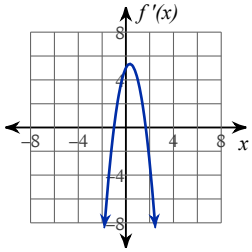
Answers to Unit Three Review (ID: 1)

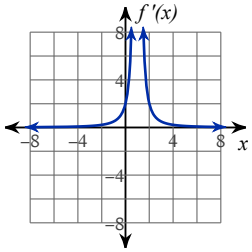
1) Absolute minima: $(-1, -3), (1, -3), (0, -3)$
Absolute maxima: $\left(-\frac{\sqrt{2}}{2}, -\frac{11}{4}\right), \left(\frac{\sqrt{2}}{2}, -\frac{11}{4}\right)$

2) Absolute minimum: $(3, 0)$
Absolute maximum: $(1, \sqrt[3]{10})$

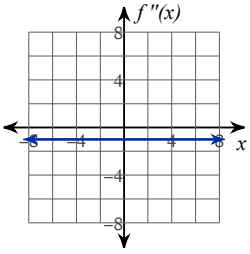
3)



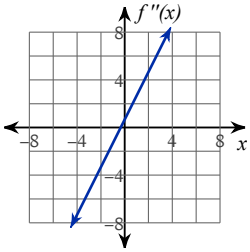
4)



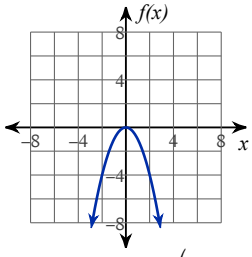
5)



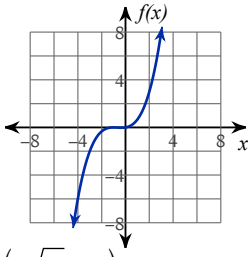
6)



7)



8)



9) Concave up: $\left(-\infty, -\frac{\sqrt{3}}{3}\right), \left(\frac{\sqrt{3}}{3}, \infty\right)$ Concave down: $\left(-\frac{\sqrt{3}}{3}, \frac{\sqrt{3}}{3}\right)$

10) Concave up: $(-\infty, -4), (4, \infty)$ Concave down: $(-4, 4)$

11) Concave up: $(-\infty, -6), (-6, \infty)$ Concave down: No intervals exist.

12) Concave up: $(-\infty, -1)$ Concave down: $(-1, \infty)$

13) Concave up: $\left(-\frac{\pi}{2}, 0\right), \left(\frac{\pi}{2}, \pi\right)$ Concave down: $\left(-\pi, -\frac{\pi}{2}\right), \left(0, \frac{\pi}{2}\right)$

14) Increasing: $\left(-\infty, -\frac{\sqrt{2}}{2}\right), \left(0, \frac{\sqrt{2}}{2}\right)$ Decreasing: $\left(-\frac{\sqrt{2}}{2}, 0\right), \left(\frac{\sqrt{2}}{2}, \infty\right)$

15) Increasing: $(-\pi, 0), (0, \pi)$ Decreasing: No intervals exist.

16) Increasing: $(-\infty, -4), (-4, 0)$ Decreasing: $(0, 4), (4, \infty)$

17) Increasing: $(-\infty, -3)$ Decreasing: $(-3, \infty)$

18) Increasing: $(0, 2), (4, \infty)$ Decreasing: $(-\infty, 0), (2, 4)$

19) $\{4\}$

20) The function is not continuous on $[-1, 4]$

21) $\left\{\frac{13}{27}\right\}$

22) The function is not differentiable on $(-2, 2)$

23) $dy = \frac{2}{x^2}dx$

24) $dy = \frac{1}{2x^{\frac{1}{2}}}dx$

25) $dy = 3x^2dx$

26) $dy = (-2x + 4)dx$

27) $\frac{162567}{25} = 6502.68$

28) $\frac{91}{30} \approx 3.0333$

29) $\frac{1919}{480} \approx 3.9979$

30) $\frac{12848}{25} = 513.92$