**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 AnalysisBOTNO = **B**igger **O**n **T**op, **NO** HABOSCO = **BO**th are **S**ame, take **CO**efficientsBOBO = **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) |