2.1 day 2

Tuesday, August 15, 2017 2:18 PM

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2. $y(t) = 16t^2$

$y(4) = 16(4)^2 = 256$ feet

$y(0) = 16(0)^2 = 0$ feet

$\frac{256-0}{4-0}\frac{ft}{s} = 64$ ft/s

4. Need instantaneous @ $t=4$ and $h \to 0$

$$\frac{16(4+h)^2 - 16(4)^2}{4+h-4}$$

$$= \frac{16(4^2+8h+h^2) - 256}{h}$$

$$= \frac{256 + 128h + 16h^2 - 256}{h}$$

$$= \frac{128h + 16h^2}{h}$$

$$= 128 + 16h$$

$\rightarrow$ 128 $\frac{ft}{s}$ when $h \to 0$

7. $\lim_{x \to -1/2} 3x^2(2x-1) = 3(-1/2)^2(2\cdot -1/2 - 1)$

$= 3 \cdot \frac{1}{4} \cdot (-1-1)$

$= \frac{3}{4} \cdot -2$

$= -3/2$

11. $\lim_{y \to -3} \frac{y^2+4y+3}{y^2-3} = \frac{(-3)^2 + 4(-3) + 3}{(-3)^2 - 3}$

$= \frac{9-12+3}{9-3}$

$= 0$

13. $\lim_{x \to -2} (x-6)^{2/3} = (-2-6)^{2/3}$

$= 4$

15. $f(x) = \dfrac{x^2 + 6x + 2}{x + 1}$

x	-0.1	-0.01	-0.001	-0.0001
$f(x)$	$\frac{47}{30}$	$\frac{6467}{3300}$	2	2

x	0.1	0.01	0.001	0.0001
$f(x)$	2.373	2.040	2.004	2

$\lim_{x \to 0} f(x) = 2$ because $\lim_{x \to 0^+} f(x) = \lim_{x \to 0^-} f(x)$

-0.0001

17. $f(x) = x \sin \frac{1}{x}$

x	-0.1	-0.01	-0.001	-0.0001
$f(x)$	-0.054	-0.005	0	0

x	0.1	0.01	0.001	0.0001
$f(x)$	-0.054	-0.005	0	0

$\lim_{x \to 0} f(x) = 0$ because $\lim_{x \to 0^+} f(x) = \lim_{x \to 0^-} f(x)$

23. $\lim_{x \to 0} \dfrac{|x|}{x}$ ← problem here!

Expression not defined at $x = 0$. Use table or graph.

There is NO limit because the $\lim_{x \to 0^-} \neq \lim_{x \to 0^+}$

26. $\lim_{t \to 2} \dfrac{t^2 - 3t + 2}{t^2 - 4} = \dfrac{(t-2)(t-1)}{(t-2)(t+2)} = \dfrac{t-1}{t+2} = \dfrac{2-1}{2+2} = \dfrac{1}{4}$

43. A. True
B. True
C. False
D. True

C. False
D. True
E. True
F. True
G. False
H. False) $\lim_{x \to 1}$ does not exist
I. False
J. False $\lim_{x \to 2}$ does not exist because there is no $\lim_{x \to 2^+}$ to compare to $\lim_{x \to 2^-}$

46. A. $\lim_{t \to -4^-} g(t) = 5$

B. $\lim_{t \to -4^+} g(t) = 2$

C. $\lim_{t \to -4} g(t)$ does not exist because $\lim_{t \to -4^-} \neq \lim_{t \to -4^+}$

d. $g(-4) = 2$

48. A. $\lim_{s \to -2^-} p(s) = 3$

B. $\lim_{s \to -2^+} p(s) = 3$

C. $\lim_{s \to -2} p(s) = 3$

D. $p(-2) = 3$

50. A. $\lim_{x \to 2^-} G(x) = 1$

B. $\lim_{x \to 2^+} G(x) = 1$

C. $\lim_{x \to 2} G(x) = 1$

D. $G(2) = 3$