CALCULUS
Problem Bank
Trigonometric limits
\[ \sin x \quad \sim \quad ?? \]

\[ x \to 0 \]

(a) \( x \)

(b) \( \cos x \)

(c) \( -\cos x \)

(d) none of the above
\[ [\sin x] - x \sim x \to 0 \]

(a) \(-x^3/6\)

(b) 1

(c) \(x\)

(d) \textit{none of the above}
\[
\cos x \quad \sim \\
x \to 0
\]

(a) \(-x^3/6\)

(b) 1

(c) \(x\)

(d) none of the above
\[ \cos x - 1 \sim x \to 0 \]

(a) \(-x^2/2\)

(b) 1

(c) \(x\)

(d) none of the above
$$\sin x \sim ??$$

$$x \to \frac{\pi}{2}$$

(a) $-\frac{x^3}{6}$

(b) $-1$

(c) $x$

(d) *none* of the above

Correct answer: 1
\[ 3x^3 + 2x \quad \sim \quad x \to 0 \]

(a) \(3x^3\)

(b) 0

(c) \(2x\)

(d) none of the above
\[
\lim_{x \to 0} \frac{3x^3 + 2x}{\sin x} = ??
\]

(a) 0

(b) 2

(c) 3

(d) none of the above
\[ \lim_{{x \to 0}} \left[ \frac{4x^6 - 7x^4 + 4x}{-2x^3 + 7x^2 - 4x} \right] = ??? \]

(a) \(-2\)

(b) \(1\)

(c) \(-1\)

(d) \textit{none of the above}
\[
\lim_{x \to 0} \left[ \frac{4x^6 - 7x^4 + 4x}{-2x^3 + 7x^2 - 4\sin x} \right] = ??
\]

(a) $-2$

(b) $1$

(c) $-1$

(d) none of the above
\[
\lim_{t \to 0} \frac{2t^5 + 8t^4}{t^2(\sin^2 t)}
\]

(a) 0

(b) \(\infty\)

(c) \(-\infty\)

(d) none of the above

Correct answer: 8
\[ \lim_{{t \to 0^+}} \left[ \frac{\sqrt{4t^6 + 9t^4}}{t(\sin t)} \right] = ?? \]

(a) DNE

(b) \( \infty \)

(c) 3

(d) none of the above
\[ x - \sin x \sim x^3/6 \quad x \to 0 \]

\[
\lim_{x \to 0} \left[ \frac{x^3 + x^4}{x - \sin x} \right] = ??
\]

(a) DNE
(b) 6
(c) 1/6
(d) none of the above
\[ x - \sin x \quad x \to 0 \quad x^3/6 \]

\[ \lim_{x \to 0} \left[ \frac{x^3 + x^4}{x - \sin x} \right] = ?? \]

(a) DNE

(b) \(-1/6\)

(c) \(1/6\)

(d) none of the above

Correct answer: 6