

$$22. y = \left(\frac{2}{x} + 1\right) \left(\frac{5x^2 - 1}{x^2}\right)$$

$$\lim_{x \rightarrow \infty} \left(\frac{2}{x} + 1\right) \left(\frac{5x^2 - 1}{x^2}\right) =$$

$$= (0 + 1)(5)$$

$$= \boxed{5}$$

$$\lim_{x \rightarrow \infty} y = \boxed{5}$$

$$28. f(x) = \frac{x^2 - 1}{2x + 4}$$

a) VA $x = -2$

b) $\lim_{x \rightarrow -2^-} f(x) = -\infty$

$\lim_{x \rightarrow -2^+} f(x) = \infty$

$$42. f(x) = \frac{3x^2 - x + 5}{x^2 - 4}$$

EBM $y = 3$

HA $y = 3$

$$55. \lim_{x \rightarrow 1} f(x) = 2$$

$$\lim_{x \rightarrow 5^-} f(x) = \infty$$

$$\lim_{x \rightarrow 5^+} f(x) = \infty$$

$$\lim_{x \rightarrow \infty} f(x) = -1$$

$$\lim_{x \rightarrow -2^+} f(x) = -\infty$$

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

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

$$25. y = \frac{\cos x - 2x^3}{x^3} = \frac{\cos x}{x^3} - \frac{2x^3}{x^3}$$

$$\lim_{x \rightarrow \infty} \left(\frac{\cos x}{x^3} - \frac{2x^3}{x^3}\right) = 0 - 2 = \boxed{-2}$$

$$\lim_{x \rightarrow -\infty} y = \boxed{-2}$$

$$35. y = \frac{2x^3 - 3x^2 + 1}{x + 3}$$

EBM $y = 2x^2$ (a)

$$36. y = \frac{x^5 - x^4 + x + 1}{2x^2 + x - 3}$$

EBM $y = \frac{x^5}{2x^2} = \frac{x^3}{2}$ (c)

$$37. \text{EBM } y = \frac{2x^4}{-x} = -2x^3$$
 (d)

$$38. \text{EBM } y = \frac{x^4}{-x^2} = -x^2$$
 (b)

$$46. y = x^2 + e^{-x}$$

Right EBM $y = x^2$ because

as $x \rightarrow \infty$, $x^2 \rightarrow \infty$ but $e^{-x} \rightarrow 0$

Left EBM $y = e^{-x}$ because

as $x \rightarrow -\infty$, $x^2 \rightarrow \infty$, but $e^{-x} \rightarrow \infty$ much faster (exponentially)

