

## section 1

$$\lim_{x \rightarrow a} \frac{\sin(x) - \sin(a)}{x - a} \rightarrow \cos(a)$$

$$\lim_{x \rightarrow a} \frac{\cos(x) - \cos(a)}{x - a} \rightarrow -\sin(a)$$

$$\lim_{x \rightarrow 0} \frac{\cos(3x) - \cos(x)}{x^2} \rightarrow -4$$

$$\lim_{x \rightarrow 0} \frac{\sin(a+x) - 2 \cdot \sin(a) + \sin(a-x)}{x^2} \rightarrow -\sin(a)$$

$$\lim_{x \rightarrow 0} \frac{\cos(a+x) - 2 \cdot \cos(a) + \cos(a-x)}{x^2} \rightarrow -\cos(a)$$

$$\lim_{x \rightarrow 0} \frac{\sin(2x) - 2 \cdot \sin(x)}{x^3} \rightarrow -1$$

## section 2

$$\lim_{x \rightarrow 0} \frac{\sin(6x)}{3x} \rightarrow 2$$

$$\lim_{x \rightarrow 0} \frac{\tan(x)}{\sin(x)} \rightarrow 1$$

$$\lim_{x \rightarrow 0} \frac{\sin(2x)}{\tan(3x)} \rightarrow \frac{2}{3}$$

$$\lim_{x \rightarrow 0} \frac{\sin(2x) - \sin(x)}{x} \rightarrow 1$$

$$\lim_{x \rightarrow 0} \frac{\tan(2x) - \tan(x)}{x} \rightarrow 1$$

$$\lim_{x \rightarrow 0} \frac{\sin(3x) - 2 \sin(2 \cdot x) + \sin(x)}{x^3} \rightarrow -2$$

$$\lim_{x \rightarrow 0} \frac{\cos(3x) - 2 \cos(2 \cdot x) + \cos(x)}{x^2} \rightarrow -1$$

$$\lim_{x \rightarrow 0} \frac{\tan(x) - \sin(x)}{x^3} \rightarrow \frac{1}{2}$$

## section 3

$$\lim_{x \rightarrow 0} \frac{\sin(2x) - 2 \cdot \sin(x)}{x^3} \rightarrow -1$$

$$\lim_{x \rightarrow 0} \frac{\sin(3x) - 3 \cdot \sin(x)}{x^3} \rightarrow -4$$

$$\lim_{x \rightarrow 0} \frac{\sin(x) + \sin(3 \cdot x) - \sin(4x)}{x^3} \rightarrow 6$$

$$\lim_{x \rightarrow 0} \frac{\cos(2x) - \cos(3x)}{x^2} \rightarrow \frac{5}{2}$$

$$\lim_{x \rightarrow 0} \frac{\cos(x) + \cos(3x) - 2\cos(2x)}{x^2} \rightarrow -1$$

$$\lim_{x \rightarrow 0} \frac{\tan(2x) - 2 \cdot \tan(x)}{x^3} \rightarrow 2$$

$$\lim_{x \rightarrow 0} \frac{\tan(x) + \tan(3x) - \tan(4x)}{x^3} \rightarrow -12$$

$$\lim_{x \rightarrow 0} \frac{\tan(x) - \sin(x)}{x^3} \rightarrow \frac{1}{2}$$

### section 10

$$\sqrt{\cos(x)} \quad \text{converts to the series} \quad 1 - \frac{1}{4} \cdot x^2 - \frac{1}{96} \cdot x^4 + O(x^6)$$

$$\frac{1}{\cos(x)} \quad \text{converts to the series} \quad 1 + \frac{1}{2} \cdot x^2 + \frac{5}{24} \cdot x^4 + O(x^6)$$

$$\frac{1}{1 + \sin(x)} \quad \text{converts to the series} \quad 1 - 1 \cdot x + 1 \cdot x^2 - \frac{5}{6} \cdot x^3 + \frac{2}{3} \cdot x^4 - \frac{61}{120} \cdot x^5 + O(x^6)$$

$$\sin(\tan(2x)) \quad \text{converts to the series} \quad 2 \cdot x + \frac{4}{3} \cdot x^3 - \frac{4}{5} \cdot x^5 + O(x^6)$$

$$\tan(2 \sin(x)) \quad \text{converts to the series} \quad 2 \cdot x + \frac{7}{3} \cdot x^3 + \frac{59}{20} \cdot x^5 + O(x^6)$$