Answer on Question #56643 – Math – Algebra

1 What is the equation for the vertical asymptote of the function shown below?

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

A: y = x^3 – 2
B: x = 3/2
C: x = 3/5
D: x = 5/2

Solution

We can find the equation for the vertical asymptote from equation:

$$2x - 5 = 0$$

$$x = \frac{5}{2}$$

Answer: D $x = \frac{5}{2}$.

2 The number 4 is an upper bound for the set of roots of this polynomial function

$$f(x) = 3x^4 - 5x^3 - 5x^2 + 5x + 2$$

A: True
B: False

Solution

$$\begin{aligned} 3x^4 - 5x^3 - 5x^2 + 5x + 2 &= 3x^4 - 2x^3 - 7x^2 - 2x - 3x^3 + 2x^2 + 7x + 2 \\ &= x(3x^3 - 2x^2 - 7x - 2) - (3x^3 - 2x^2 - 7x - 2) = \\ &= (x-1)(3x^3 - 2x^2 - 7x - 2) = \\ &= (x-1)(3x^3 - 5x^2 - 2x + 3x^2 - 5x - 2) = \\ &= (x-1)(x(3x^2 - 5x - 2) + 3x^2 - 5x - 2) = \\ &= (x-1)(x+1)(3x^2 - 5x - 2) = \\ &= (x-1)(x+1)(x-2)\left(x + \frac{1}{3}\right) \end{aligned}$$

So roots are: $-1, -\frac{1}{3}, 1, 2$. That`s why 4 is an upper bound for the set of roots.

Answer: A true.

3 Which of the following correctly describes the domain of the function shown below?

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

A: {x:x = ± 1}
B: {x:x + 1}
C: All real numbers
D: {x:x=0}

Solution

The domain of the function is:

$D(y) = R\backslash\{x: x = \pm 1\}$, because $x^2 - 1 \neq 0$.

Answer: $D(y) = R\backslash\{x: x = \pm 1\}$.