

# Homework Math 140

## Lecture 8, 9,10

### Will be Tested on March 7

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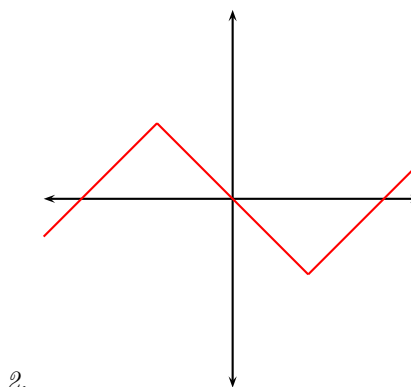
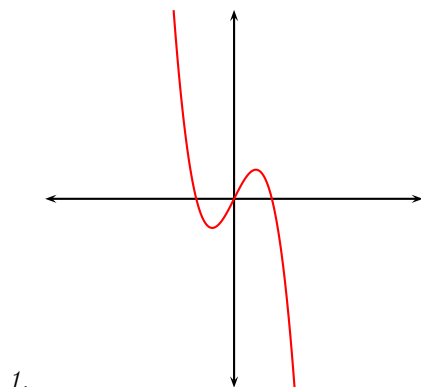
**Problem 1** (Textbook, page 235, problems 9-30). Find the limit or show that it does not exist. If the limit does not exist, indicate whether it is  $\pm\infty$ , or neither.

- |   |  |  |
|---|--|--|
| 1. $\lim_{x \rightarrow \infty} \frac{3x-2}{2x+1}.$                 | 8. $\lim_{x \rightarrow \infty} \frac{x^2}{\sqrt{x^4+1}}.$       | 16. $\lim_{x \rightarrow \infty} \sqrt{x^2+1}.$              |
| 2. $\lim_{x \rightarrow \infty} \frac{1-x^2}{x^3-x+1}.$             | 9. $\lim_{x \rightarrow \infty} \frac{\sqrt{9x^6-x}}{x^3+1}.$    | 17. $\lim_{x \rightarrow -\infty} (x^4+x^5).$                |
| 3. $\lim_{x \rightarrow -\infty} \frac{x-2}{x^2+1}.$                | 10. $\lim_{x \rightarrow -\infty} \frac{\sqrt{9x^6-x}}{x^3+1}.$  | 18. $\lim_{x \rightarrow -\infty} \frac{1+x^6}{1+x^4}.$      |
| 4. $\lim_{x \rightarrow -\infty} \frac{4x^3+6x^2-2}{2x^3-4x+5}.$    | 11. $\lim_{x \rightarrow \infty} \sqrt{9x^2+x} - 3x.$            | 19. $\lim_{x \rightarrow \infty} (x - \sqrt{x}).$            |
| 5. $\lim_{x \rightarrow \infty} \frac{\sqrt{t}+t^2}{2t-t^2}.$       | 12. $\lim_{x \rightarrow -\infty} x + \sqrt{x^2+2x}.$            | 20. $\lim_{x \rightarrow \infty} (x^2 - x^4).$               |
| 6. $\lim_{x \rightarrow \infty} \frac{t-t\sqrt{t}}{2t^{3/2}+3t-5}.$ | 13. $\lim_{x \rightarrow \infty} \sqrt{x^2+ax} - \sqrt{x^2+bx}.$ | 21. $\lim_{x \rightarrow \infty} x \sin \frac{1}{x}.$        |
| 7. $\lim_{x \rightarrow \infty} \frac{(2x^2+1)^2}{(x-1)^2(x^2+x)}.$ | 14. $\lim_{x \rightarrow \infty} \cos x.$                        | 22. $\lim_{x \rightarrow \infty} \sqrt{x} \sin \frac{1}{x}.$ |
| 15. $\lim_{x \rightarrow \infty} \frac{x^4-3x^2+x}{x^3-x+2}.$       |  |  |

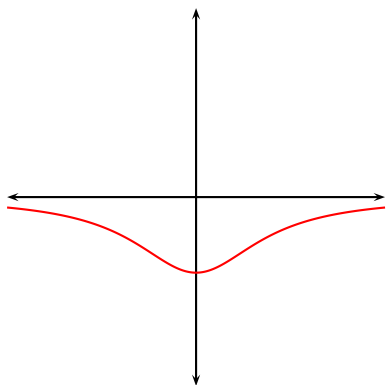
**Problem 2** (Textbook, page 235, problems 33-38). Find the horizontal and vertical asymptotes of each curve. If you have a graphing device, check your work by graphing the curve and estimating the asymptotes.

- |                                   |                                    |  |
|-----------------------------------|------------------------------------|--|
| 1. $y = \frac{2x+1}{x-2}.$        | 3. $y = \frac{2x^2+x-1}{x^2+x-2}.$ | 5. $y = \frac{x^3-x}{x^2-6x+5}.$       |
| 2. $y = \frac{x^2+1}{2x^2-3x-2}.$ | 4. $y = \frac{1+x^4}{x^2-x^4}.$    | 6. $y = \frac{x-9}{\sqrt{4x^2+3x+2}}.$ |

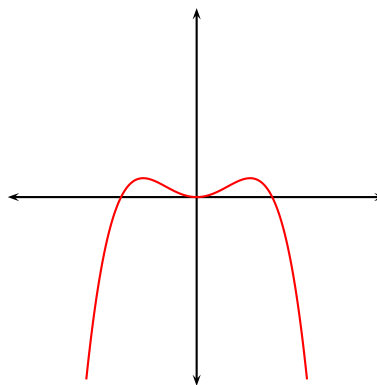
**Problem 3** (Textbook, page 122, problem 3) Match the graph of each the following functions



3.

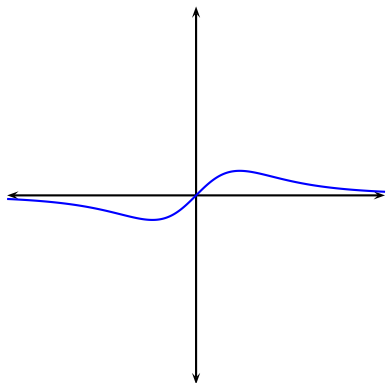


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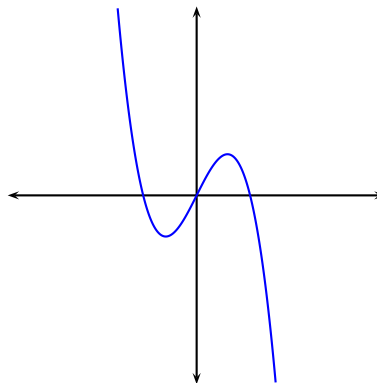


to the graph of its derivative among the graphs below

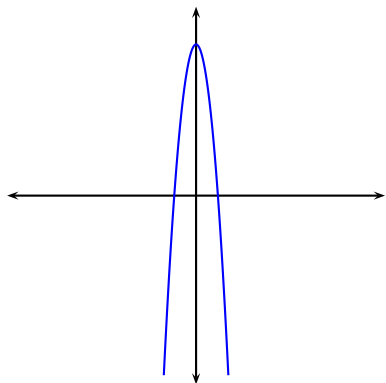
1.



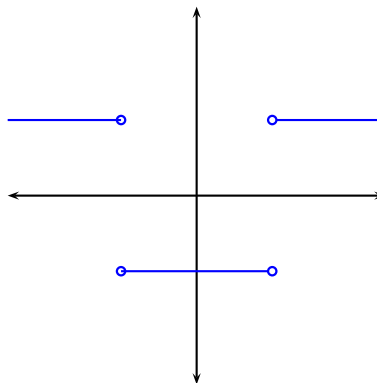
3.



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?