Answers to Problems from section 4.2:

4. Absolute maximum at e; absolute minimum at t; local maxima at c, e and s; local minima at b, c, d and r; neither a maximum nor a minimum at a.

17. $f(x) = x^2$. $\quad 0 < x < 2$. No absolute or local maximum or minimum value. (graph omitted here).

27. The three critical numbers are $0, \dfrac{-1 \pm \sqrt{5}}{2}$.

28. $t = \dfrac{4}{3}$.

40. $f(1) = f(4) = 6$ is the absolute maximum value and $f(-1) = -14$ is the absolute minimum value.

47. $f(2) = 2e^{-1/2}$ is the absolute maximum value and $f(-1) = -e^{-1/8}$ is the absolute minimum value.

Answers to Problems from section 4.3:

7. (a) f is increasing on $(-\infty, -2)$ and $(2, \infty)$ and f is decreasing on $(-2, 2)$. (b) $f(-2) = 17$ is a local maximum value and $f(2) = -15$ is a local minimum value. (c) f is concave upward on $(0, \infty)$ and concave downward on $(-\infty, 0)$. Inflection point is $(0, 1)$.

16. First derivative test is easier to use for this function. Both methods give: $f(-2) = -\frac{1}{4}$ is a local minimum value, while $f(2) = \frac{1}{4}$ is a local maximum value.

21. (a) h is increasing on $(-\infty, -1)$ and $(1, \infty)$, and decreasing on $(-1, 1)$, with a horizontal tangent at $x = 0$. (b) Local maximum value $h(-1) = 5$, local minimum value $f(1) = 1$. (c) h is CU on $(-\frac{1}{\sqrt{2}}, 0)$ and $(\frac{1}{\sqrt{2}}, \infty)$ and CD on $(-\infty, -\frac{1}{\sqrt{2}})$ and $(0, \frac{1}{\sqrt{2}})$. Inflection points at $(0, 3)$ and $(\pm\frac{1}{\sqrt{2}}, 3 \mp \frac{7}{8}\sqrt{2})$.

29. (a) HA: $y = 1$, VA: $x = -1, x = 1$. (b) f is increasing on $(-\infty, -1)$ and $(-1, 0)$, and f is decreasing on $(0, 1)$ and $(1, \infty)$. (c) $f(0) = 0$ is a local maximum point. (d) f is CU on $(-\infty, -1)$ and $(1, \infty)$, and f is CD on $(-1, 1)$. There is no inflection points.