

## Chapter 4 Review Extra Practice Answers

1. a. i.  $(-\infty, -\frac{\sqrt{3}}{3})$  and  $(\frac{\sqrt{3}}{3}, \infty)$

ii.  $(-\frac{\sqrt{3}}{3}, \frac{\sqrt{3}}{3})$

iii.  $x = -\frac{\sqrt{3}}{3}, x = \frac{\sqrt{3}}{3}$

b. i.  $(-\infty, -3)$  and  $(3, \infty)$

ii.  $(-3, 0)$  and  $(0, 3)$

iii.  $x = -3, x = 3$

c. i.  $(-\infty, 0)$  and  $(0, \infty)$

ii. never decreasing

iii.  $x = 0$

2. a.  $x = 0$ : local maximum

b. no critical points or local extrema

c.  $x = 0, x = \sqrt{24}, x = -\sqrt{24}$ ; local maximum at  $x = -\sqrt{24}$ , local minimum at  $x = \sqrt{24}$

3. a. vertical asymptote  $x = 2$ ; horizontal asymptote  $y = 1$

b. vertical asymptote  $x = 11$ ; horizontal asymptote  $y = 0$

c. vertical asymptotes  $x = 4, x = -4$ ; horizontal asymptote  $y = 3$

d. vertical asymptote  $x = 0$ ; no horizontal asymptote

e. vertical asymptotes  $x = -\frac{5}{2}, x = 4$ ; no horizontal asymptote

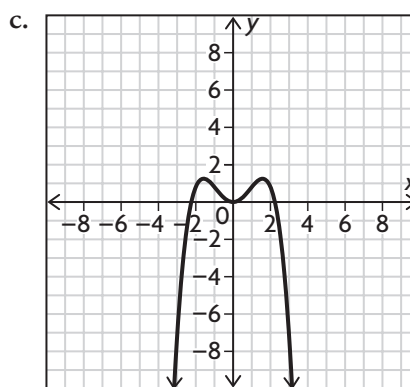
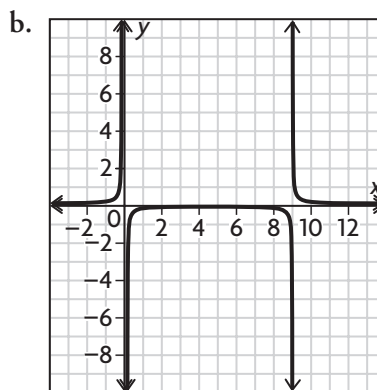
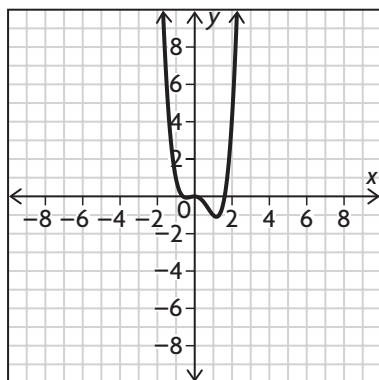
4. a.  $x = -5$ : local minimum

b.  $x \doteq -1.47$ : local maximum,  $x \doteq 1.13$ : local minimum

c.  $x = 0$ , local maximum at  $x = 0$

d. There are no critical points; no local extrema

5. a.



6. a. concave up on  $(-\infty, -2)$ ; concave down on  $(-2, 0)$  and  $(0, \infty)$

b.  $x = -2$  (Note: For  $x = 0$ , concavity does not switch signs on each side of  $x = 0$ , so  $x = 0$  is not an inflection point.)

