Homework Math 140
Lecture 8, 9,10
## Will be Tested on March 7

Problem 1 *(Textbook, page 235, problems 9-30). Find the limit or show that it does not exist. I the limit does not exist, indicate whether it is $\pm\infty$, or neither.*

1. $\lim\limits_{x\to\infty} \frac{3x-2}{2x+1}$.

2. $\lim\limits_{x\to\infty} \frac{1-x^2}{x^3-x+1}$.

3. $\lim\limits_{x\to-\infty} \frac{x-2}{x^2+1}$.

4. $\lim\limits_{x\to-\infty} \frac{4x^3+6x^2-2}{2x^3-4x+5}$.

5. $\lim\limits_{x\to\infty} \frac{\sqrt{t}+t^2}{2t-t^2}$.

6. $\lim\limits_{x\to\infty} \frac{t-t\sqrt{t}}{2t^{3/2}+3t-5}$.

7. $\lim\limits_{x\to\infty} \frac{(2x^2+1)^2}{(x-1)^2(x^2+x)}$.

8. $\lim\limits_{x\to\infty} \frac{x^2}{\sqrt{x^4+1}}$.

9. $\lim\limits_{x\to\infty} \frac{\sqrt{9x^6-x}}{x^3+1}$.

10. $\lim\limits_{x\to-\infty} \frac{\sqrt{9x^6-x}}{x^3+1}$.

11. $\lim\limits_{x\to\infty} \sqrt{9x^2+x}-3x$.

12. $\lim\limits_{x\to-\infty} x+\sqrt{x^2+2x}$.

13. $\lim\limits_{x\to\infty} \sqrt{x^2+ax}-\sqrt{x^2+bx}$.

14. $\lim\limits_{x\to\infty} \cos x$.

15. $\lim\limits_{x\to\infty} \frac{x^4-3x^2+x}{x^3-x+2}$.

16. $\lim\limits_{x\to\infty} \sqrt{x^2+1}$.

17. $\lim\limits_{x\to-\infty} (x^4+x^5)$.

18. $\lim\limits_{x\to-\infty} \frac{1+x^6}{1+x^4}$.

19. $\lim\limits_{x\to\infty} (x-\sqrt{x})$.

20. $\lim\limits_{x\to\infty} (x^2-x^4)$.

21. $\lim\limits_{x\to\infty} x\sin\frac{1}{x}$.

22. $\lim\limits_{x\to\infty} \sqrt{x}\sin\frac{1}{x}$.

Problem 2 *(Textbook, page 235, problems 33-38). Find the horizontal and vertical asymptotes of each curve. If you have a graphing device, check your work by graphing the curve and estimating the asymptotes.*

1. $y = \frac{2x+1}{x-2}$.

2. $y = \frac{x^2+1}{2x^2-3x-2}$.

3. $y = \frac{2x^2+x-1}{x^2+x-2}$.

4. $y = \frac{1+x^4}{x^2-x^4}$.

5. $y = \frac{x^3-x}{x^2-6x+5}$.

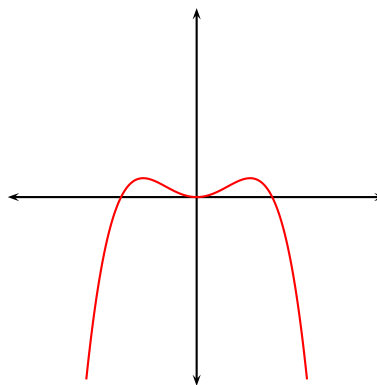6. $y = \frac{x-9}{\sqrt{4x^2+3x+2}}$.

Problem 3 *(Textbook, page 122, problem 3) Match the graph of each the following functions*
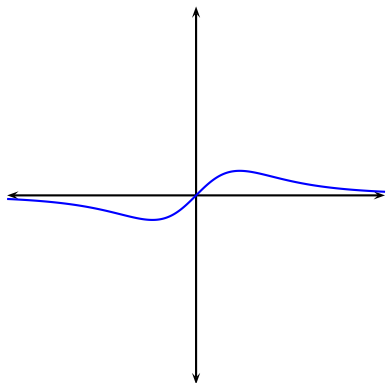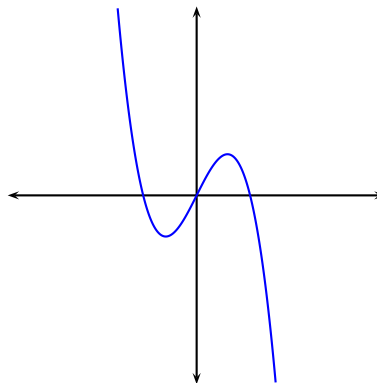

1.

2.
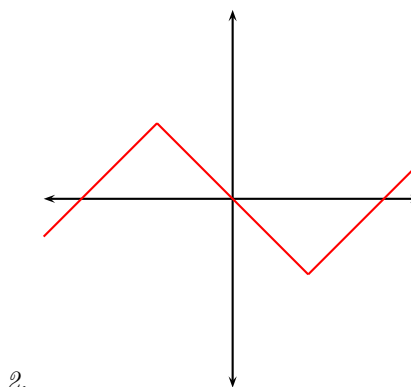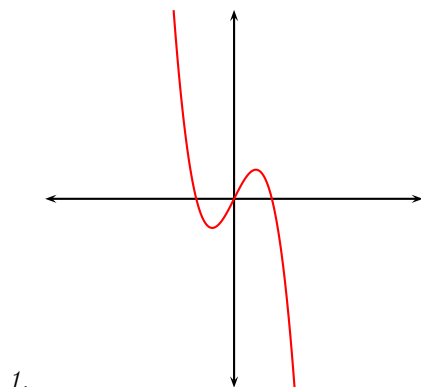
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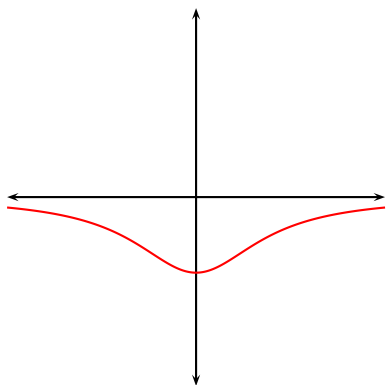
4.

to the graph of its derivative among the graphs below
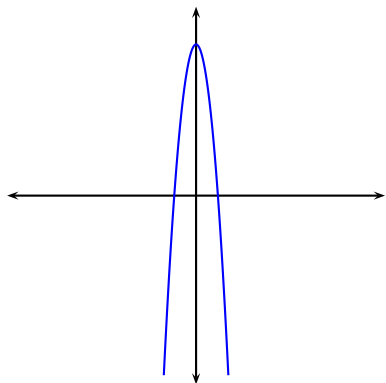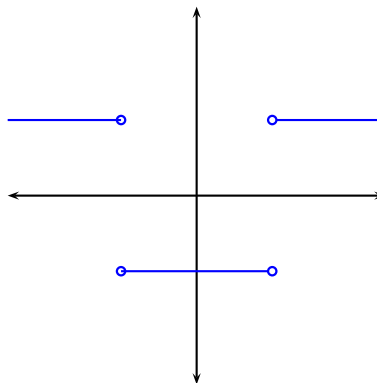
1.

3.

2.

4.

Give reasons for your choices. Can you guess a formulas that would give a similar (or precisely the same) graph, and confirm visually your guess using a graphing device?