



(4) Find the angle $\angle ACB$ of the triangle with the vertices, $A(3, 0)$, $B(0, 3)$, $C(5, 4)$.

(5) Find the distance from the point $(1, 2)$ to the line $y = 3x - 4$.



- (6) Two forces \mathbf{F}_1 and \mathbf{F}_2 act on an object. The magnitude of \mathbf{F}_1 is 10 lb and it makes a 120° angle with the positive x -axis. The magnitude of \mathbf{F}_2 is 8 lb and it makes a 45° angle with the positive x -axis. Find the magnitude of the resultant force \mathbf{F} .



- (7) A constant force with the vector representation $\mathbf{F} = \langle 10, 18 \rangle$ moves an object along a straight line from the point $(2, 3)$ to the point $(4, 9)$. Find the work done, if the distance is measured in meters and the magnitude of the force is measured in newtons.

- (8) A woman exerts a horizontal force of 65 lb on a crate as she pushes it up a ramp that is 20 ft long and inclined at an angle of 30° above the horizontal. Find the work done on the box.



(9) Find the equation of the line perpendicular to the vector $\langle 3, 5 \rangle$ and passing through the point $(5, 1)$.

(10) Consider the line $x = 8 - 2t$, $y = 14 + 7t$. (a) Find a vector perpendicular to the line, (b) Find the Cartesian form and (c) sketch the graph.



(11) Simplify.

(a) $\tan(\arccos(\frac{1}{4}))$

(b) $\sin(\arctan(2))$

(c) $\tan(\arcsin(3x))$



(12) Let $f(x) = \begin{cases} x & \text{if } x < 0 \\ x^2 & \text{if } 0 < x \leq 2 \\ 8 - x & \text{if } x > 2 \end{cases}$

evaluate each of the following limits if it exists.

(a) $\lim_{x \rightarrow 0^+} f(x)$

(b) $\lim_{x \rightarrow 0^-} f(x)$

(c) $\lim_{x \rightarrow 0} f(x)$

(d) $\lim_{x \rightarrow 2^-} f(x)$

(e) $\lim_{x \rightarrow 2^+} f(x)$

(f) $\lim_{x \rightarrow 2} f(x)$



(13) Evaluate the limit.

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

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

(c) $\lim_{t \rightarrow 0} \frac{\sqrt{2-t} - \sqrt{2}}{t}$



$$(d) \lim_{h \rightarrow 0} \frac{(3+h)^{-1} - 3^{-1}}{h}$$

$$(e) \lim_{x \rightarrow -4^-} \frac{|x+4|}{x+4}$$

$$(f) \lim_{x \rightarrow 4^-} \frac{|x-4|}{x^2 - 2x - 8}$$



$$(g) \lim_{x \rightarrow -1^-} \frac{x - 2}{x + 1}$$

$$(h) \lim_{x \rightarrow -\infty} \frac{-x^3 + 2x^2 - 4x}{8 + 4x^2 - 5x^3}$$

$$(i) \lim_{x \rightarrow \infty} \frac{e^x + 2e^{-x}}{2e^x - e^{-x}}$$



$$(j) \lim_{x \rightarrow -\infty} \frac{\sqrt{1 + 4x^6}}{5 - 2x^3}$$

$$(k) \lim_{x \rightarrow \infty} \ln \left(\frac{x}{x^2 - 3x} \right)$$



(l) $\lim_{x \rightarrow \infty} \arctan(e^x)$

(m) $\lim_{x \rightarrow \infty} \arctan(\ln x)$

(n) $\lim_{x \rightarrow 0^+} \arctan(\ln x)$

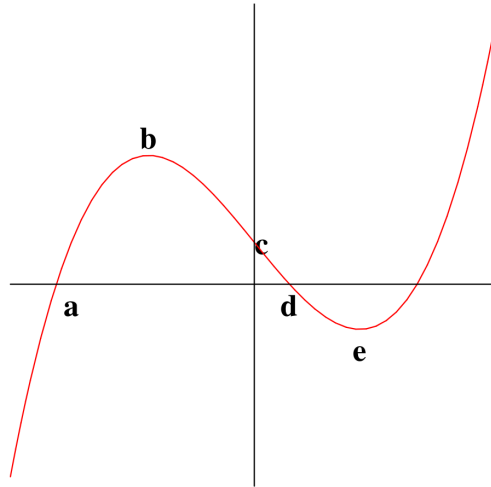


(14) Given $-2x - 2 \leq f(x) \leq \frac{1}{2}x^2$, compute $\lim_{x \rightarrow -2} f(x)$.

(15) Find the vertical and horizontal asymptotes of $f(x) = \frac{(x-1)(x+3)}{x^2-1}$.



(16) Given the graph of $f(x)$ below, sketch the graph of the derivative.



(17) Given $f(x) = \begin{cases} x - 4a & \text{if } x < -2 \\ ax^2 & \text{if } x \geq -2 \end{cases}$. Find the value of a which makes the function continuous everywhere.



- (18) Which of following intervals must contain a solution to the equation $2x^3 + 16x + 3 = 22$?
- (a) $[-2, -1]$
 - (b) $[-1, 0]$
 - (c) $[0, 1]$
 - (d) $[1, 2]$
 - (e) $[2, 3]$

- (19) Find the average rate of change of $f(x) = x^2 + 6$ from $x = -3$ to $x = 1$.



(20) Find $f'(x)$ using the limit definition of the derivative for $f(x) = 3x^2 - 4$.

(21) Using the result above, find the equation of the tangent line to the graph of $f(x) = 3x^2 - 4$ at $x = 2$.



(22) Find $f'(x)$ using the limit definition of the derivative for $f(x) = \sqrt{3x + 1}$.

(23) Using the result above, find the equation of the tangent line to the graph of $f(x) = \sqrt{3x + 1}$ at $x = 1$.



(24) Find $f'(x)$ using the limit definition of the derivative for $f(x) = \frac{-2}{x+2}$.

(25) Using the result above, find the equation of the tangent line to the graph of $f(x) = \frac{-2}{x+2}$ at $x = 0$.