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Exercise set 6

1 Compute the following limits.

a) $\lim_{x \rightarrow 0} \cos x$

b) $\lim_{x \rightarrow 0} (x \sin x)$

c) $\lim_{x \rightarrow \frac{\pi}{2}} \frac{\cos x}{\sin x}$

d) $\lim_{x \rightarrow \frac{\pi}{3}} \frac{2x + \cos(x)}{x \sin(x)}$

2 Differentiate the following functions.

a) $f(x) = x^{100} + x^{50} + \cos x$

b) $f(x) = \sin(2x) \cos(3x)$

c) $f(x) = \cos(e^x)$

d) $f(x) = \sin(\ln x)$

e) $f(x) = (x - 1)^3 \cos(x^4)$

3 Find the equation for the tangent line to the function $f(x) = \cos x$ at the point $(\pi/3, 1/2)$.