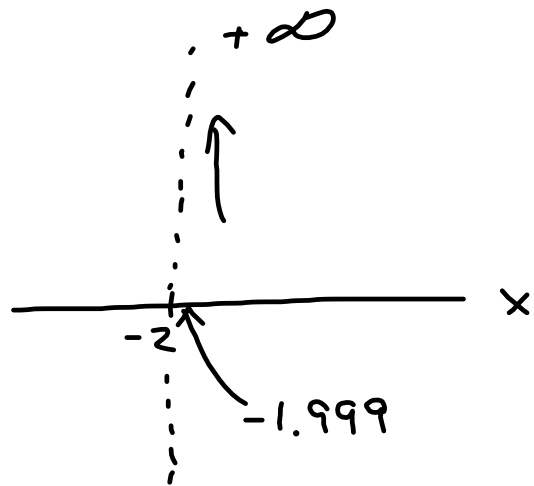


Find the limit.

$$10) \quad \lim_{x \rightarrow (-2)^+} \frac{1}{x+2}$$



$$\frac{1}{x+2} = \frac{1}{-1.999+2} = \frac{1}{.001} = +1000$$

Find the vertical asymptotes of the graph of $f(x)$.

$$11) f(x) = \frac{1}{(x-9)^2}$$

where
denominator = 0

$$x - 9 = 0$$

$$x = 9$$

Find all points where the function is discontinuous.

$$12) f(x) = \begin{cases} 0, & x < 0 \\ x^2 - 3x, & 0 \leq x \leq 3 \\ 3, & x > 3 \end{cases}$$

$$\underline{x = 0}$$

$$f(0) = 0$$

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

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

all 3 same
 \rightarrow continuity

$$\underline{x = 3}$$

$$f(3) = 0$$

$$\lim_{x \rightarrow 3^-} f(x) = 0$$

$$\lim_{x \rightarrow 3^+} f(x) = 3$$

all 3 not
 same \rightarrow
 discontinuous
 @ $x = 3$

#2 p. 146 find $\frac{dy}{dx}$

$$y = 2 \sin x - \tan x$$

$$\frac{dy}{dx} = 2 \cos x - \sec^2 x$$

$$\#3 \quad y = \frac{1}{x} + 5\sin x$$

$$y = x^{-1} + 5\sin x$$

$$\frac{dy}{dx} = -1x^{-2} + 5\cos x$$

or

$$\frac{dy}{dx} = -\frac{1}{x^2} + 5\cos x$$

$$\#6 \quad y = 3x + x \cdot \tan x$$

$$u = x \quad v = \tan x$$

$$u' = 1 \quad v' = \sec^2 x$$

$$u'v + uv'$$

$$\frac{dy}{dx} = 3 \cdot 1 + 1 \cdot \tan x + x \cdot \sec^2 x$$

$$= 3 + \tan x + x \sec^2 x$$

Topic: power notation for named functions.

<u>Named fcn $f(x)$</u>	<u>Square of $f(x)$</u>	<u>We write</u>
$\sin x$	$(\sin(x))^2$	$\sin^2 x$
$\ln x$	$(\ln(x))^2$	$\ln^2 x$
$\tan x$	$(\tan(x))^2$	$\tan^2 x$
$\cos x$	$(\cos(x))^2$	$\cos^2 x$

↑
on calculator

#5 $y = 4 - x^2 \sin x$

$$u = x^2 \quad v = \sin x$$

$$u' = 2x \quad v' = \cos x$$

$$\frac{dy}{dx} = - (u'v + uv')$$

$$= -2x \sin x - x^2 \cos x$$

$$= -x(2 \sin x + x \cos x)$$

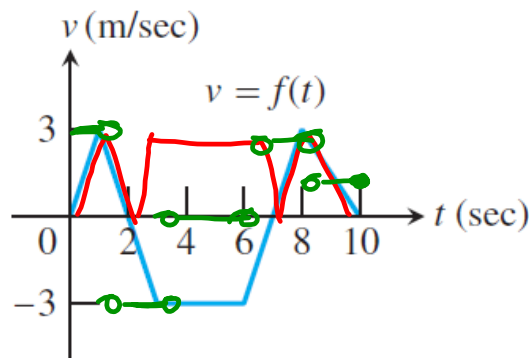
$$\#7 \quad y = \frac{4}{\cos x} \quad u = 4 \quad v = \cos x$$

$$u' = 0 \quad v' = -\sin x$$

$$\frac{dy}{dx} = \frac{u'v - uv'}{v^2} = \frac{4 \sin x}{\cos^2 x} = \frac{4}{1} \cdot \frac{1}{\cos x} \cdot \frac{\sin x}{\cos x}$$

$$= 4 \sec x \tan x$$

11. **Particle Motion** The accompanying figure shows the velocity $v = ds/dt = f(t)$ (m/sec) of a body moving along a coordinate line.



- (b) constant speed $t=3$ to $t=6$
- (c) see graph. speed = $|v|$
- (d) see graph
- (a) reverse direction v from $+$ to $-$ or from $-$ to $+$
 $t=2$ $t=7$