

Due by 9am on September 29. Please upload your solutions to Canvas as one PDF file. Do not forget to attach the honor code. Each problem is worth 10 points. You must show all your work for full credit.

(1) Evaluate the limits.

$$(a) \lim_{x \rightarrow -1} (3x^4 - 2x^3 + 4x)$$

$$(b) \lim_{x \rightarrow 2} (x+1)(3x^2 - 9)$$

$$(c) \lim_{t \rightarrow 4} \frac{3t - 14}{t + 1}$$

$$(d) \lim_{t \rightarrow 25} \frac{3\sqrt{t} - \frac{1}{5}t}{(t - 20)^2}$$

$$(e) \lim_{t \rightarrow -1} \frac{t^2 + 1}{(t^3 + 2)(t^4 + 1)}$$

(2) Evaluate the limit $\lim_{x \rightarrow 4} \frac{\sqrt{5-x} - 1}{2 - \sqrt{x}}$

(3) Calculate $\lim_{x \rightarrow \frac{\pi}{2}} \frac{\tan x}{\sec x}$

(4) Evaluate the limits.

$$(a) \lim_{x \rightarrow 1} \left(\frac{1}{x-1} - \frac{2}{x^2-1} \right)$$

$$(b) \lim_{\theta \rightarrow \frac{\pi}{4}} \left(\frac{1}{\tan \theta - 1} - \frac{2}{\tan^2 \theta - 1} \right)$$

(5) Calculate $\lim_{x \rightarrow \frac{\pi}{4}} \frac{\sin x - \cos x}{\tan x - 1}$

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

(7) Calculate $\lim_{\theta \rightarrow \frac{\pi}{4}} \left(\frac{1}{\tan \theta - 1} - \frac{2}{\tan^2 \theta - 1} \right)$

(8) Calculate $\lim_{x \rightarrow \frac{\pi}{2}} (\sec \theta - \tan \theta)$

(9) Evaluate the limits.

$$(a) \lim_{x \rightarrow 0} \frac{\sin 5x \sin 2x}{\sin 3x \sin 5x}$$

$$(b) \lim_{x \rightarrow 0} \frac{\sin 3x \sin 2x}{x \sin 5x}$$

$$(c) \lim_{h \rightarrow 0} \frac{\sin(2h)(1 - \cos h)}{h^2}$$

$$(d) \lim_{t \rightarrow 0} \frac{1 - \cos 2t}{\sin^2 3t}$$

$$(e) \lim_{h \rightarrow \frac{\pi}{2}} \frac{1 - \cos 3h}{h}$$

(10) Evaluate the limits using the Squeeze Theorem.

$$(a) \lim_{x \rightarrow 0} x^2 \cos \left(\frac{1}{x} \right)$$

$$(b) \lim_{x \rightarrow 1} (x-1) \sin \frac{\pi}{x-1}$$

$$(c) \lim_{t \rightarrow 0} (2^t - 1) \cos \frac{1}{t}$$

$$(d) \lim_{x \rightarrow 0^+} \sqrt{x} 4^{\cos(\pi/x)}$$

$$(e) \lim_{x \rightarrow 0} \tan x \cos \left(\sin \frac{1}{x} \right)$$