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[illegible]

Ans01 >

$$\lim_{x \rightarrow 4^-} f(x) = 0.1667, \quad \lim_{x \rightarrow 4^+} f(x) = 0.1667, \quad \lim_{x \rightarrow 4} f(x) = 0.1667, \quad \text{"# } f(x) \text{ is discontinuous at } x = 4"$$
$$\lim_{x \rightarrow 0^-} f(x) = -2.0000, \quad \lim_{x \rightarrow 0^+} f(x) = 2.0000, \quad \lim_{x \rightarrow 0} f(x) = \text{does not exist}, \quad \text{"\# f(x) is discontinuous at x = 0"}$$
$$\lim_{x \rightarrow 4^-} f(x) = -4.0000, \quad \lim_{x \rightarrow 4^+} f(x) = -4.0000, \quad \lim_{x \rightarrow 4} f(x) = -4.0000, \quad \text{"# } f(x) \text{ is discontinuous at } x = 4"$$
$$\lim_{x \rightarrow 0^-} f(x) = 3.0000, \quad \lim_{x \rightarrow 0^+} f(x) = 3.0000, \quad \lim_{x \rightarrow 0} f(x) = 3.0000, \quad \text{"# } f(x) \text{ is discontinuous at } x = 0"$$
$$\lim_{x \rightarrow 0^-} f(x) = 0, \quad \lim_{x \rightarrow 0^+} f(x) = 0, \quad \lim_{x \rightarrow 0} f(x) = 0, \quad \text{"\# f(x) is discontinuous at } x = 0"$$
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LimitExercise01 Answers for No.10057

|      |         |         |         |         |             |                   |     |         |         |         |         |         |
|------|---------|---------|---------|---------|-------------|-------------------|-----|---------|---------|---------|---------|---------|
| x    | 1.8000  | 1.9000  | 1.9900  | 1.9990  | 1.9999 ...  | a = 2             | ... | 2.0001  | 2.0010  | 2.0100  | 2.1000  | 2.2000  |
| f(x) | -0.1923 | -0.1961 | -0.1996 | -0.2000 | -0.2000 ... | f( 2) = undefined | ... | -0.2000 | -0.2000 | -0.2004 | -0.2041 | -0.2083 |

|      |         |         |         |         |             |                  |     |        |        |        |        |        |
|------|---------|---------|---------|---------|-------------|------------------|-----|--------|--------|--------|--------|--------|
| x    | -0.2000 | -0.1000 | -0.0100 | -0.0010 | -0.0001 ... | a = 0            | ... | 0.0001 | 0.0010 | 0.0100 | 0.1000 | 0.2000 |
| f(x) | 1.8127  | 1.9033  | 1.9900  | 1.9990  | 1.9999 ...  | f(0) = undefined | ... | 2.0001 | 2.0010 | 2.0100 | 2.1034 | 2.2140 |

```
x | 48.8000| 48.9000| 48.9900| 48.9990| 48.9999|...| a = 49 |...| 49.0001| 49.0010| 49.0100| 49.1000| 49.2000|
f(x)|-13.9857|-13.9929|-13.9993|-13.9999|-13.9997|...|f(49) = undefined|...|-13.9997|-14.0001|-14.0007|-14.0071|-14.0143|
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|      |         |         |         |         |             |                   |     |        |        |        |        |        |
|------|---------|---------|---------|---------|-------------|-------------------|-----|--------|--------|--------|--------|--------|
| x    | -0.2000 | -0.1000 | -0.0100 | -0.0010 | -0.0001 ... | a = 0             | ... | 0.0001 | 0.0010 | 0.0100 | 0.1000 | 0.2000 |
| f(x) | -1.8000 | -1.9000 | -1.9900 | -1.9990 | -1.9999 ... | f( 0) = undefined | ... | 2.0001 | 2.0010 | 2.0100 | 2.1000 | 2.2000 |

|      |         |         |         |         |             |                  |     |        |        |        |        |        |
|------|---------|---------|---------|---------|-------------|------------------|-----|--------|--------|--------|--------|--------|
| x    | -0.2000 | -0.1000 | -0.0100 | -0.0010 | -0.0001 ... | a = 0            | ... | 0.0001 | 0.0010 | 0.0100 | 0.1000 | 0.2000 |
| f(x) | 1.0067  | 1.0017  | 1.0000  | 1.0000  | 1.0000 ...  | f(0) = undefined | ... | 1.0000 | 1.0000 | 1.0000 | 1.0017 | 1.0067 |

|       | a  | f(a)      | LH-Limit | RH-Limit  | Limit | Continuity    |
|-------|----|-----------|----------|-----------|-------|---------------|
| Ans06 | -9 | 4         | 4        | -infinity | DNE   | Discontinuous |
|       | -4 | undefined | 3        | 3         | 3     | Discontinuous |
|       | -2 | 3         | 3        | 3         | 3     | Continuous    |
|       | 4  | 3         | 4        | 4         | 4     | Discontinuous |
|       | 10 | 3         | 3        | 3         | 3     | Continuous    |

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Ans01 >
      x | 2.8000| 2.9000| 2.9900| 2.9990| 2.9999|...| a = 3      |...| 3.0001| 3.0010| 3.0100| 3.1000| 3.2000|
      f(x) | 6.8000| 6.9000| 6.9900| 6.9990| 6.9999|...| f( 3) = undefined|...| 7.0001| 7.0010| 7.0100| 7.1000| 7.2000|

```

```
900|  0.9990|  0.9999|...|   a = 1         |...|  1.0001|  1.0010|  1.0100|  1.1000|
950|  1.9995|  1.9999|...|f( 1) = undefined|...|  2.0000|  2.0005|  2.0050|  2.0488|
lim  f(x)=2.0000,   , lim  f(x)=2.0000,   , lim  f(x)=2.0000,   , " # f(x) is discontinuous at x=1"
x→1-          x→1+          x→1
```

|      |        |        |        |        |        |     |                  |     |        |        |        |        |        |
|------|--------|--------|--------|--------|--------|-----|------------------|-----|--------|--------|--------|--------|--------|
| x    | 0.8000 | 0.9000 | 0.9900 | 0.9990 | 0.9999 | ... | a = 1            | ... | 1.0001 | 1.0010 | 1.0100 | 1.1000 | 1.2000 |
| f(x) | 1.8944 | 1.9487 | 1.9950 | 1.9995 | 1.9999 | ... | f(1) = undefined | ... | 2.0000 | 2.0005 | 2.0050 | 2.0488 | 2.0954 |

```

100| -0.0010| -0.0001|...|   a = 0           |...|  0.0001|  0.0010|  0.0100|  0.1000|
701| -5.9970| -5.9997|...| f( 0) = undefined|...| -6.0003| -6.0030| -6.0301| -6.3103|
lim_{x→0-} f(x) = -6.0000,   lim_{x→0+} f(x) = -6.0000,   lim_{x→0} f(x) = -6.0000,   , "# f(x) is discontinuous at x = 0

```

|      |         |         |         |         |         |     |                  |     |         |         |         |         |         |
|------|---------|---------|---------|---------|---------|-----|------------------|-----|---------|---------|---------|---------|---------|
| x    | -0.2000 | -0.1000 | -0.0100 | -0.0010 | -0.0001 | ... | a = 0            | ... | 0.0001  | 0.0010  | 0.0100  | 0.1000  | 0.2000  |
| f(x) | -5.4381 | -5.7098 | -5.9701 | -5.9970 | -5.9997 | ... | f(0) = undefined | ... | -6.0003 | -6.0030 | -6.0301 | -6.3103 | -6.6421 |

```

100| -0.0010| -0.0001|...|  a = 0          |...|  0.0001| 0.0010| 0.0100| 0.1000| 0
050|  0.0005| 0.0000|...|f( 0) = undefined|...| -0.0000| -0.0005| -0.0050| -0.0500| -
    lim_{x→0-} f(x)=0,  , lim_{x→0+} f(x)=0,  , lim_{x→0} f(x)=0,  , " # f(x) is discontinuous at x=0"

```

|      |         |         |         |         |         |     |                  |     |         |         |         |         |         |
|------|---------|---------|---------|---------|---------|-----|------------------|-----|---------|---------|---------|---------|---------|
| x    | -0.2000 | -0.1000 | -0.0100 | -0.0010 | -0.0001 | ... | a = 0            | ... | 0.0001  | 0.0010  | 0.0100  | 0.1000  | 0.2000  |
| f(x) | 0.0997  | 0.0500  | 0.0050  | 0.0005  | 0.0000  | ... | f(0) = undefined | ... | -0.0000 | -0.0005 | -0.0050 | -0.0500 | -0.0997 |

```

1.0010| -0.0001|...| a = 0 |...| 0.0001| 0.0010| 0.0100| 0.
2.9990| -2.9999|...| f( 0) = undefined|...| 3.0001| 3.0010| 3.0100| 3.
=-3.0000,   , lim_{x→0+} f(x) = 3.0000,   , lim_{x→0} f(x) = does not exist,   , " # f(x) is discontinuous

```

|      |         |         |         |         |         |     |                  |     |        |        |        |        |        |
|------|---------|---------|---------|---------|---------|-----|------------------|-----|--------|--------|--------|--------|--------|
| x    | -0.2000 | -0.1000 | -0.0100 | -0.0010 | -0.0001 | ... | a = 0            | ... | 0.0001 | 0.0010 | 0.0100 | 0.1000 | 0.2000 |
| f(x) | -2.8000 | -2.9000 | -2.9900 | -2.9990 | -2.9999 | ... | f(0) = undefined | ... | 3.0001 | 3.0010 | 3.0100 | 3.1000 | 3.2000 |

| Limit    | RH-Limit | Limit | Continuity    |
|----------|----------|-------|---------------|
| 4        | 4        | 4     | Continuous    |
| infinity | 4        | DNE   | Discontinuous |

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