

3.6: Rational Fcts

3.6
1/2

Defn: Rational fcts

$$r(x) = \frac{P(x)}{Q(x)} \quad \text{where } P \text{ \& } Q \text{ are polys.}$$

(1) vertical asymptotes

ex1: $f(x) = \frac{1}{x+2}$ (use GT mode)

ex2: $g(x) = \frac{-30}{(x+2)(x-3)}$

(2) zeros (x-intercepts)

ex3: $h(x) = \frac{5(x+1)}{(x+3)(x-2)}$ (dot mode?)

ex4: $i(x) = \frac{-2(x-5)(x+1)}{(x+2)(x-3)}$

(3) holes (common factors)

ex5: $j(x) = \frac{x^2 - x - 6}{x^2 - 2x - 3}$ $-9.4 \leq x \leq 9.4$

ex6: $k(x) = \frac{x-5}{x-5}$ $\therefore l(x) = 1$

3.6
2/2

(4) Now, vertical asymptotes.

ex 7: $m(x) = \frac{x-5}{x^2+1}$

ex 8: $n(x) = \frac{-3(x-3)^2}{(x+4)(x-1)}$

ex 9: $o(x) = \frac{10 \sin(x)}{x^2+1} + 2$ (must be in rad mode)

ex 10: $p(x) = \frac{x^2+4}{x-1}$

ex 11: $q(x) = \frac{x^2+5x+4}{x-3}$

(5) Putting it all together

ex 12: $r(x) = \frac{2x+6}{-6x+3}$

ex 13: $s(x) = \frac{x^2-x-2}{x^2+2x+1}$

ex 14: $t(x) = \frac{x^2-6x+9}{x^2+6x+9}$