

AP AB Calculus  
Homework Day 17

Name \_\_\_\_\_

Date \_\_\_\_\_

1.  $\lim_{x \rightarrow \infty} \ln(3x - 7)$  is

- a) 1      b)  $-\infty$       c)  $1^-$       d)  $1^+$       e)  $\infty$

2.  $\lim_{x \rightarrow -\infty} \ln(5 - 2x)$  is

- a) 1      b)  $-\infty$       c)  $1^-$       d)  $1^+$       e)  $\infty$

3.  $\lim_{h \rightarrow \infty} \frac{3}{\sqrt{h-4}}$  is

- a) 1      b) 0      c) 3      d)  $\frac{1}{3}$       e)  $\infty$

4.  $\lim_{x \rightarrow \infty} \frac{2x+1}{x}$  is

- a)  $-\infty$       b) 0      c) 3      d) 2      e)  $\infty$

5.  $\lim_{x \rightarrow \infty} \frac{5x^4 + 3x^3 + 2x^2 + 1}{4x^4 + 5}$  is

- a)  $-\frac{5}{4}$       b)  $\frac{5}{4}$       c)  $\frac{11}{9}$       d)  $\infty$       e) 5

6.  $\lim_{x \rightarrow \infty} \frac{x}{(x+2)(x-3)}$  is

- a) 1      b)  $-\infty$       c)  $-\frac{2}{3}$       d) 0      e)  $\infty$

7.  $\lim_{x \rightarrow -\infty} \frac{x^2}{(3-x)(3+x)}$  is

- a) 1      b)  $-\infty$       c) -1      d) 0      e)  $\infty$

8.  $\lim_{x \rightarrow -\infty} \frac{2-2^x}{5-5^x}$  is

- a) 1      b) 2      c) 0      d)  $\frac{1}{5}$       e)  $\frac{2}{5}$

9.  $\lim_{x \rightarrow -\infty} \frac{7-7^x}{8-8^x}$  is

- a) 1      b) 7      c) 0      d)  $-\frac{7}{8}$       e)  $\frac{7}{8}$

10.  $\lim_{x \rightarrow \infty} \frac{e^{5x}}{\ln 2x}$  is

- a) 1      b) 0      c)  $\frac{5}{2}$       d)  $5e$       e)  $\infty$

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11. If  $f(x) = \frac{4x}{\sqrt{x^2 + 9}}$ , find all horizontal asymptotes.

- a)  $y = \pm 1$       b)  $y = 4$  only      c)  $y = \pm 4$   
d)  $y = 0$       e)  $y = 3$

12. Find all horizontal asymptotes of  $f(x) = \frac{6x}{\sqrt{4x^2 - 10}}$ .

- a)  $y = \pm \frac{3}{2}$       b)  $y = \pm 3$       c)  $y = 6$  only  
d)  $y = 0$       e)  $y = \pm 6$

13. Which of the following functions has a horizontal asymptote at  $y = 2$ ?

- a)  $\frac{x - 2}{3x - 5}$       b)  $\frac{2x}{\sqrt{x - 2}}$   
c)  $\frac{2x^2 - 6x + 1}{1 + x^2}$       d)  $\frac{2x - 1}{x^2 + 1}$   
e)  $\frac{5 - 2x^2}{7 + x^3}$

14.  $\lim_{x \rightarrow \infty} \sqrt{25x^2 + x} - 5x = \underline{\hspace{2cm}}$

15. Given a function defined by  $f(x) = \frac{3x - 12}{x^2 - 6x + 8}$ , for what value(s) of  $x$  is the function discontinuous?

- a) 4 only      b) 2      c) 2, 4  
d) -4 only      e) -4, -2

16. For what values of  $x$  is the function  $f(x) = \frac{x + 4}{x^2 + 5x + 6}$  discontinuous?

- a) -2 and -3      b) -2 only      c) -4 only  
d) 2, 3      e) 4 only

17. Which of the following functions are continuous for all real numbers  $x$ ?

- I.  $y = -\frac{2}{x - 3}$   
II.  $y = e^x$   
III.  $y = \csc x$

- a) I and III only      b) II only  
c) II and III only      d) I and II only  
e) I only

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18. Which of the following functions are continuous for all real numbers  $x$ ?

I.  $y = \frac{x^2 + 5}{x^2 + 2}$

II.  $y = \frac{3}{x^2}$

III.  $y = |2x - 7|$

- a) I and III only                      b) I only  
c) III only                                d) I and II only  
e) II and III only

19. Which of the following functions are continuous for all real numbers  $x$ ?

I.  $y = \frac{1}{5 + 3x^4}$

II.  $y = 3x \cos x$

III.  $y = \frac{4}{e^{x^2/3}}$

- a) III only                                b) II and III only  
c) I and III only                        d) I and II only  
e) I, II, and III

20. Let  $f$  be defined as follows:

$$f(x) = \begin{cases} \frac{x^2 - 9}{x - 3} & \text{for } x \neq 3, \\ 1 & \text{for } x = 3 \end{cases}$$

Which of the following are true about  $f$ ?

I.  $\lim_{x \rightarrow 3} f(x)$  exists

II.  $f(3)$  exists

III.  $f(x)$  is continuous at  $x = 3$

- a) None                                      b) I only  
c) II only                                    d) I and II only  
e) I, II, and III

21. Consider  $f$  as defined below:

$$f(x) = \begin{cases} \frac{x^2 - 36}{x - 6} & \text{for } x \neq 6, \\ 25 & \text{for } x = 6 \end{cases}$$

Which of the following are true about  $f$ ?

I.  $\lim_{x \rightarrow 6} f(x)$  exists

II.  $f(6)$  exists

III.  $f(x)$  is continuous at  $x = 6$

- a) None                                      b) I only  
c) II only                                    d) III only  
e) I and II only

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22. Let  $f$  be defined as follows:

$$f(x) = \begin{cases} x^2 + 5 & \text{for } x > 5, \\ 3ax & \text{for } x \leq 5 \end{cases}$$

For what value of  $a$  is the function continuous?

- a) 2      b) 10      c) 5      d) 15      e) 30

23.  $f$  is continuous on  $[2, 4]$  and has the values shown.

The equation  $f(x) = 3$  must have at least 2 solutions on  $[2, 4]$  for  $k =$  \_\_\_\_\_.

- a) 3      b) 4      c) 2  
d) 5      e) 6

$x$	2	3	4
$f(x)$	5	$k$	9

24.  $f$  is continuous on  $[5, 7]$  and has the values shown.

The equation  $f(x) = 4$  must have at least 2 solutions on  $[5, 7]$  for  $k =$  \_\_\_\_\_.

- a) 12      b) 10      c) 1  
d) 8      e) 9

$x$	5	6	7
$f(x)$	8	$k$	10

25. Consider  $f(x) = \begin{cases} x + c & \text{for } x < -2, \\ cx^2 + 7 & \text{for } x \geq -2 \end{cases}$

For what value of the constant  $c$  is  $f$  continuous for all real numbers?

1.  
Answer: e  
CodePath: EAS.APC.C.E.1
2.  
Answer: e  
CodePath: EAS.APC.C.E.2
3.  
Answer: b  
CodePath: EAS.APC.C.E.3
4.  
Answer: d  
CodePath: EAS.APC.C.E.5
5.  
Answer: b  
CodePath: EAS.APC.C.E.9
6.  
Answer: d  
CodePath: EAS.APC.C.E.11
7.  
Answer: c  
CodePath: EAS.APC.C.E.14
8.  
Answer: e  
CodePath: EAS.APC.C.E.17
9.  
Answer: e  
CodePath: EAS.APC.C.E.18
10.  
Answer: e  
CodePath: EAS.APC.C.E.19
11.  
Answer: c  
CodePath: EAS.APC.C.E.21
12.  
Answer: b  
CodePath: EAS.APC.C.E.23
13.  
Answer: c  
CodePath: EAS.APC.C.E.25
14.  
Answer:  $\frac{1}{10}$   
CodePath: EAS.APC.C.E.42

15.  
Answer: c  
CodePath: EAS.APC.C.F.1
16.  
Answer: a  
CodePath: EAS.APC.C.F.4
17.  
Answer: b  
CodePath: EAS.APC.C.F.6
18.  
Answer: a  
CodePath: EAS.APC.C.F.7
19.  
Answer: e  
CodePath: EAS.APC.C.F.12
20.  
Answer: d  
CodePath: EAS.APC.C.F.17
21.  
Answer: e  
CodePath: EAS.APC.C.F.20
22.  
Answer: a  
CodePath: EAS.APC.C.F.31
23.  
Answer: c  
CodePath: EAS.APC.C.F.35
24.  
Answer: c  
CodePath: EAS.APC.C.F.36
25.  
Answer: -9  
CodePath: EAS.APC.C.F.46