## WORKSHEET 5: 18 points Math 6B-030, Spring 2021 Due: Friday, May 7th, 11:59pm via Gradescope Note that there are two pages to this worksheet

**Question 1 (6 points)** Let  $n(x) = 5(x-3)^2(x-7)(x+3)^3$  and  $d(x) = 7(x+1)(x-3)(x-7)(x+4)^3$ . Let  $r(x) = \frac{n(x)}{d(x)}$ . **Justify all of your answers symbolically (not visually)**. After solving symbolically, you may check your answers by graphing r(x).

- (a). (1 point) What are the vertical asymptotes of r(x)
- **(b).** (2 points) Evaluate:  $\lim_{x \to 3^+} r(x)$ ,  $\lim_{x \to 3^-} r(x)$ . What feature occurs at x = 3?
- (c). (1 point) Does r(x) have a horizontal asymptote? If so, what and how do you know? If not, why not?
- (d). (1 point) Evaluate:  $\lim_{x \to +\infty} r(x)$ ,  $\lim_{x \to -\infty} r(x)$ . Write out the limit notation in your solution.
- (e). (1 point) Where is r(x) continuous? Write your answer in interval notation.

**Question 2 (5 points)** The following questions are about the pictures below. *Recall that a circle of radius r has circumference*  $2\pi r$ .



- (a). (1 point) In (i), what portion of the circumference of the circle is the arc length (with angle  $\frac{7\pi}{6}$  radians)? Justify.
- (b). (1 point) In (i), how long is arc length *s*? Justify and include units.
- (c). (1 point) In (i), convert the angle  $\frac{7\pi}{6}$  radians to degrees.
- (d). (1 point) In (ii), what portion of the circumference of the circle is the arc length depicted? Be precise. *This circle has radius 5 inches*.
- (e). (1 point) In (ii), what is the angle depicted? Include units.

**Question 3 (5 points)** Converting between angle measure units.

- - *Your answers may involve R, but no other variables.*

