MATH 151- WEEK-IN-REVIEW 4

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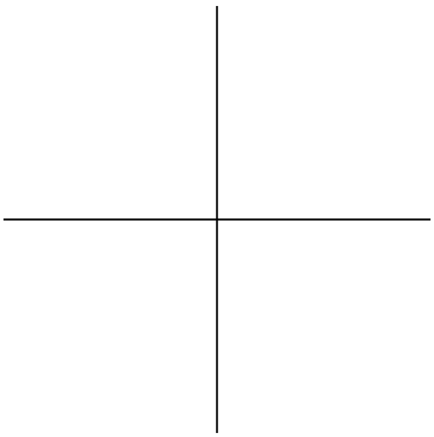
EXAM 1 REVIEW

1. Graph the line represented by the parametric equations $x = 1 - 2t$, $y = 5t + 2$. Then write the Cartesian equation for the function.



2. Find the work done by a force (in Newtons) of $\mathbf{F} = \langle 2, 5 \rangle$ and moving an object 6 meters due east.

3. Consider the curve $x(t) = t - 2$, $y(t) = t^2 - 3$. (a) Is the point $(4, 40)$ on the graph of the curve? (b) Eliminate the parameter to find a Cartesian equation.

4. Describe the curve given by $(2 + \cos(t))\mathbf{i} + (2 - \sin^2(t))\mathbf{j}$.

5. Two forces simultaneously act on an object sitting at the origin. The forces are given by $\mathbf{F}_1 = \langle 2, -1\rangle$ and $\mathbf{F}_2 = \langle 3, 7\rangle$. Find the magnitude and direction of the resultant vector. Measure the direction from the positive x-axis.

6. Find the vector projection of $\mathbf{b} = \langle -3, -2\rangle$ onto $\mathbf{a} = \langle -1, 5\rangle$

7. Find the distance from the point $(1, -4)$ to the line $3x + 2y = -2$.

8. Evaluate $\cos\left(2\arcsin\left(-\frac{2}{7}\right)\right)$

9. Express $\csc(\tan(x))$ as an algebraic expression.

10. Find the vertical and horizontal asymptotes for the curve $f(x) = \dfrac{\sqrt{9x^6+1}}{x^3-4x^2-3x+12}$.

11. Use the limit definition to find the derivative, $f'(x)$, for $f(x) = \sqrt{3-2x}$. No points will be awarded for not using the limit definition of the derivative.

Find the equation of the tangent line for the above function at $x = -1$.

12. Find the limit or prove it does not exist. Do not use L'Hôpital's Rule.

(a) $\lim_{x\to 2} \dfrac{\dfrac{2}{2x+1} - \dfrac{2}{5}}{x-2}$

(b) $\lim_{x\to -3} \dfrac{2x^4 - 162}{x+3}$

(c) $\lim_{x\to -4} \dfrac{3+x}{(x+4)^2}$

(d) $\lim_{x\to 1^-} \dfrac{x^2+3x-4}{|1-x|}$

(e) $\lim_{x\to\infty} \frac{x^2+3x-4}{3+5x-7x^2}$

(f) $\lim_{x\to\infty} \frac{5-4x}{\sqrt{9x^2+2x}}$

(g) $\lim_{x\to-\infty} e^2x+1$

(h) $\lim_{x\to-\frac{1}{2}^+} \left(\frac{3}{e}\right)^{x/(4x+2)}$

(i) $\lim_{x\to\infty}[\log(3x^2-4)-\log(1+5x^2)]$

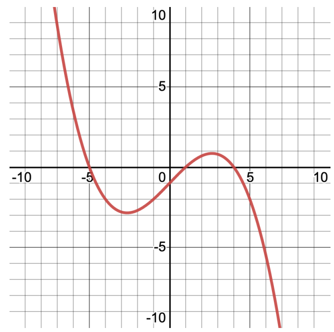
(j) $\lim_{x\to\infty}\dfrac{3e^{-5x}+9e^{3x}}{7e^{-5x}-3e^{3x}}$ $\qquad$ $\lim_{x\to-\infty}\dfrac{3e^{-5x}+9e^{3x}}{7e^{-5x}-3e^{3x}}$

13. Which of following intervals must contain a solution to the equation $2x^3+16x+3=18$?
    (a) $[-2,-1]$
    (b) $[-1,0]$
    (c) $[0,1]$
    (d) $[1,2]$
    (e) $[2,3]$

14. Given $f(x)=\begin{cases} x^2-5a & \text{if } x<-1 \\ ax^2 & \text{if } -1\le x\le 2 \\ 3ax+b & \text{if } x>2 \end{cases}$. Find values for a and b that make the function continuous everywhere.

15. Given $-2x+1 \leq f(x) \leq 3x^2$, compute $\lim_{x \to -1} f(x)$.

16. Given $f'(x)$ to the right, choose the graph of $f(x)$.



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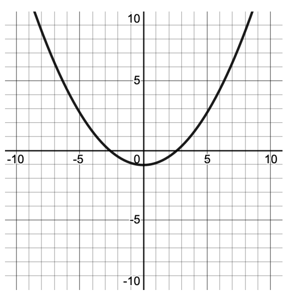

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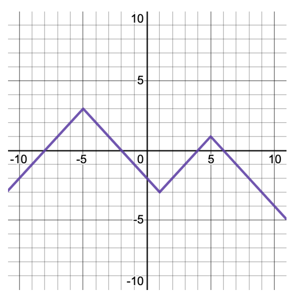

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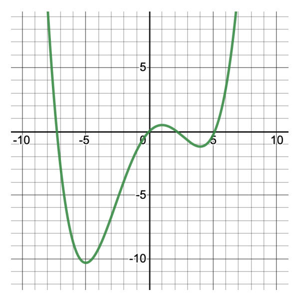

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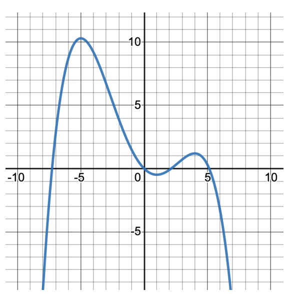

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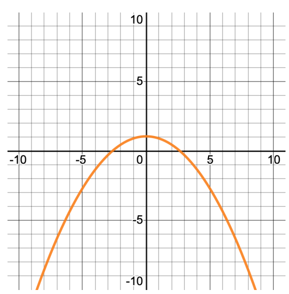
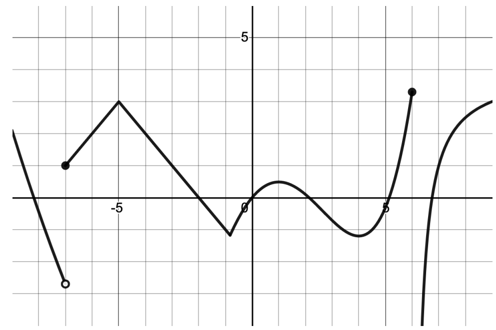


17. Determine the following limits given the graph of $f(x)$ to the right.



(a) $\lim_{x\to -7} f(x)$

(b) $\lim_{x\to -1} f(x)$

(c) $\lim_{x\to 1} f(x)$

(d) $\lim_{x\to 6^-} f(x)$

(e) $\lim_{x\to 6^+} f(x)$

(f) $\lim_{x\to 6} f(x)$

Is there anywhere $f(x)$ is discontinuous? If so, is it left continuous, right continuous, or neither?

Is there anywhere $f(x)$ is not differentiable?