Answers to Review Document for Exam 3, Fall 2012

1) Vertical asymptotes: $x = 2$ and $x = 3$
Horizontal asymptote: $y = 0$ (x-axis)

2) Vertical asymptotes: $x = -2$, $x = 5$
Horizontal asymptote: $y = \frac{3}{2}$

3) Vertical asymptote: $x = \frac{1}{5}$
No horizontal asymptote

4) $x = -4$

5) $x = -11$

6) $x = 0,\ x = \frac{1}{2}$

7) \$7145.51

8) approximately 5.6 years

9) $\log_4 2 = 0.5$

10) $\ln 35.6 \approx 3.5723$ $e^{2.3} \approx 9.9742$

11) $\log_3 17 \approx 2.5789$

12) $x = 35$

13) $x = 0$ only

14) $c \approx 2.5932$

15) $\log_b 20 = 2x + y$

16) $\log_4 64 = 3,\quad \log_3 \frac{1}{9} = -2$

17) $2 + \log_4 p - \frac{1}{2}\log_4 q$

18) (a) $-\frac{3}{5}$ (b) 0

19) $y' = -28e^{2x}$

20) $f'(x) = 2xe^{-3x}(3x - 2)$

21) $y' = \dfrac{1-\ln(2x+6)}{(x+3)^2}$

22) $y' = 3(x^3+e^{2x})^2(3x^2+2e^{2x})$

23) $f'(x) = \dfrac{e^x[x(x^2+2x+2)(\ln x)-(x^2+2)]}{x(\ln x)^2}$

24) slope of tangent line = $2e$ equation of tangent line: $y = (2e)x + (e^x - 2e)$

25 (a) increasing: $(-\infty,-2)\cup\left(\frac{2}{3},\infty\right)$ (b) increasing: $(-\infty,-\frac{7}{2})\cup(-\frac{7}{2},\infty)$

26) relative maximum: $f(-2) = 25$, relative minimum: $f(1) = -2$

27) relative maximum: $g(e^{1/2}) = 1$

28) $f''(x) = \dfrac{2(27x^4+2)}{x^3}$

29) $g''(x) = \dfrac{80}{(4x+3)^3}$

30) $f''(2) = \dfrac{-397}{8}$, $f''(5) = \dfrac{-87494}{625}$

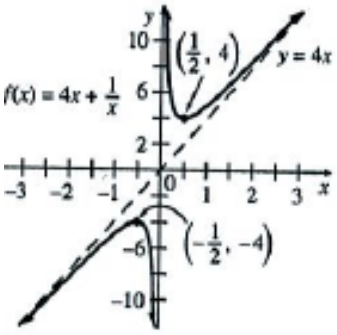
31) D = $(-\infty,\infty)$, no intercepts, no horizontal asymptote, vertical asymptote: $x = 0$

Increasing: $(-\infty,-\frac{1}{2})\cup(\frac{1}{2},\infty)$, decreasing: $\left(-\frac{1}{2},\frac{1}{2}\right)$

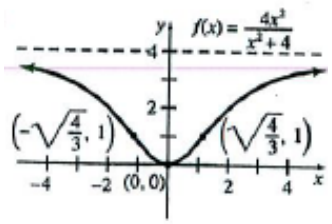
Relative maximum at point $(-\frac{1}{2},-4)$, Relative minimum at point $\left(\frac{1}{2},4\right)$

Concave downward: (-∞, 0), Concave upward: (0, ∞) , no inflection points

Graph:



32) D = (-∞, ∞), intercept: (0, 0) no vertical asymptote(s), horizontal asymptote: $y = 4$
Increasing: (0, ∞) Decreasing: (-∞,0) relative minimum (0, 0)
Concave upward: $\left(-\infty,-\sqrt{\frac{4}{3}}\right)\cup\left(\sqrt{\frac{4}{3}},\infty\right)$ Concave downward: $\left(-\sqrt{\frac{4}{3}},\sqrt{\frac{4}{3}}\right)$
Points of inflection: $(-\sqrt{\frac{4}{3}},1)$ and $\left(\sqrt{\frac{4}{3}},1\right)$



Graph: