

D 40. $\lim_{x \rightarrow -1} \frac{x+x^2}{x^2-1} = \lim_{x \rightarrow -1} \frac{x(1+x)}{(x+1)(x-1)} = \frac{(-1)}{(-1)-1} = \frac{1}{2}$

(A) $-\frac{1}{2}$ (B) 1 (C) -1 (D) $\frac{1}{2}$ (E) DNE

A 42. $\lim_{x \rightarrow \infty} \left(\frac{1}{x} - \frac{x}{x-1} \right) = \lim_{x \rightarrow \infty} \frac{1}{x} - \lim_{x \rightarrow \infty} \frac{x}{x-1} = 0 - 1 = -1$

(A) -1 (B) 0 (C) 1 (D) 2 (E) None of these

C 43. $\lim_{x \rightarrow 0} \frac{\frac{3}{x^2}}{\frac{2}{x^2} + \frac{105}{x}} = \lim_{x \rightarrow 0} \frac{3}{2+105x} = \frac{3}{2}$

(A) 0 (B) 1 (C) $\frac{3}{2}$ (D) $\frac{3}{107}$ (E) None of these

D 46. $\lim_{x \rightarrow \infty} \sqrt[3]{\frac{8+x^2}{x(x+1)}} = \left(\lim_{x \rightarrow \infty} \frac{8+x^2}{x^2+x} \right)^{1/3} = (1)^{1/3} = 1$

(A) 0 (B) 2 (C) $\sqrt[3]{9}$ (D) 1 (E) DNE

C 47. $\lim_{x \rightarrow -1} \frac{\sqrt{x^2+3}-2}{x+1} = \lim_{x \rightarrow -1} \frac{\sqrt{x^2+3}-2}{\sqrt{x^2+3}+2} = \lim_{x \rightarrow -1} \frac{x^2+3-4}{(x+1)(\sqrt{x^2+3}+2)} = \lim_{x \rightarrow -1} \frac{(x+1)(x-1)}{(x+1)(\sqrt{x^2+3}+2)} = \frac{(-1)-1}{\sqrt{(-1)^2+3}+2} = \frac{-2}{4} = -\frac{1}{2}$

(A) 0 (B) -2 (C) $-\frac{1}{2}$ (D) 2 (E) DNE

1. Using the memorized trig limits, evaluate the following limits. Show all steps.

$$(a) \lim_{x \rightarrow 0} \frac{\sin 2x}{x} =$$

$$(b) \lim_{x \rightarrow 0} \frac{\sin x}{2x^2 - x} =$$

$$(c) \lim_{x \rightarrow 0} \frac{x + \sin x}{x} =$$

$$(d) \lim_{x \rightarrow 0} \frac{\sin^2 x}{x} =$$

$$(e) \lim_{x \rightarrow 0} \frac{3 \sin 4x}{\sin 3x} =$$

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

$$\text{_____ } 8. \lim_{x \rightarrow 0} \frac{\cos^2 x - 1}{2x \sin x} =$$

(A) -1

(B) $-\frac{1}{2}$

(C) 1

(D) $\frac{1}{2}$

(E) 0

$$\text{_____ } 9. \lim_{x \rightarrow 0} \frac{\sin 2x}{x \cos x} =$$

(A) 0

(B) 1

(C) $\frac{1}{2}$

(D) 2

(E) DNE

$$\text{_____ } 10. \lim_{x \rightarrow 0} \frac{\cot 6x}{\csc 3x} =$$

(A) 2

(B) 0

(C) $\frac{1}{2}$

(D) -2

(E) DNE

For problems 7 – 12, evaluate the given limits.

$$7. \lim_{x \rightarrow 3} \frac{|x-3|}{x-3} =$$

$$8. \lim_{x \rightarrow 2} |x+1| =$$

$$9. \lim_{x \rightarrow 2^+} \frac{6-3x}{|2x-4|} =$$

$$10. \lim_{x \rightarrow -2^+} \frac{x^3|x+2|}{x+2} =$$

$$11. \lim_{x \rightarrow 4^-} \frac{x^3|x-4|}{x-4} =$$

$$12. \lim_{x \rightarrow 1^-} \frac{2x+10}{x^2|x+5|} =$$

$$\text{_____ } 17. \lim_{x \rightarrow -3^+} \frac{x^2|x+3|}{x^2-9} =$$

(A) DNE

(B) 0

(C) 1

(D) -1.5

(E) 1.5