Spring 2008 Math 151

Week in Review # 2

sections: 1.3-2.3

courtesy: Joe Kahlig

Section 1.3

1. Find a Cartesian equation for the following parametric curves. Sketch the curve.

   (a) $x = 3t + 4$, $y = 5 - t$, $-2 \le t \le 4$

   (b) $x = 4\sin\theta$, $y = 2\cos\theta$, $0 \le \theta \le \pi$

   (c) $\mathbf{r}(\theta) = \langle 2cos(\theta), y = sec(\theta) \rangle$, $\frac{-\pi}{2} < \theta < \frac{\pi}{2}$

2. An object is moving in the xy-plane and its position after t seconds is $\mathbf{r}(t) = \langle 4t^2 - 3, 2t - 1 \rangle$

   (a) Does the object go thru the point$(32, 5)$? If so, at what value of t does this happen?

   (b) Does the object go thru the point$(141, 11)$? If so, at what value of t does this happen?

   (c) Find the Cartesian equation of the curve and sketch the curve.

3. Find parametric equations and the vector equation for the line described below:

   (a) The line passes thru the points $(0, 3)$ and $(-3, 5)$.

   (b) The line passes thru the point $(-1, 5)$ and is parallel to the line $x = 2 + 3t$, $y = 5 + 2t$

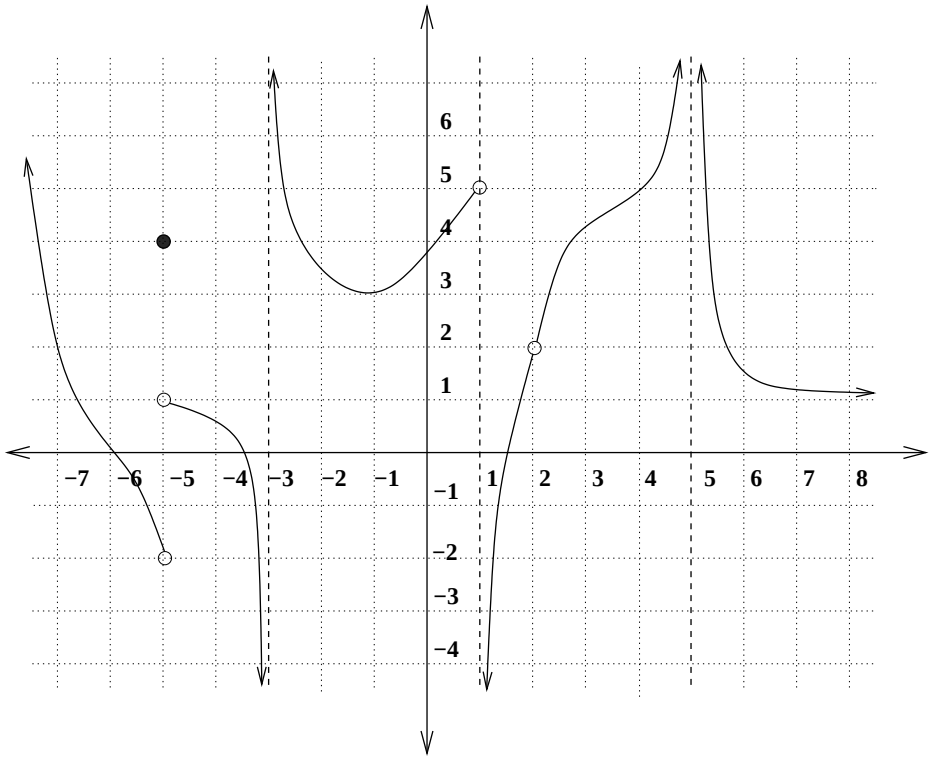
4. Determine whether the following lines are parallel or perpendicular. If they are not parallel, find the point of intersection.

   $L_1(t) =< 1 + t, 8 + 3t >$

   $L_2(s) =< 3 - s, 7 - 2s >$

Section 2.2

Use the graph of $f(x)$ to answer questions 5-12



5. $\lim_{x \to -5^-} f(x) =$

6. $\lim_{x \to -5^+} f(x) =$

7. $\lim_{x \to -5} f(x) =$

8. $\lim_{x \to -1} f(x) =$

9. $\lim_{x \to 2} f(x) =$

10. $\lim_{x \to -3} f(x) =$

11. $\lim_{x \to 5} f(x) =$

12. Find the equation(s) of all vertical asymptotes.

13. Find all holes and vertical asymptote(s) for the graph of $g(x) = \dfrac{(x^2+4x)(x-8)}{x^2(x^2+2x-8)}$ and determine the behavior of the function near the vertical asymptotes.

Section 2.3

Compute the exact values of these limits. If the limit doesn't exist, support your answer by evaluating left and right hand limits.

14. $\lim_{x \to -1} \dfrac{x^2 - x - 2}{x^2 + 9x + 8} =$

15. $\lim_{x \to 2^+} \dfrac{x + 3}{x^2 - 4x + 4} =$

16. $\lim_{x \to 2} \dfrac{|3x - 6|}{x - 2} =$

17. $\lim_{x \to 2} f(x)$, where $f(x) = \begin{cases} \sqrt{x^2 + 16}, & \text{if } x \leq 3 \\ x^3 - 10, & \text{if } x > 3 \end{cases}$

18. $\lim_{x \to 3^+} f(x)$, where $f(x) = \begin{cases} \sqrt{x^2 + 16}, & \text{if } x \leq 3 \\ x^3 - 10, & \text{if } x > 3 \end{cases}$

19. $\lim_{x \to 0} \dfrac{(4+x)^{-1} - 4^{-1}}{x} =$

20. $\lim_{x \to 3} \dfrac{x - \sqrt{4x-3}}{x^2 - 9}$

21. $\lim_{x \to 0^-} \left(\dfrac{1}{x} - \dfrac{1}{|x|} \right)$

22. If $3x \leq f(x) \leq x^3 + 2$ for $0 \leq x \leq 2$, evaluate $\lim_{x \to 1} f(x)$.