Answers for Review for Exam 3 Worksheet, SP 2015

1)   Equations for asymptotes: $x = 2,\ x = 3,\ y = 0$

2)   Equations for asymptotes: $x = -2,\ x = 5,\ y = \dfrac{3}{2}$

3)   Equations for asymptote: $x = \dfrac{1}{5}$

4) $x = -4$ 5) $x = -11$ 6) $x = 0,\ x = \dfrac{1}{2}$

7) $A = \$7147.51$ 8) $t \approx 5.6$ years

9) $\log_4 2 = 0.5$ 10) $\ln 35.6 \approx 3.5723,\quad e^{2.3} \approx 9.974$

11) $\log_3 17 \approx 2.5789$ 12) $x = 35$ 13) $x = 0$ only

14) $x \approx 2.593$ 15) $2x + y$ 16) $\log_4 64 = 3,\quad \log_3 \dfrac{1}{9} = -2$

17) $2 + \log_4 p - \dfrac{1}{2}\log_4 q$ 18)   (a) $-\dfrac{3}{5}$ (b) 0

19) $y' = -28e^{2x}$ 20) $f'(x) = 2x(e^{-3x})(3x - 2)$

21) $y' = \dfrac{1 - \ln(2x + 6)}{(x + 3)^2}$ 22) $y' = 3(x^3 + e^{2x})^2\,(3x^2 + 2e^{2x})$

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

24) $y = (2e)x - e$ $m = 2e$ and y-intercept is $(0, -e)$

25)   (a)   Function f is increasing on $(-\infty, -2) \cup (\tfrac{2}{3}, \infty)$.
       (b)   Function g is never increasing.

26)   There is a relative maximum of 25 when $x = -2$. There is a relative minimum of -2 when $x = 1$.

27)   There is a relative maximum of $\dfrac{1}{4e}$ when $x = \sqrt{e}$.

28) $f''(x) = 54x + \dfrac{4}{x^3}$ 29) $g''(x) = \dfrac{80}{(4x + 3)^3}$

30) $f''(2) = -\dfrac{445}{8}$ $f''(5) = -\dfrac{91244}{625}$

31)   concave upward on $(-\infty, -4)$, concave downward on $(-4, \infty)$

32)   relative minimum point $(1, -4)$, relative maximum point $(3,0)$, point of inflection $(1, -4)$

33)   There is a maximum number of 1160 million or 1,160,000,000 bacteria after a time of 4 hours.

34)   There is a maximum concentration of about 0.222% of the drug in the bloodstream after 3 hours.
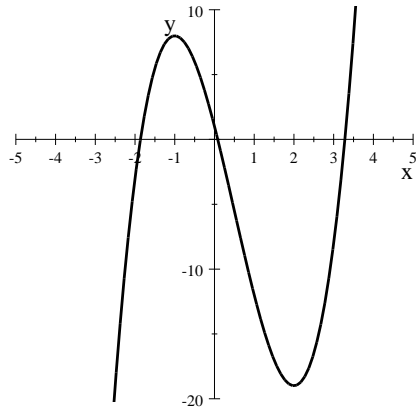
35)   (a) $v(t) = 256 - 32t$, $v(2) = 192$ ft./sec.
       (b) $a(t) = -32$ ft/sec^2
       (c)   1024 feet is the maximum height.
       (d)   It hits the ground in 16 seconds.

36)   Graph of f:

Graph increases on $(-\infty, -1)$ and $(2, \infty)$.
Graph decreases on $(-1,2)$.
A relative maximum is at $(-1,8)$ and a
relative minimum is at $(2, -19)$.
Graph is concave downward on $\left(-\infty, \dfrac{1}{2}\right)$ and
concave upward on $\left(\dfrac{1}{2}, \infty\right)$.
There is a point of inflection at $\left(\dfrac{1}{2}, -\dfrac{11}{2}\right)$.
y-intercept is $(0, -12)$.