

23) Sketch graph of  $f$ :  $f(x) = \begin{cases} x^2, & x \leq 2 \\ 8-2x, & 2 < x < 4 \\ 4, & x \geq 4 \end{cases}$   
 Identify values of  $c$  where  $\lim_{x \rightarrow c} f(x)$  exists

$y = x^2$

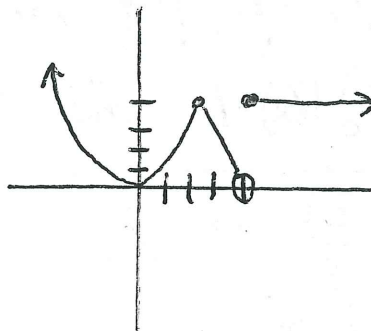
x	y
2	4
1	1
0	0
-1	1

$y = 8 - 2x$

x	y
2	4
3	2
4	0

$y = 4$

x	y
4	4
5	4
6	4



$\lim_{x \rightarrow c} f(x)$  exists for all  $c \neq 4$

BC  
24)  $f(x) = \begin{cases} \sin x, & x < 0 \\ 1 - \cos x, & 0 \leq x \leq \pi \\ \cos x, & x > \pi \end{cases}$

$y = \sin x$

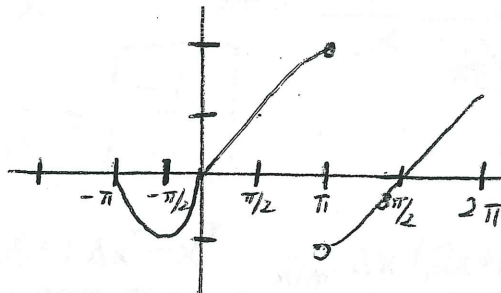
x	y
0	0
$-\pi/2$	-1
$-\pi$	0

$y = 1 - \cos x$

x	y
0	0
$\pi/2$	1
$\pi$	2

$y = \cos x$

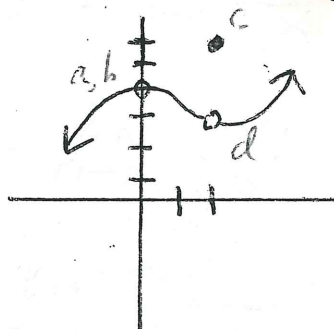
x	y
$\pi$	-1
$3\pi/2$	0
$2\pi$	1



$\lim_{x \rightarrow c} f(x)$  exists for all values of  $c \neq \pi$

25) Sketch graph of function  $f$  with given characteristics

- a)  $f(0)$  undefined
- b)  $\lim_{x \rightarrow 0} f(x) = 4$
- c)  $f(2) = 6$
- d)  $\lim_{x \rightarrow 2} f(x) = 3$



53)  $\lim_{x \rightarrow 8} f(x) = 25$  "The limit of the function as  $x$  approaches 8 is 25"

54) If  $f(2) = 4$ , no conclusion about  $\lim_{x \rightarrow 2} f(x)$  can be reached without further information.

55) No conclusion can be reached. More information needed.

63) False

65) IF  $f(c) = L$ , then  $\lim_{x \rightarrow c} f(x) = L$

66) IF  $\lim_{x \rightarrow c} f(x) = L$ , then  $f(c) = L$

Counterexample

$f(3) = 4$   
False  $\lim_{x \rightarrow 3} f(x) = 6$

False ↗

BC: #37-48

38) -1

40)  $\frac{29}{3}$

42) -1

44) 2

46) 0

48) 0