

# $\frac{d}{dx}$ Trigonometry

1. For each  $f$  defined below, find  $f'(x)$ .

$$f(x) = \sin(x) + 2e^x$$

$$f(\theta) = \frac{5}{\sin(\theta)}$$

2. Find the limits below (if they exist).

$$\lim_{\theta \rightarrow 0} \frac{\sin(\theta)}{\theta}$$

$$\lim_{\theta \rightarrow 0} \frac{\sin(7\theta)}{4\theta}$$

3. Find the following:

$$\frac{d}{dx}(4 \sin(x^3 - 5))$$

$$(\cos^2(x))'$$

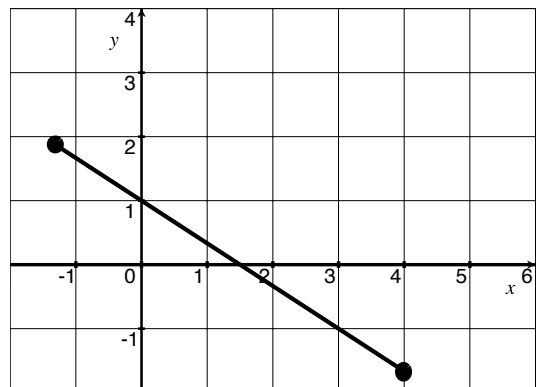
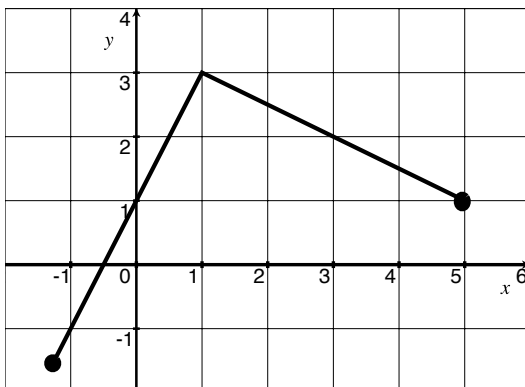
# Mixing Differentiation Rules

4. Find  $(7^{3x^2-x})'$

$$\frac{d}{dx}(\cos^2(x)7^{3x^2-x})$$

5. Find an equation of the line tangent to  $y = 3x + 6 \cos(x)$  when  $x = \frac{\pi}{3}$ .

6. Let  $f$  be the function graphed on the left and  $g$  be the function graphed on the right.



Let  $P(x) = f(x) \cos(x)$  and  $C(x) = g(\sin(x))$ . Find:

$$P'(0)$$

$$\left. \frac{d}{dx}(C(x)) \right|_{x=0}$$