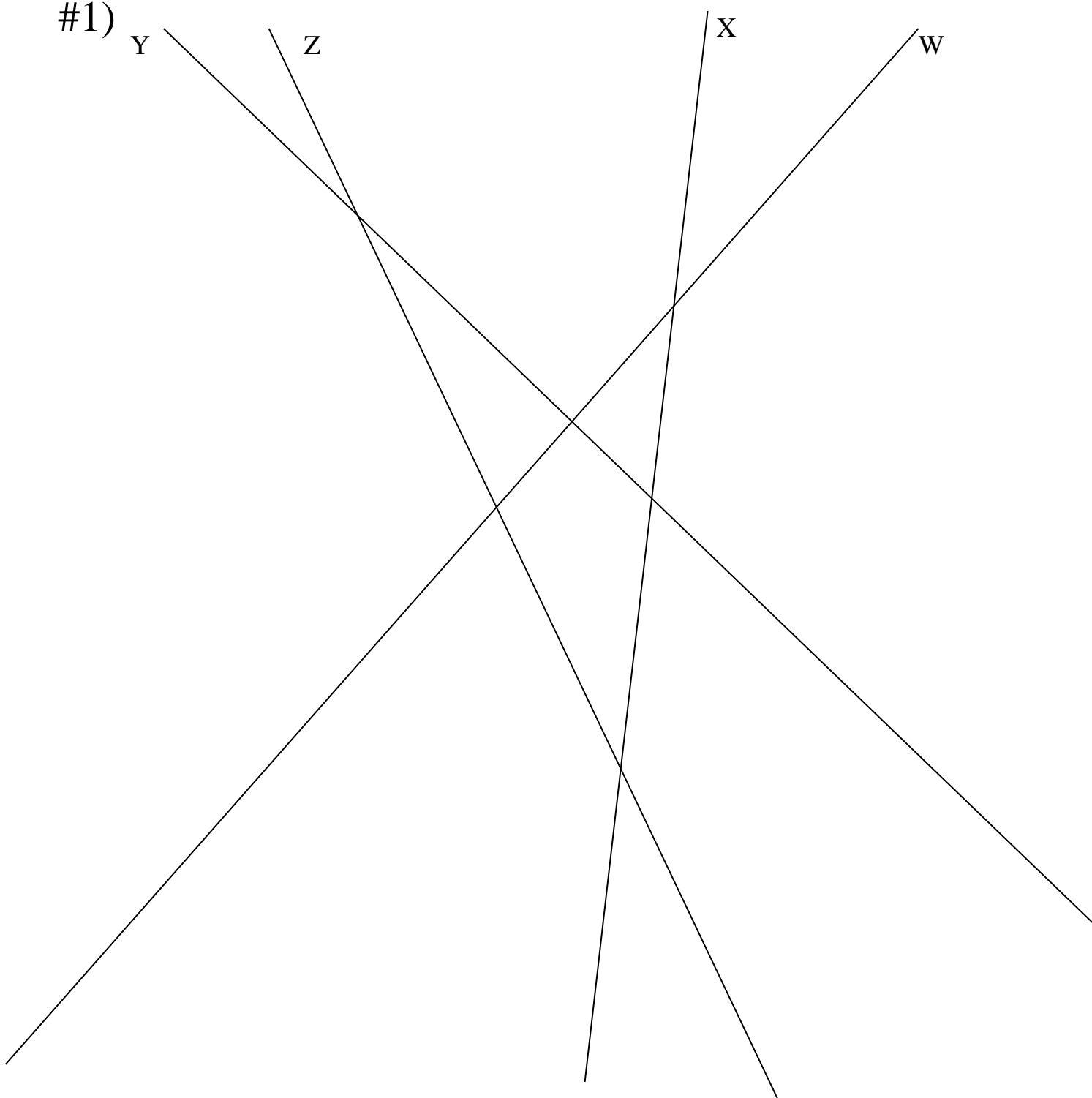
6) $x^2 = kx - h^2$

**The Philosophy and Geometry
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Worksheet #3**

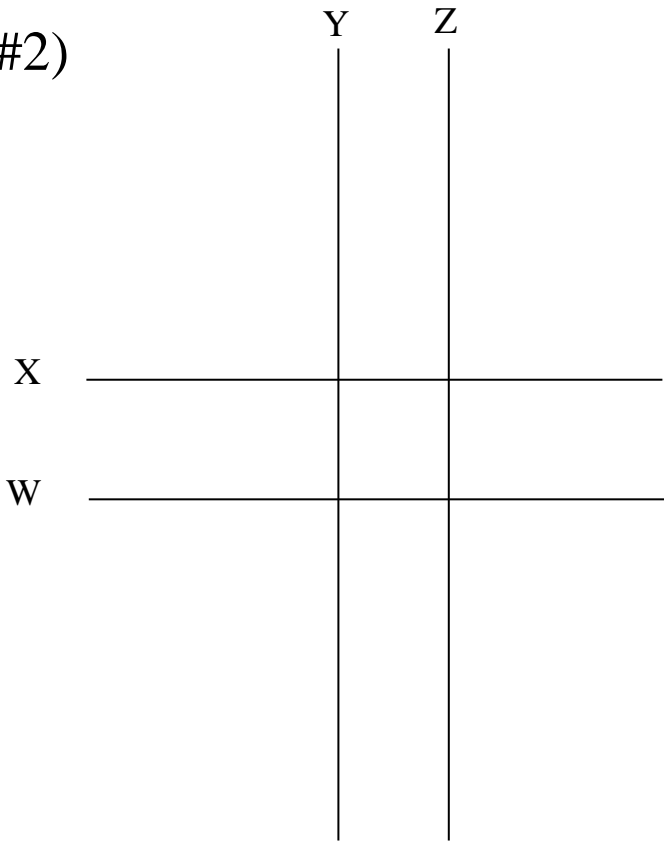
The Pappus Problem!

For each problem, find the locus of points such that $W \cdot X = Y \cdot Z$, where W is the distance from a given point on the curve to line w ; X is the distance from the same point to line x ; Y is the distance from the same point to line y ; and Z is the distance from the same point to line z . (There are infinite such points that satisfy the given conditions. These points combine to form a curve.)

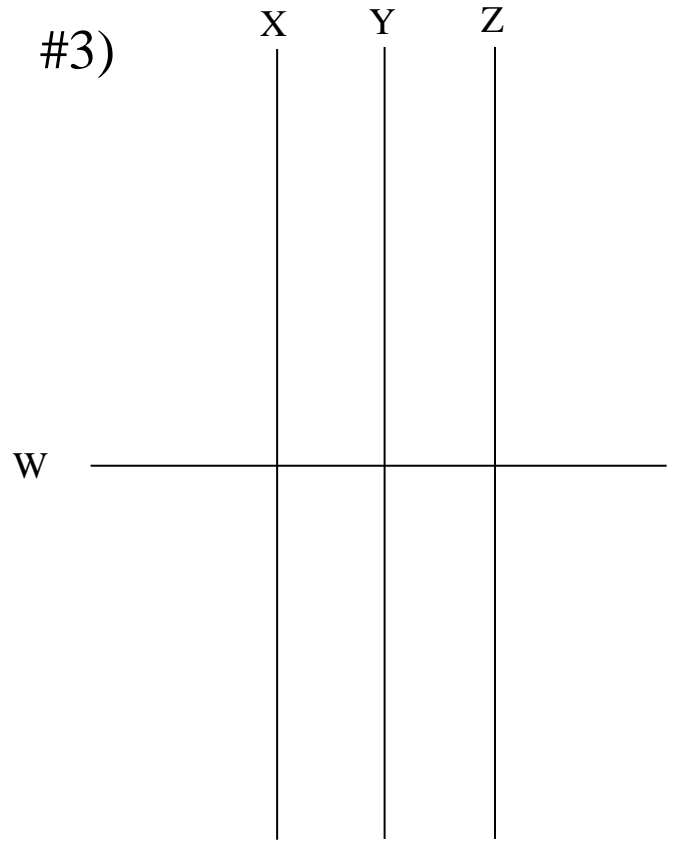
#1)



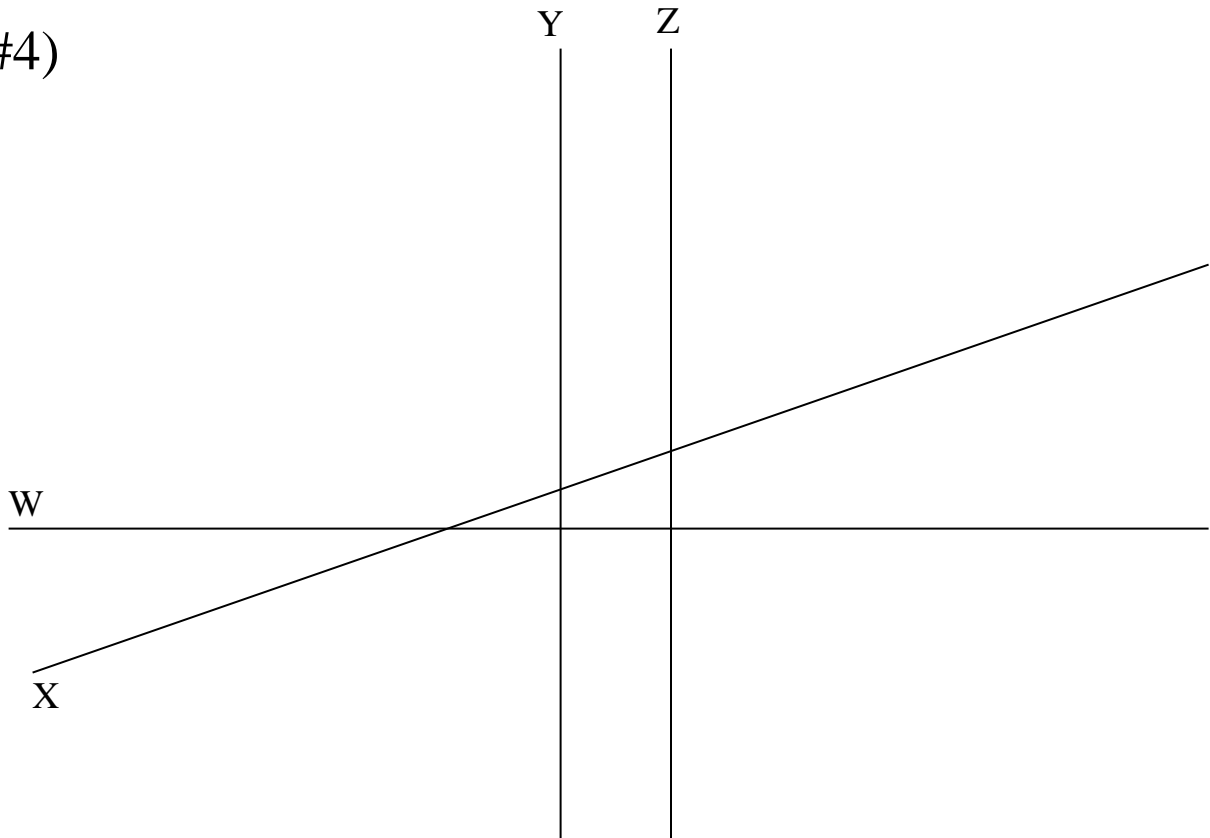
#2)



#3)



#4)



Answers to Sheet #1

Note that all answers give the length of the resulting line in centimeters.

- 1) 11.0 2) 1.9 3) 14.9 4) 1.4 5) 2.7 6) 11.1 7) 3.0 8) 2.8 9) 2.4

Answers to Sheet #2

Note that all answers give the length of the resulting line in centimeters.

- 1) 8.2 2) 0.8 3) 11.2 4) 13.3 5) 8.6, 1.0 6) No solution