6.11 Classwork: Point-slope form of a linear equation   HSG.GPE.B.6

Point-slope form: $(y - y_1) = m(x - x_1)$

1. Write the linear equation $y - 1 = 2(x - 3)$ in the form $y = mx + b$.

   (a) What is the slope of the line?

   $$M = 2$$

   (b) Name a point on the line as an ordered pair.

   $$(3, 1)$$

   (c) Rewrite the equation of the line in the form $y = mx + b$.

   $$y - 1 = 2(x - 3)$$
   $$y - 1 = 2x - 6$$
   $$y = 2x - 5$$

   (d) What is the y-intercept of the line?

   $$-5$$

2. A line has a slope of $\dfrac{3}{4}$ and passes through the point $(8, 3)$.

   (a) Write the equation of the line in the form $(y - y_1) = m(x - x_1)$.

   $$y - 3 = \frac{3}{4}(x - 8)$$

   (b) Rewrite the equation of the line in the form $y = mx + b$.

   $$y - 3 = \frac{3}{4}x - 6$$
   $$y = \frac{3}{4}x - 3$$

3. Find the slope of the line through the points $(1, 3)$ and $(5, 4)$.

   $$M = \frac{4 - 3}{5 - 1} = \frac{1}{4}$$

4. Given two points $R(7,5)$ and $S(4,9)$.

   (a) Write down the distance formula.

   $$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

   (b) What is the length of $\overline{RS}$?

   $$RS = \sqrt{(4-7)^2 + (9-5)^2}$$
   $$= \sqrt{9 + 16}$$
   $$= \sqrt{25} = 5$$

5. Given two points $T(2,3)$ and $U(10,11)$.

   (a) Write down the midpoint formula.

   $$M = \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$$

   (b) What is the midpoint of $\overline{TU}$?

   $$M = \left(\frac{2+10}{2}, \frac{3+11}{2} \right)$$
   $$= (6, 7)$$

6. A line through $P(2,2)$ is plotted on the graph below.

   (a) Write down the equation of the line.

   $$y = \tfrac{1}{2}x + 1$$

   (b) What slope would be perpendicular to the line?

   $$-2$$

   (c) Write down the equation of a perpendicular line through P and plot it on the graph.

   $$y - 2 = -2(x - 2$$