Name:_____
M242: Calculus I (Fall 2017)
Instructor: Justin Ryan
Chapter 1 Exam

WICHITA STATE UNIVERSITY

Read and follow all instructions. You may not use any notes or electronic devices. All you need is a pencil and your brain!

Part I: True/False [2 points each]
*Neatly write **T** if the statement is always true, and **F** otherwise.*

_____**1.** $\lim_{x\to 4}\left(\frac{2x}{x-4}-\frac{8}{x-4}\right)=\lim_{x\to 4}\frac{2x}{x-4}-\lim_{x\to 4}\frac{8}{x-4}$

_____**2.** Let f be a function satisfying $f(a)=k$. Then $\lim_{x\to a} f(x)=k$.

_____**3.** If p is a polynomial, then $\lim_{x\to b} p(x)=p(b)$.

_____**4.** The equation $x^4-6x^2+5=0$ has a root in the interval $(0,2)$.

_____**5.** If $|f|$ is continuous at a, so is f.

Part II: Multiple Choice [5 points each]
Select the best answer and write its corresponding letter neatly on the given line.

_____**6.** Compute $\lim_{x\to 0}\cos(x+\sin x)$

A. 0 **B.** 1

C. $\cos(1)$ **D.** $\frac{\pi}{2}$

_____**7.** Compute $\lim_{x\to 5}\frac{x^2-25}{x-5}$

A. 0 **B.** 5

C. 10 **D.** Does Not Exist

_____**8.** Compute $\lim_{x\to 0} x^2 \cos\left(\frac{2\pi}{x}\right)$

A. 0 **B.** 1

C. $+\infty$ **D.** Does Not Exist

_____**9.** Compute $\lim_{\theta\to \frac{\pi}{2}^+} \tan\theta$

A. $+\infty$ **B.** $-\infty$

C. 0 **D.** Does Not Exist

_____**10.** Compute $\lim_{x\to 3} \frac{x^2+2x-5}{x+2}$

A. 0 **B.** -2

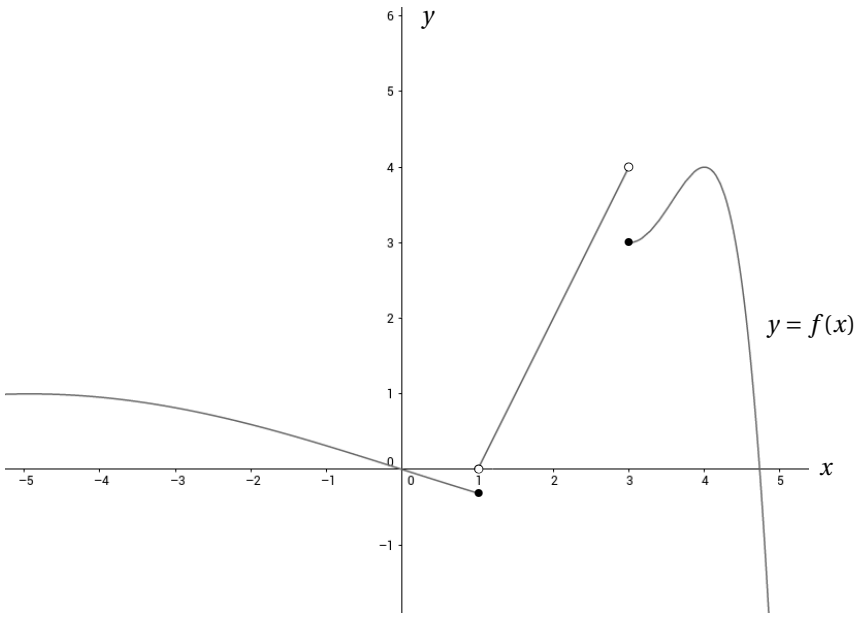
C. 2 **D.** Does Not Exist

_____**11.** Compute $\lim_{v\to 4^+} \frac{4-v}{|4-v|}$

A. -1 **B.** 1

C. 0 **D.** Does Not Exist

12–13. Use the graph of the function f to compute the limits.



_____**12.** $\lim_{x \to 3^-} f(x)$

A. 0 **B.** 3

C. 4 **D.** Does Not Exist

_____**13.** $\lim_{x \to 1} f(x)$

A. 0 **B.** $-\frac{1}{4}$

C. 3 **D.** Does Not Exist

Part III: Written Problems [10 points each]
Complete all problems, showing enough work.

14. Does the function $f(x) = \cos x - x^3$ have a real zero between 0 and $\frac{\pi}{2}$? Explain.

15. Compute $\lim_{\theta \to 0} \frac{\sin^2(2\theta)}{\theta^2}$. Show enough work.

16. You wish to prove that $\lim_{x \to 2} 14 - 5x = 4$. If you fix $\varepsilon > 0$, what should you set δ equal to in order to finish the proof? Show enough work.

17. Compute $\lim_{h\to 0} \dfrac{(x+h)^3 - x^3}{h}$. Show enough work.

18. Let $F(x) = \begin{cases} x^2 - 2 & x < 0 \\ k & x = 0 \\ -2\cos(x) & x > 0 \end{cases}$.

What must k equal in order for F to be continuous at 0? Explain.