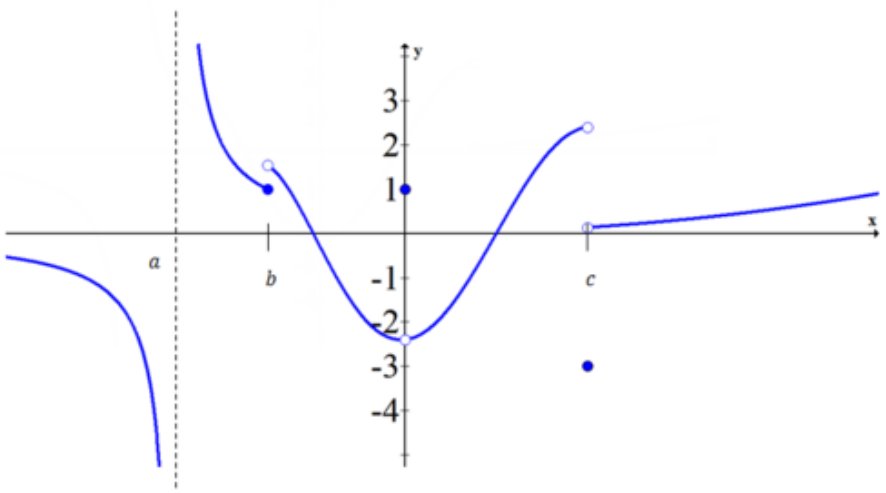
Math 241 Spring 2019 Professor MG
Classwork 1 Name: _____

Show all work and circle/box your final answer. All answers must be simplified unless stated otherwise.

1. If $g(t) = t^3 - 3t^2 + t$, find $g(2)$, $g(a)$, and $g(t+h)$
2. If $f(x) = x^2 + 3x + 1$ find $\dfrac{f(x+h) - f(x)}{h}$
3. Find the domain of the following functions (in interval notation):
   (a) $f(x) = \dfrac{3x-5}{x^2+x-6}$
   (b) $\sqrt{2x+7} + \sqrt{x}$
   (c) $\dfrac{1}{\sqrt{2x+4}}$
4. Let $f(x) = \begin{cases} \pi x^2 & , x < 2 \\ 1 + x & , 2 \le x \le 2.5 \\ 4x & , x > 2.5 \end{cases}$
   Find $f(1)$, $f(2)$, and $f(3)$.
5. Find $g \circ f$ and $f \circ g$ for $f(x) = \dfrac{x-3}{2}$, $g(x) = \sqrt{x}$
6. Write the following as a composition of functions $f \circ g$:
   (a) $(x+2)^5$
   (b) $\cos^2(x)$
   (c) $\sqrt{\sin x}$

7. Using the graph of $f(x)$ below find the following:




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

(b) $\lim_{x\to\infty} f(x)$

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

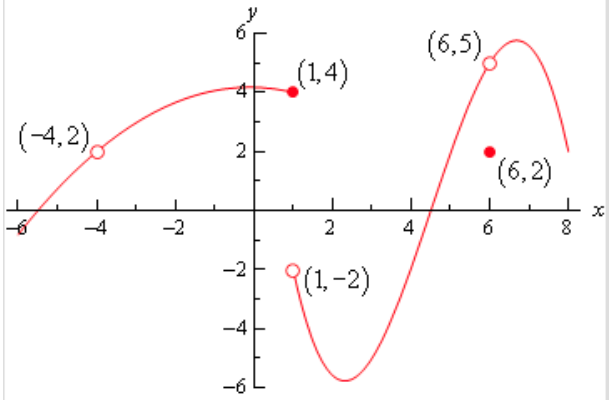
(d) $\lim_{x\to a^+} f(x)$

(e) $\lim_{x\to a} f(x)$

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

(g) The equations of any asymptotes

8. Using the graph of $f(x)$ below, find the following limits:




(a) $\lim_{x\to1^+} f(x)$

(b) $\lim_{x\to1^-} f(x)$

(c) $\lim_{x\to1} f(x)$

(d) $\lim_{x\to-4} f(x)$

(e) $\lim_{x\to6} f(x)$