

Math 195 Quiz 6B

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) $x^a \cdot x^b = x^{a+b}$ (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. Solve the following equations:

(a) $1 + \frac{3}{x^2} = \frac{4}{x} \Rightarrow x = 1; 3$ (b) $\frac{1}{x} = \frac{1}{y} - \frac{1}{z} \Rightarrow x = \frac{yz}{z-y}$

(c) $\frac{4}{x-2} + \frac{2}{x+2} = \frac{15}{x^2-4} \Rightarrow x = 1/6$ (d) $4 + \sqrt{x+2} = x \Rightarrow x = 7$

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

(a) $|8x + 3| > 12 \Rightarrow x \in (-\infty, -\frac{15}{8}) \cup (\frac{9}{8}, \infty)$ (b) $\frac{x+2}{x+3} \geq \frac{x-1}{x-2} \Rightarrow x \in (-\infty, -3) \cup [-\frac{1}{2}, 2)$

(c) $x^2 - 2x \leq 3 \Rightarrow x \in [-1, 3]$

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

1. Compute the distance between $(4, -3)$ and $(-2, 5)$: $d = 10$

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

3. Find the equation of the circle that has $(4, -3)$ and $(-2, 5)$ as endpoints of its diameter.

$(x-1)^2 + (y-1)^2 = 25$