

PRACTICE EXERCISE

1. Which of the following functions will have an oblique asymptote?

a) $f(x) = \frac{3x^2 - x}{x + 7}$

b) $f(x) = \frac{-5x + 2}{x - 3}$

c) $f(x) = \frac{3x^2 + 4}{x}$

d) $f(x) = \frac{3x^3 - x^2}{x^2 + 5}$

e) $f(x) = \frac{6x^4 + 2x^2 + 3x + 1}{-7x^3 + x}$

f) $f(x) = \frac{4x^4 + 6}{2x^2 - 1}$

2. Find the equation of the oblique asymptotes for each of the following functions.

a) $f(x) = \frac{2x^2 + 3}{x}$

b) $f(x) = \frac{3x^2 - 7x}{x - 2}$

c) $f(x) = \frac{6x^3 - 5x}{x^2 + 1}$

d) $f(x) = \frac{-4x^3 + 2x^2 + x - 4}{x^2 - 2x}$

PRACTICE EXERCISE

1. Determine the equations of the horizontal asymptotes for each of the following functions, if they exist, by evaluating the $\lim_{x \rightarrow \pm\infty} f(x)$.

a) $f(x) = \frac{x^2}{x^3 - 4}$

b) $f(x) = \frac{2x^2 - x}{4x^2 - 3}$

c) $f(x) = \frac{-5x^3 - 4x^2}{3x^2 + x}$

d) $f(x) = \frac{-4x^3 + 2x^2 - 1}{6x^3 - x + 5}$

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1. Which of the following functions will have an oblique asymptote?

a) $f(x) = \frac{3x^2 - x}{x+7}$

b) $f(x) = \frac{-5x+2}{x-3}$

c) $f(x) = \frac{3x^2+4}{x}$

d) $f(x) = \frac{3x^3-x^2}{x^2+5}$

e) $f(x) = \frac{6x^3+2x^2+3x+1}{-7x^3+x}$

f) $f(x) = \frac{4x^3+6}{2x^2-1}$ *↪ equal power*

2. Find the equation of the oblique asymptotes for each of the following functions.

a) $f(x) = \frac{2x^2+3}{x}$

$= 2x + \frac{3}{x}$

$y = 2x$

b) $f(x) = \frac{3x^2-7x+2}{x-2}$

$$\begin{array}{r} 3x - 7 \\ 3x - 6 \\ \hline -1 - 2 \end{array}$$

$3x - 1 = \frac{2}{x-2}$

$y = 3x - 1$

c) $f(x) = \frac{6x^3-5x}{x^2+1}$

$$\begin{array}{r} 6x \\ 6x^3 + 0x^2 - 5x \\ \hline -6x^3 + 6x^2 - 5x \\ \hline 6x^2 - 5x \end{array}$$

$y = 6x - \frac{11x}{x^2+1}$

$y = 6x$

d) $f(x) = \frac{-4x^2+2x^2+x-4}{x^2-2x}$

$$\begin{array}{r} -4x - 6 \\ x^2 - 2x \overline{) -4x^3 + 8x^2 + x - 4} \\ \underline{-4x^3 + 8x^2} \\ 8x^2 + x - 4 \\ \underline{-6x^2 + 12x} \\ 12x - 4 \end{array}$$

$y = -4x - 6$

PRACTICE EXERCISE

1. Determine the equations of the horizontal asymptotes for each of the following functions, if they exist, by evaluating the $\lim_{x \rightarrow \pm\infty} f(x)$.

a) $f(x) = \frac{x^2}{x^2-4}$

$= 0$

b) $f(x) = \frac{2x^2-x}{4x^2-3}$

$\frac{1}{2}$

c) $f(x) = \frac{-5x^3-4x^2}{3x^2+x}$

NO HORIZONTAL

d) $f(x) = \frac{-4x^3+2x^2-1}{6x^3-x+5}$

$-\frac{2}{3}$