8.6 Classwork: Parallel & perpendicular slopes, applications   HSG.GPE.B.5

1. What is the slope of a line parallel to the line with the equation $y = 2x + 5$?

   $\uparrow \, m = 2$

   $$y = 2x + 7$$

2. What is an equation of the line that passes through the point $(6, 8)$ and is ~~perpendicular~~ parallel to a line with equation $y = \frac{3}{2}x + 5$?

   $m = \frac{3}{2}$

   (a) $y - 8 = \frac{3}{2}(x - 6)$ $m_\perp = -\frac{2}{3}$ (c) $y + 8 = \frac{3}{2}(x + 6)$

   (b) $y - 8 = -\frac{3}{2}(x - 6)$ (d) $y + 8 = -\frac{3}{2}(x + 6)$

   (a) is circled

3. What is an equation of the image of the line $y = \frac{3}{2}x - 4$ after a translation up 3?

   $\nwarrow +3$

   $$y = \frac{3}{2}x - 1$$

4. What equation represents a line with a y-intercept of $b = 3$ that is perpendicular to the line represented by $y = \frac{2}{3}x + 1$?

   $m_\perp = -\frac{3}{2}$

   $$y = -\frac{3}{2}x + 3$$

5. Determine and state an equation of the line perpendicular to the line $5x - 4y = 10$ and passing through the point $(5, 12)$.

   $-4y = -5x + 10$

   $y = \frac{5}{4}x - \frac{5}{2}$

   $\nwarrow m_\perp = -\frac{4}{5}$

   $y - 12 = -\frac{4}{5}(x - 5)$

6. Write an equation of the line that is parallel to the line whose equation is $3y + 7 = 2x$ and passes through the point $(2, 6)$.

   $$y - 6 = \frac{2}{3}(x - 2)$$

   $y = \frac{2}{3}x - \frac{7}{3}$

   $m = \frac{2}{3}$

7. A translation maps $\overline{MN} \to \overline{M'N'}$. If $\overline{MN}$ is represented by $y = -3x + 6$, which equation can represent $\overline{M'N'}$, the image of $\overline{MN}$?

$m = -3$ ↖

(a) $y = -3x + 12$ $M = -3$

(c) $y = 3x + 12$

(b) $y = \frac{1}{3}x + 6$

(d) $y = -\frac{1}{3}x + 6$

8. Show that quadrilateral $ABCD$ is a parallelogram. $A(0,3)$, $B(6,5)$, $C(8,2)$, $D(2,0)$

$M_{AB} = \frac{2}{6} = \frac{1}{3}$
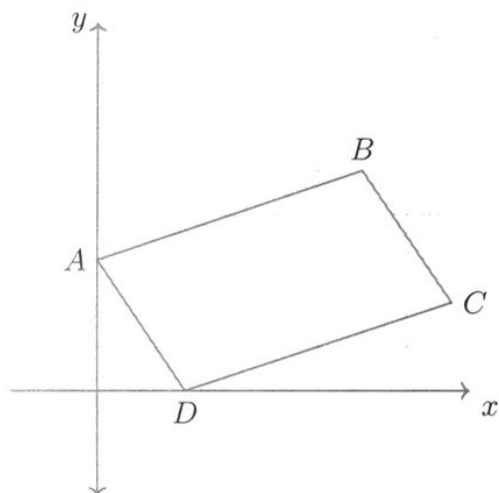
$M_{BC} = \frac{-3}{2}$

$M_{CD} = \frac{2}{6} = \frac{1}{3}$

$M_{AD} = -\frac{3}{2}$

$M_{BC} = M_{AD} = \frac{-3}{2} \Rightarrow \overline{BC} \parallel \overline{AD}$

$M_{AB} = M_{CD} = \frac{1}{3} \Rightarrow \overline{AB} \parallel \overline{CD}$

$\Rightarrow ABCD$ is ▱

9. Show that triangle ABC is a right triangle. $A(0,3)$, $B(10,8)$, $C(4,0)$

$M_{AC} = \frac{0-3}{4-0} = -\frac{3}{4}$

$M_{BC} = \frac{0-8}{4-10} = \frac{8}{6} = \frac{4}{3}$

$M_{AC} \cdot M_{BC} = \left(-\frac{3}{4}\right)\left(\frac{4}{3}\right) = -1$

$\Rightarrow \overline{AC} \perp \overline{BC}$

$\Rightarrow ABC$ is right Δ