

Homework 2

(due February 24)

Math 130 *Kovitz* 2020

On homework assignments, starred problems are either more difficult, somewhat advanced, or less important. Doubly starred problems are even more difficult.

1. The coordinates of B are $(6, 13)$ and the coordinates of the midpoint of the line segment $\overline{AB}$ are $(8.5, 7)$.
 - (a) Find the coordinates of A . (drawing the line segment helps)
 - (b) Find the length of the line segment $\overline{AB}$.
2. Find an equation of the straight line through $(-3, 5)$ and $(6, 2)$. Then find the x - and y -intercepts and graph it, labeling the x - and y -intercepts and the two given points. Then plot and label with coordinates one additional point on the graph for each quadrant through which it passes.
3. Decide whether the set of points $A(0.2, 6)$, $B(0.8, -2)$, $C(1.4, -10)$ are collinear.
4. Graph
 - (a) $y = -\frac{1}{2}x - 2$
 - (b) $x^2 = 25 - y^2$
 - * (c) $xy^2 = 18$
5. Find the center and radius of the circle with the equation
$$x^2 + 12x = y - y^2 - 24.$$
6. For the points $P(-2, 8.5)$ and $Q(22, 15.5)$:
 - (a) Compute the distance between the points.
 - (b) Find the radius of the circle for which the given line segment is a diameter.
 - (c) Write an equation of the circle for which the line segment PQ is a diameter.
 - (d) Sketch the circle and plot and label the center, the two given points, and all the intercepts with their coordinates.
 - (e) How many points on this graph lie in the third quadrant? If possible, plot one of those points: a 3rd-quadrant point on the circle.
7.
 - (a) Write the equation of the unit circle.
 - (b) Graph the unit circle and label with coordinates at least 5 points for which neither x nor y are integers.
 - (c) Find the points of intersection of the unit circle with the line $y = x$. [Hint: first substitute x for y in the equation of part (a)]