BECA / Dr. Huson / Geometry
Unit 11: Function transformations
17 May 2022

Name: Solutions

11.14 Exit note: Perpendicular bisectors

1. The line l has the equation $y = -3x - 2$.

   (a) What is the slope of line l? -3

   (b) Rewrite the equation of l in the form $ax + by = c$.

   $3x + y = -2$

2. (a) Find the slope m of the line $3x - y = 12$.

   $y = 3x - 12$

   $m = 3$

   (b) Write down the slope perpendicular to the line, $m_\perp$. $-\frac{1}{3}$

3. Write down the slope perpendicular to the given slope.

   (a) $m = -\frac{3}{2}$ $\quad m_\perp = \frac{2}{3}$ $\quad$ (b) $m = 2$ $\quad m_\perp = -\frac{1}{2}$

4. The line segment $\overline{AB}$, $A(1, 7)$ and $B(9, 3)$, is shown below.

   (a) Mark the midpoint M of $\overline{AB}$. Label it as an ordered pair.

   (b) Find the slope of $\overline{AB}$.

   $m = \frac{3-7}{9-1} = -\frac{1}{2}$

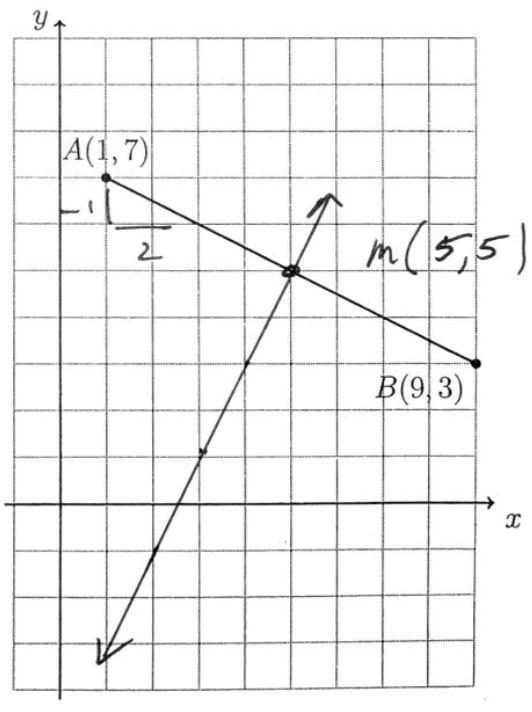
   (c) Write down the slope perpendicular to $\overline{AB}$.

   $+2$

   (d) Write down the equation of the perpendicular bisector of $\overline{AB}$.

   $y - 5 = 2(x - 5)$

   (e) Draw the perpendicular bisector on the graph.



5. Write down the equation of the line through $(2, 3)$ with a slope of -2.

$$y - 3 = -2(x-2)$$

6. The line l has the equation $y - 5 = -3(x - 2)$. Rewrite the equation in slope-intercept form, $y = mx + b$.

$$y = -3x + 6 + 5$$
$$y = -3x + 11$$

7. Quadrilateral $ABCD$ is shown on the graph below with $A(-1, -2)$, $B(5, 2)$, $C(2, 6)$, and $D(-4, 2)$. Calculate the slopes of the four sides and show that $ABCD$ is a parallelogram but not a rectangle.

Slopes

$m_{\overline{AB}} = \frac{2}{3}$

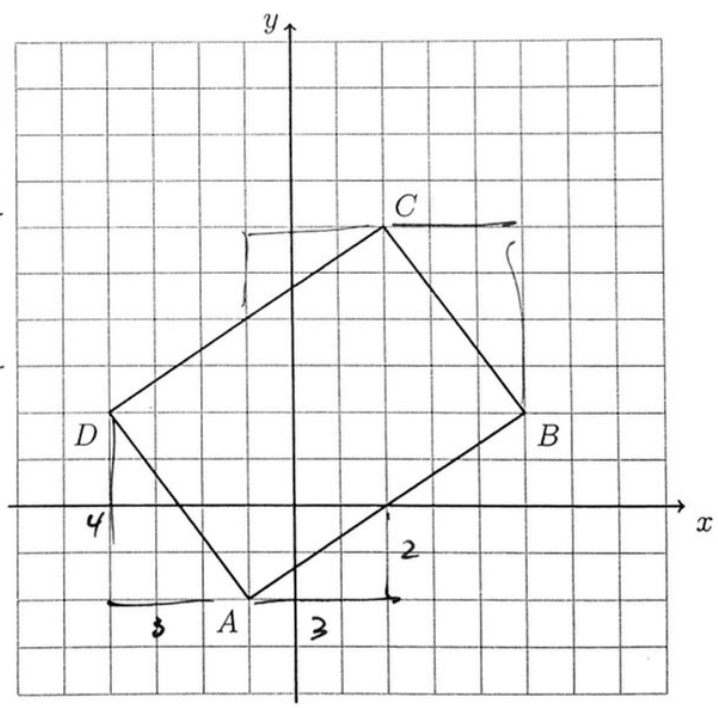
$m_{\overline{BC}} = -\frac{4}{3}$

$m_{\overline{CD}} = \frac{2}{3}$

$m_{\overline{AD}} = -\frac{4}{3}$

$m_{\overline{AB}} = m_{\overline{CD}}$

$m_{\overline{BC}} = m_{\overline{AD}}$



Slopes equal $\Rightarrow$ sides parallel

$\overline{AB} \parallel \overline{CD}$, $\overline{BC} \parallel \overline{AD}$

$\Rightarrow$ ABCD parallelogram

But $(m_{\overline{AB}})(m_{\overline{BC}}) = \left(\frac{2}{3}\right)\left(-\frac{4}{3}\right) \neq -1$ $\Rightarrow$ NOT perpendicular

$\Rightarrow$ Not rectangle