6.9 Do Now: Analytic proof

1. The line l has the equation $y = \frac{3}{2}x + 5$.

   (a) What is the slope of the line k, given $k \parallel l$?

   (b) What is the slope of the line j, given $j \perp l$?

2. Find the decimal value of each expression, rounded to the nearest throusandth.

   Write your answer as given in example #1.

   (a) $\tan 60° = 1.7320508\ldots$

   ≈ 1.732

   (b) $\tan 30°$

   (c) $\frac{2}{3}\sqrt{11}$

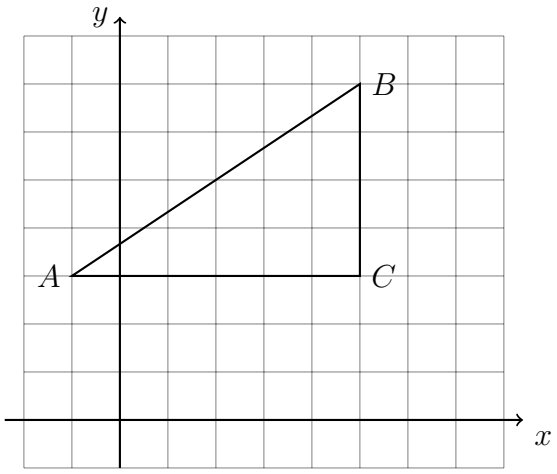
   (d) $\dfrac{(-5)^2}{7}$

3. Given $\triangle ABC$, find the lengths of its sides. $A(-1, 3)$, $B(5, 7)$, $C(5, 3)$.

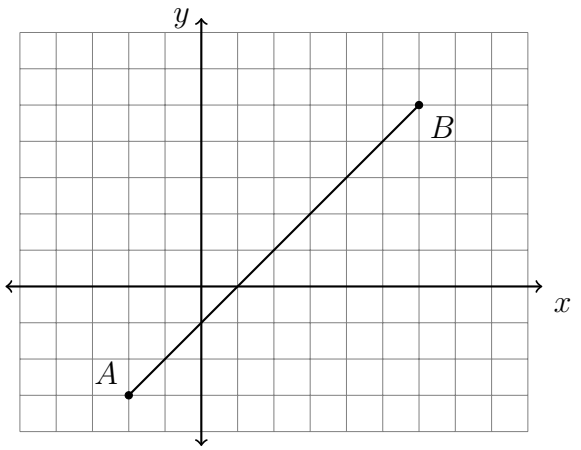
   (a) $AC =$

   (b) $BC =$

   (c) Use the formula for distance:
   $d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$
   $AB =$



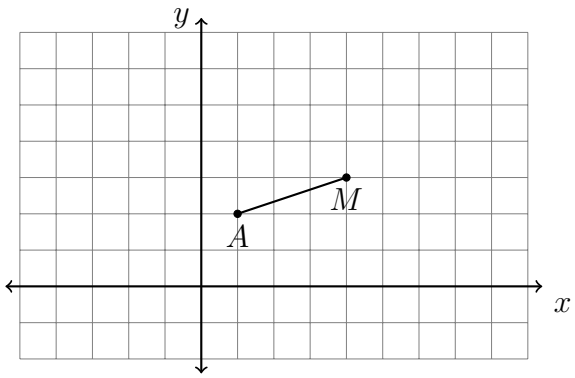
4. As shown, $\overline{AB}$ has endpoints with coordinates $A(-2,-3)$ and $B(6,5)$. Show the calculation for the coordinates of the midpoint M of $\overline{AB}$. Mark and label it on the graph.



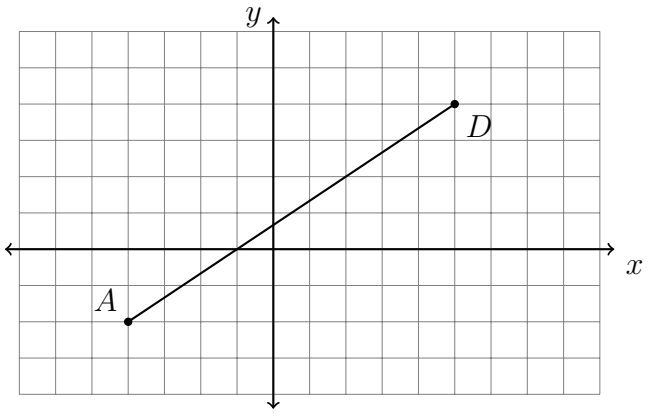
5. $A(1,2)$ is one endpoint of $\overline{AB}$. The segment's midpoint is $M(4,3)$. Find the other endpoint, B.

   What translation maps

   $A(1,2) \rightarrow M(4,3)$?



6. In the diagram below, $\overline{AD}$ has endpoints with coordinates $A(-4,-2)$ and $D(5,4)$. What points B and C trisect $\overline{AD}$ into three congruent segments? Mark and label them on the graph. State their coordinates.



Spicy Regents problems: Using slope to prove a parallelogram

7. In this problem use the following theorem (copy it at the bottom of the page after your calculations):

   A quadrilateral is a parallelogram if and only if it's opposite sides are parallel.

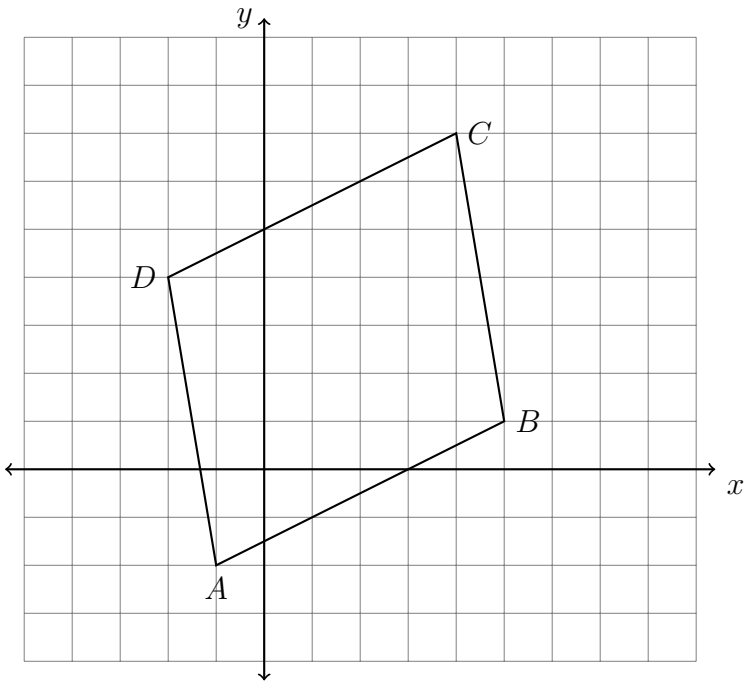
   Shown below is quadrilateral $ABCD$, $A(-1,-2)$, $B(5,1)$, $C(4,7)$, and $D(-2,4)$.

   Prove it is a parallelogram by

   (a) finding the slope of each of the four sides,

   (b) stating which sides are parallel,

   (c) copying the theorem as your conclusion.



Using the distance formula to prove a parallelogram

8. In this problem use the following theorem (copy it at the bottom of the page after your calculations):

   A quadrilateral is a parallelogram if and only if it's opposite sides are congruent.

   Shown below is quadrilateral $ABCD$, $A(-1,-2)$, $B(5,1)$, $C(4,7)$, and $D(-2,4)$.

   Prove it is a parallelogram by

   (a) finding the length of each of the four sides,

   (b) stating which sides are congruent,

   (c) copying the theorem as your conclusion.