**Harold’s Graphing Rationals**

**Cheat Sheet**

31 March 2025

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| **Graphing Rational Functions** | **How to Obtain** | |
|  | Reorder from highest to lowest degree/power. | |
| Horizontal Asymptote (HA)  EBA = Endpoint Behavior Analysis  BOTNO = **B**igger **O**n **T**op, **NO** HA  BOSCO = **BO**th are **S**ame, take **CO**efficients  BOBO = **B**igger **O**n **B**ottom, HA is | **Left:** | |
| Case 1:  (BOTNO) |  |
| Case 2:  (BOSCO) | (line) |
| Case 3:  (BOBO) |  |
| Slant Asymptote (SA) | Case 4:  (Special case of BOTNO) |  |
| Use synthetic or long division to determine . | |
| Holes | Cancel identical factors in numerator and denominator. | |
| -Intercept | **Right:** Plug in to get . | |
| -Intercepts (roots or zeros) | **Top:** Factor to find roots of , check for holes. | |
| Vertical Asymptotes (VA) | **Bottom:** Factor to find roots of , check for holes. | |
| Domain (valid values) | All except for VAs and holes. | |
| Range (valid values) | Depends upon Domain. | |
| Examples | | |
| Left Case 2: | Left Case 4:  Graph of f(x) | |