Name:_____

MATH 150: QUIZ 3 (1.3–1.4)

1. Compute the slope of the line through the points $(2, 3)$ and $(1, 1)$.

2. What is the slope of a line perpendicular to
$$y = 3x - 7.$$

3. Compute the slope-intercept form of the line
$$2x - 3y = 1.$$

4. Find the standard form for a circle of radius 5 and center $(3, 4)$.

5. Find the radius of the circle
$$x^2 - 2x + y^2 + 2y - 5 = 0.$$

Solutions

1.
$$\begin{aligned} m &= \frac{\Delta y}{\Delta x} \\ &= \frac{3-1}{2-1} \\ &= 2. \end{aligned}$$

2. Recall that two lines are perpendicular if the product of the slopes is -1. That means that the line perpendicular to $y = 3x - 7$ has slope m, where $3m = -1$. Solving for m, we get that
$$m = -\frac{1}{3}.$$

3. The slope-intercept form is $y = mx + b$. In order to get the equation into this form, we just solve for y and simplify.
$$\begin{aligned} 2x - 3y &= 1 \\ -3y &= 1 - 2x \\ y &= -\frac{1}{3}(-2x + 1) \\ y &= \frac{2}{3}x - \frac{1}{3}. \end{aligned}$$

4. Recall that the standard form for a circle of radius r and center (h, k) is
$$(x - h)^2 + (y - k)^2 = r^2.$$
That means the equation we are after is
$$(x - 3)^2 + (y - 4)^2 = 25.$$

5. To find the radius of the circle, we must first write the equation in standard form by completing the square.
$$\begin{aligned} x^2 - 2x + y^2 + 2y - 5 &= 0 \\ (x - 1)^2 + (y + 1)^2 - 7 &= 0 \\ (x - 1)^2 + (y + 1)^2 &= 7 \end{aligned}$$
That means that $r^2 = 7$, so $r = \sqrt{7}$.