

# Review for Calculus chapter 3

Name Key

①  $\lim_{x \rightarrow 2} 2x = \underline{4}$

②  $\lim_{x \rightarrow \frac{1}{3}} (3x-1) = \underline{0}$

③  $\lim_{x \rightarrow -1} \frac{x+3}{x^2+3x+1} = \underline{-2}$

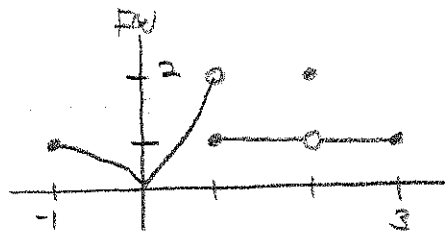
④  $\lim_{x \rightarrow 0} \frac{(4+x)^2 - 16}{x} = \underline{8}$

⑤  $\lim_{x \rightarrow 1} \frac{x-1}{x^2-1} = \underline{\frac{1}{2}}$

⑥  $\lim_{x \rightarrow -5} \frac{x^2+3x-10}{x+5} = \underline{-7}$

⑦  $\lim_{t \rightarrow 2} \frac{t^2-3t+2}{t^2-4} = \underline{\frac{1}{4}}$

⑧ True or False.



a)  $\lim_{x \rightarrow -1^+} f(x) = 1$  I

c)  $\lim_{x \rightarrow 2} f(x) = \text{DNE}$  F

b)  $\lim_{x \rightarrow 2} f(x) = 2$  F

d)  $\lim_{x \rightarrow 1^-} f(x) = 2$  I

⑨ Find the value(s) of  $x$  (if any) where the function is not continuous.

a)  $f(x) = \frac{x+1}{x^2-4x+3}$   
 $x=1$

b)  $f(x) = |2x+3|$   
 None

c)  $f(x) = \sqrt{2x+3}$   
 $x < -\frac{3}{2}$

⑩ a)  $\lim_{x \rightarrow \infty} \frac{2x+3}{5x+7} = \underline{\frac{2}{5}}$

b)  $\lim_{x \rightarrow -\infty} \frac{2x^3+7}{x^3-x^2+x+7} = \underline{2}$

c)  $\lim_{x \rightarrow \infty} \frac{3x^4+5x^3-7}{x^3-6x+8} = \underline{\infty, \text{DNE}}$

Find the derivative of  $f(x)$ .

⑪  $f(x) = 2x^2+6x-7$   
 $f'(x) = 4x+6$

⑫  $f(x) = \frac{2}{x-3}$   
 $\lim_{h \rightarrow 0} \frac{\frac{2}{x+h-3} - \frac{2}{x-3}}{h}$

$\frac{2x-6 - 2x-2h+6}{h(x+h-3)(x-3)}$

$\lim_{h \rightarrow 0} \frac{-2}{(x+h-3)(x-3)}$

$f'(x) = \frac{-2}{(x-3)^2}$

⑬  $f(x) = \sqrt{2x+1}$   
 $f'(x) = \lim_{h \rightarrow 0} \frac{\sqrt{2x+2h+1} - \sqrt{2x+1}}{h}$

$= \lim_{h \rightarrow 0} \frac{2x+2h+1 - 2x-1}{h(\sqrt{2x+2h+1} + \sqrt{2x+1})}$

$\lim_{h \rightarrow 0} \frac{2h}{h(\sqrt{2x+2h+1} + \sqrt{2x+1})}$

$f'(x) = \frac{2}{2\sqrt{2x+1}} = \frac{1}{\sqrt{2x+1}}$

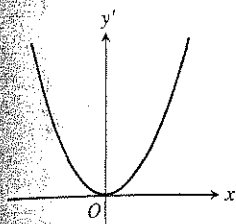
14) Find the slope of the line tangent to  $F(x) = \frac{x+4}{x-2}$  @  $x=3$

$$F'(3) = \lim_{h \rightarrow 0} \frac{\frac{3+h+4}{3+h-2} - \frac{3+4}{3-2}}{h} = \lim_{h \rightarrow 0} \frac{\frac{7+h}{1+h} - 7}{h}$$

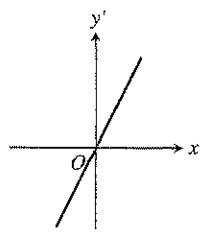
$$\lim_{h \rightarrow 0} \frac{7+h - 7(1+h)}{h(1+h)} = \frac{-6h}{h(1+h)} = \frac{-6}{1+h} = -6$$

15)

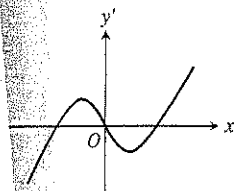
Match the graphs of the functions in Exercises 27-30 with the graphs of the derivatives shown here:



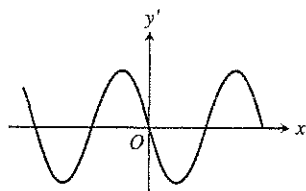
(a)



(b)

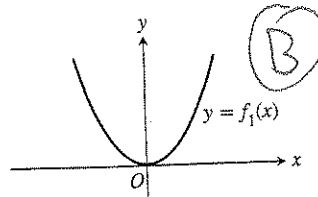


(c)

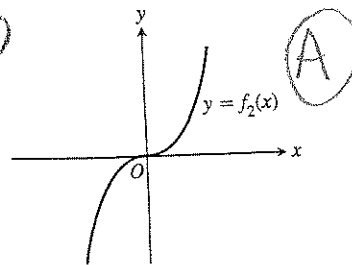


(d)

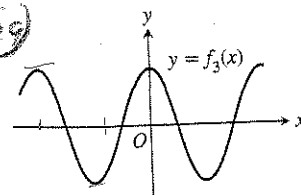
27)



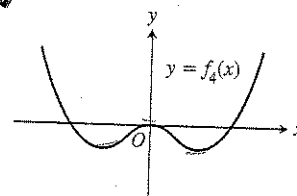
28)



29)



30



(B)

(A)

(D)

(C)