school novaTM
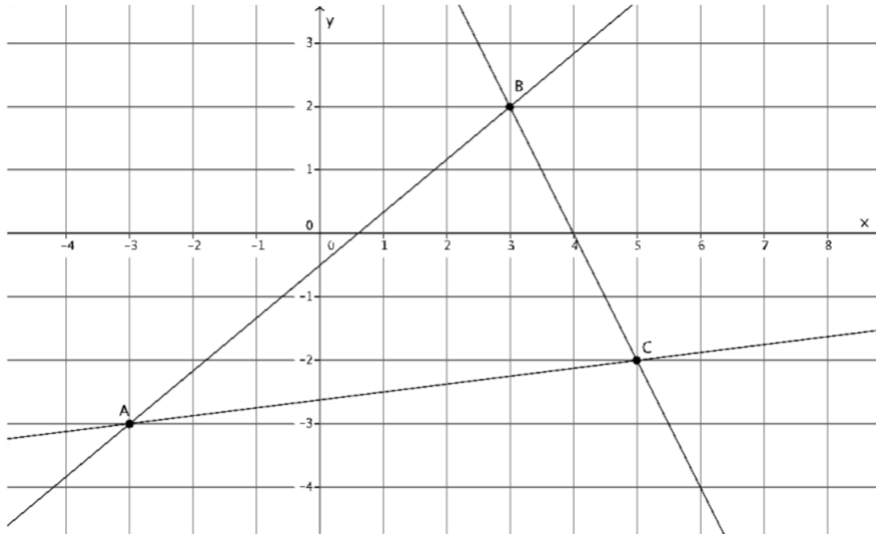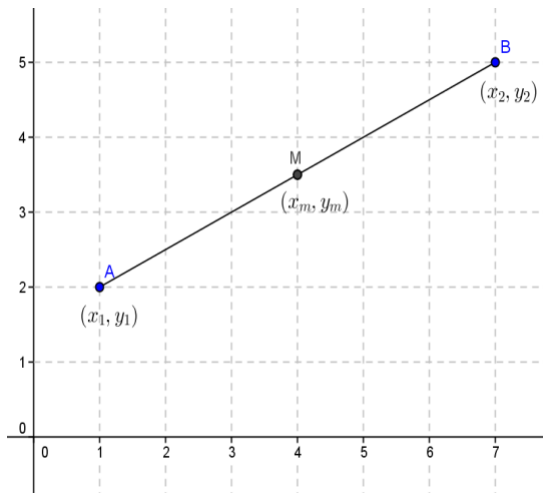
Please be prepared to hand in.

1. Triangle ABC is made up of line segments formed from the intersection of lines L_{AB}, L_{BC}, and L_{AC}.
    Write the equations that represent the lines that make up the triangle.

    Then, using the properties of equality to change the equations from slope-intercept form, $y = mx + b$, to standard form, $ax + by = c$, where a, b, and c are integers, and a is not negative.

2. Given $\overline{AB}$ with midpoint M as shown, prove that the point on the directed segment from A to B that divides $\overline{AB}$ into a ratio of $1:3$ is the midpoint of $\overline{AM}$.

Please be prepared to hand in.

3.   Determine the equation of the line that goes through points $(1, 1)$ and $(3, 7)$.

4.   Prove using the Pythagorean theorem that $\overline{AC}$ is perpendicular to $\overline{AB}$ given points $A(-2, -2)$, $B(5, -2)$, and $C(-2, 22)$.

5.   Using the general formula for perpendicularity of segments through the origin and $(90,0)$, determine if $\overline{OA}$ and $\overline{OB}$ are perpendicular.

     a. $A(-3, -4), B(4,3)$

     b. $A(8,9), B(18, -16)$

6.   Given points $N(7,6)$ and $M(7, -2)$:

     a.   Write the equation of the line through M and perpendicular to $\overline{MN}$.

     b.   Write the equation of the line through N and perpendicular to $\overline{MN}$.

7.   Write the equation of the line through $\left(\sqrt{3}, \frac{5}{4}\right)$ and:

     a.   Parallel to $y = 7$.

     b.   Perpendicular to $y = 7$.

     c.   Parallel to $\frac{1}{2}x - \frac{3}{4}y = 10$.

     d.   Perpendicular to $\frac{1}{2}x - \frac{3}{4}y = 10$.

8.   Find the midpoint of $\overline{ST}$ given $S(-2, 8)$ and $T(10, -4)$.

9.   Find the point on the directed segment from $(-2, 0)$ to $(5, 8)$ that divides it in the ratio of $1:3$.

10.   Consider the quadrilateral with vertices $(-2, -1)$, $(2, 2)$, $(5, -2)$, and $(1, -5)$.

     a.   Show that the quadrilateral is a rectangle.
     b.   Is the quadrilateral a square? Explain.
     c.   What is the area of the quadrilateral?
     d.   What is the area of the region of the quadrilateral that lies to the right of the y-axis?
     e.   What is the equation of the perpendicular bisector of the side of the quadrilateral that lies in the fourth quadrant?