

Math 195 Quiz 6A

March 6, 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) $x^n \cdot x^m = x^{n+m}$ (b) $x^{-a} = \frac{1}{x^a}$ (c) $x^{m/n} = \sqrt[n]{x^m}$ (d) $\frac{x^n}{x^m} = x^{n-m}$

(e) $x^2 - y^2 = (x-y)(x+y)$ (f) $x^3 - y^3 = (x-y)(x^2 + xy + y^2)$

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

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

3. Solve the following equations:

(a) $1 - \frac{3}{x} = \frac{18}{x^2} \Rightarrow x = -3; 6$ (b) $\frac{4}{x-3} + \frac{2}{x+3} = \frac{9}{x^2-9} \Rightarrow x = \frac{1}{2}$

(c) $\frac{1}{x} = \frac{1}{b} - \frac{1}{a} \Rightarrow x = \frac{ab}{a-b}$ (d) $x + 4 = \sqrt{x+10} \Rightarrow x = -1$

4. Solve the following inequalities (write your answer in interval notation):

(a) $|3x - 2| \geq 5 \Rightarrow x \in (-\infty, -1] \cup [7/3, \infty)$ (b) $x^2 + 2x > 3 \Rightarrow x \in (-\infty, -3) \cup (1, \infty)$

(c) $\frac{x+2}{x+3} < \frac{x-1}{x-2} \Rightarrow x \in (-3, -1/2) \cup (2, \infty)$

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

1. Compute the distance between $(-5, -4)$ and $(3, -6)$: $d = \sqrt{68} = 2\sqrt{17}$

2. Compute the midpoint between $(-5, -4)$ and $(3, -6)$: $M = (-1, -5)$

3. Find the equation of the circle that has $(-5, -4)$ and $(3, -6)$ as endpoints of its diameter.

$(x+1)^2 + (y+5)^2 = 17$