Math 142 Solutions to Sample Exam II (A, B, C, and D)

(You may also want to check sample exam IA for some Ch. 2 limit & continuity problems)

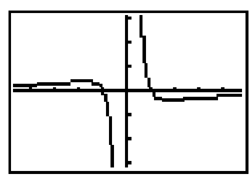
Sample Exam 2A: (* indicates that this problem in not covered in most 142 classes)

Multiple Choice

1. A
2. C
3. D
4. C
5. D *
6. D
7. D
8. A
9. C
10. B
11. A
12. A
13. B
14. B
15. C *

Work Out:

1. info given about *f(x)*
   a) $x = -1, 2$
   b) $x = 1$
   c) $x = -1$
   d) $x = 2$
2. domain is all reals except $x = 0$
   HA at $y = 0$, VA at $x = 0$
   intercepts: $(-1, 0)$ and $(1, 0)$
   rel. min at $(1.732, -0.385)$ or $\left(\sqrt{3}, \frac{-2}{(\sqrt{3})^3}\right)$ and rel. max at $(-1.732, 0.385)$ or $\left(-\sqrt{3}, \frac{2}{(\sqrt{3})^3}\right)$.
   IP: $(-2.449, 0.340)$ and $(2.449, -0.340)$, or exact: $\left(-\sqrt{6}, \frac{5}{(\sqrt{6})^3}\right)$ and $\left(\sqrt{6}, \frac{-5}{(\sqrt{6})^3}\right)$.

   the graph: 

Sample Exam 2B:

In # 1 - 4, no simplifying was necessary:

1. $f'(x) = 48x^5 - \frac{15}{2}x^{1/2} - 2^x \ln 2$
2. $f'(x) = 8(4x^7 - e^x)^7 \cdot (28x^6 - e^x)$
3. $f'(x) = \dfrac{e^x(7x^6 - \frac{1}{x}) - e^x(x^7 - \ln x)}{e^{2x}}$

   $= \dfrac{7x^6 - \frac{1}{x} - x^7 + \ln x}{e^x}$

4. $f'(x) = xe^{\left(\frac{x+1}{x-1}\right)^2+x^2} \cdot \left(2\left(\frac{x+1}{x-1}\right)\cdot\left(\frac{-2}{(x-1)^2}\right)+2x\right)+e^{\left(\frac{x+1}{x-1}\right)^2+x^2}$

$$= e^{\left(\frac{x+1}{x-1}\right)^2+x^2} \cdot \left(1+\frac{-4x(x+1)}{(x-1)^3}+2x^2\right)$$ Yuck!

5. A
6. A
7. E
8. $\frac{2}{7}$
9. $\frac{-3}{8700}$
10. $\frac{4}{\ln 5}$
11. $R'(3) = 38$
12. $f'(x) = 1 - \frac{1}{x^2}$
13. $a = e^2 - 6$
14. critical values at $x = 0, -3$

   f is dec. on $(-\infty, -3)$

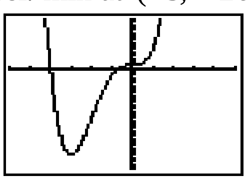
   f is inc on $(-3, 0) \cup (0, \infty)$

   rel. min at $(-3, -26)$, no rel. max.

   concave up on $(-\infty, -2) \cup (0, \infty)$

   concave down on $(-2, 0)$

   inflection points at $(-2, -15)$ and $(0, 1)$



Sample Exam C:

1. find derivatives; do not simplify:
   a) $y' = 3x^2 - 10x + 7 + 6x^{-3}$
   b) $f'(x) = \frac{3}{2}(x^4 + 3x^2 + 5)^{1/2}(4x^3 + 6x)$
   c) $g'(x) = \frac{(x-5)(2x-6)-(x^2-6x+8)}{(x-5)^2}$
   d) $h'(x) = 6xe^{3x^2+4} - \frac{4x^3+12x}{x^4+6x^2+1}$
   e) $y' = (5x^3+4x+7)(2x-6)+(x^2-6x+1)(15x^2+4)$

2. multiple choice
   a) D
   b) C
   c) B
   d) ? no graph ?
   e) ? graph missing
   f) ? no graph
   g) D
   h) A
   i) C
   j) B

3. given function *f(x)*
   a) inc on $(-\infty, -2) \cup (4, \infty)$ and dec on $(-2, 4)$.
      critical values at $x = -2$ and 4.
   b) concave up on $(1, \infty)$ and concave down on $(-\infty, 1)$.
      inflection value at $x = 1$.
   c) rel. max at $f(-2) = 38$ and rel. min at $f(4) = -70$.

4. no graph given

Sample Exam 2D: (actually has 2A at the top)

Multiple Choice

1. A
2. D
3. D
4. A
5. B
6. C
7. D
8. C
9. B
10. B
11. A
12. C
13. D
14. B

Work Out

15. use graph of *f(x)*
    a) yes
    b) at $x = -3, -1, 2$
16. same graph as above
    a) 1
    b) at $x = -3, -2, -1, 1, 2, 3$
17. 2
18. using given *g(x)* function
    a) -10 is *y*-intercept (when $x = 0$)
    b) no asymptotes (this is a polynomial)
    c) inc on $(-\infty, 0) \cup (0, 2) \cup (2, \infty)$
19. using *g(x)* again
    a) concave up on $(0, 1) \cup (2, \infty)$
    b) concave down on $(-\infty, 0) \cup (1, 2)$
20. important points of *g(x)*
    a) relative extrema (max/mins): none
    b) inflection points: $(0, -10), (1, -\frac{22}{3}), (2, -\frac{14}{3})$