

Math 195 Quiz 7B

March 11, 2019

Name: ANSWERS

Instructions: No calculators! Answer all problems in the space provided! Do your rough work on scrap paper.

1. Complete the following rules:

(a) $x^a \cdot x^b = x^{a+b}$ (b) $x^{a/b} = \sqrt[b]{x^a}$ (c) $x^{-n} = \frac{1}{x^n}$ (d) $\frac{x^a}{x^b} = x^{a-b}$
 (e) $a^2 - b^2 = (a-b)(a+b)$ (f) $a^3 - b^3 = (a-b)(a^2 + ab + b^2)$

2. Let (x_1, y_1) and (x_2, y_2) be two points in the Cartesian plane. State a formula that gives the:

(a) Midpoint between the two points: $M = \left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2} \right)$

(b) The distance between the two points: $d = \sqrt{(x_2-x_1)^2 + (y_2-y_1)^2}$

3. Suppose $(-3, 4)$ and $(1, -2)$ lie on the diameter of a circle. For this circle, find:

(a) Its center: $(-1, 1)$

(b) Its radius: $\sqrt{13}$

(c) Its equation: $(x+1)^2 + (y-1)^2 = 13$

4. The equation $2x^2 + 2y^2 + 4x - 8y - 18 = 0$ represents a circle. State its center and radius.

(i) Center: $(-1, 2)$ (ii) Radius: $\sqrt{14}$

Bonus (after attempting the problems above, do these for extra credit):

1. Suppose m_1 and m_2 are the slopes of two non-vertical lines. What is the relationship between their slopes if:

(a) They are parallel: $m_1 = m_2$

(b) They are perpendicular: $m_1 \cdot m_2 = -1$ or $m_1 = -\frac{1}{m_2}$ or $m_2 = -\frac{1}{m_1}$

2. Suppose (x_1, y_1) and (x_2, y_2) lie on a straight line. For this line:

(a) Write down the *slope-intercept form* equation of the line: $y = mx + b$

(b) Write down the *point-slope form* equation of the line: $y - y_1 = m(x - x_1)$

(c) Write an equation that gives its slope: $m = \frac{y_2 - y_1}{x_2 - x_1}$