Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Guided Practice Rational Function Parts 1 Period\_\_\_\_\_\_\_\_\_

To assist in the comprehension of a common error area, I will employ some INFORMAL vocabulary.

EQUAL Degree = the highest exponent is the SAME in both the numerator (TOP of fraction) and the denominator (BOTTOM of fraction)

BOTTOM HEAVY = when a rational function has an exponent that is LARGER than all of the exponents in the DENOMINATOR

TOP HEAVY = when a rational function has an exponent that is LARGER than all of the exponents in the NUMERATOR

* When a rational function has EQUAL degree, then a horizontal asymptote exists and must be determined by the fraction created by the lead coefficients of the numerator and denominator
* When a rational function is BOTTOM HEAVY, then a horizontal asymptote exists and is y = 0 (the x axis)
  + y = 0
* When a rational function is TOP HEAVY, then a horizontal asymptote does NOT exist.
  + A slant asymptote exists when the difference in degree of the numerator and denominator is exactly 1
  + An oblique asymptote exists when the difference in degree of the numerator and denominator exceeds 1

ALL ANSWERS ON FUTURE ASSIGNMENTS AND ASSESSMENTS MUST BE IN PROPER FORMAT

Lines are stated as lines and points are stated as points

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| BAD example  X intercept(s) 2 or -2  Y intercept  Horizontal asymptote ???? or blank  Vertical asymptote 3 | GOOD example   1. =   X intercept(s) (-2,0) or (2,0)  Y intercept (0,)  Horizontal asymptote  NONE or this has a slant asymptote  Vertical asymptote x = 3 |

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| To find the y intercept of any function   1. Evaluate the function at x = 0   To find the x intercepts of a rational function   1. Factor the numerator 2. Factor the denominator 3. Check to see if a hole is present FIRST 4. Cancel off any common terms 5. Set remaining factors from NUMERATOR equal to 0 and solve for x (these numbers are the x intercepts) 6. STATE as a POINT (x, 0) | To determine if a rational function has a hole   1. Factor both the numerator and denominator 2. Does the numerator and denominator have a factor that has a variable in common? 3. If YES on 2) then a hole is present on the graph of the rational function 4. If YES on 2) set canceled factor equal to zero and solve for x (this is the x of your hole and a domain restriction) 5. If YES on 2) replace x in NEW version of rational function with the solution you just found in 4) | To find vertical asymptotes of a rational function   1. Factor the numerator 2. Factor the denominator 3. Check to see if a hole is present FIRST 4. Cancel off any common terms 5. Set remaining factors from DENMINATOR equal to 0 and solve for x (these numbers are the x values of the vertical asymptotes & domain restrictions) 6. STATE as an EQUATION x = \_\_\_\_ |

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| Intercepts & Asymptotes  Determine the intercepts and asymptotes of each of the rational functions (if NONE, then state so)  X intercept(s) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Y intercept \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Horizontal asymptote \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Vertical asymptote \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Does this rational function have a hole? \_\_\_\_\_\_\_  If this rational function has a hole, then state it \_\_\_\_\_\_\_\_\_  X intercept(s) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Y intercept \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Horizontal asymptote \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Vertical asymptote \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Does this rational function have a hole? \_\_\_\_\_\_\_  If this rational function has a hole, then state it \_\_\_\_\_\_\_\_\_  X intercept(s) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Y intercept \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Horizontal asymptote \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Vertical asymptote \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Does this rational function have a hole? \_\_\_\_\_\_\_  If this rational function has a hole, then state it \_\_\_\_\_\_\_\_\_ | X intercept(s) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Y intercept \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Horizontal asymptote \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Vertical asymptote \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Does this rational function have a hole? \_\_\_\_\_\_\_  If this rational function has a hole, then state it \_\_\_\_\_\_\_\_\_  X intercept(s) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Y intercept \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Horizontal asymptote \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Vertical asymptote \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Does this rational function have a hole? \_\_\_\_\_\_\_  If this rational function has a hole, then state it \_\_\_\_\_\_\_\_\_  X intercept(s) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Y intercept \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Horizontal asymptote \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Vertical asymptote \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Does this rational function have a hole? \_\_\_\_\_\_\_  If this rational function has a hole, then state it \_\_\_\_\_\_\_\_\_  X intercept(s) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Y intercept \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Horizontal asymptote \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Vertical asymptote \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Does this rational function have a hole? \_\_\_\_\_\_\_  If this rational function has a hole, then state it \_\_\_\_\_\_\_\_\_ |