

Find all values of x for:

$$\frac{x^8 - x^2}{x^4 - x^2} = 7, \text{ where } x \neq 0, 1, -1$$

Reduce out $\cancel{x^2} (x^6 - 1)$ then Factor by $a^3 - b^3 = (a - b)(a^2 + ab + b^2)$
 $\frac{\cancel{x^2} (x^6 - 1)}{\cancel{x^2} (x^2 - 1)} = 7$

Reduce out $\frac{(x^2 - 1)(x^4 + x^2 + 1)}{(x^2 - 1)} = 7$

$$\begin{array}{r} x^4 + x^2 + 1 = 7 \\ \hline x^4 + x^2 - 6 = 0 \end{array}$$

$$(x^2 - 2)(x^2 + 3) = 0$$

$$x^2 = 2$$

$$x = \pm\sqrt{2}$$

$$x^2 = -3$$

imaginary answers

$$x = \pm\sqrt{3}i$$