

Gather data: Find the asymptotes and x- and y-intercepts for the graphs of the functions below. If there aren't any (e.g. if there's no slant asymptote, write n/a):

$$1. f(x) = \frac{x^2-9}{4x-16}$$

$$2. f(x) = \frac{x^2+5x+4}{x^2+7x+12}$$

Vertical Asymptote(s): \_\_\_\_\_

VA(s): \_\_\_\_\_

Horizontal Asymptote: \_\_\_\_\_

HA: \_\_\_\_\_

Oblique Asymptote: \_\_\_\_\_

slant: \_\_\_\_\_

x-intercept(s): \_\_\_\_\_

x-int(s): \_\_\_\_\_

y-intercept: \_\_\_\_\_

y-int: \_\_\_\_\_

$$3. f(x) = \frac{x^2-3x+2}{2x^2-10x+12}$$

$$4. f(x) = \frac{4x+16}{x^2+2x-8}$$

VA(s): \_\_\_\_\_

VA(s): \_\_\_\_\_

HA: \_\_\_\_\_

HA: \_\_\_\_\_

slant: \_\_\_\_\_

slant: \_\_\_\_\_

x-int (s): \_\_\_\_\_

x-int(s): \_\_\_\_\_

y-int: \_\_\_\_\_

y-int: \_\_\_\_\_

Find the asymptotes and x- and y-intercepts for the graphs of the functions below. Then rewrite the functions in **reciprocal function** form  $\left[f(x) = \frac{a}{x-h} + k\right]$ ,

5.  $f(x) = \frac{3x-1}{x+7}$

6.  $f(x) = \frac{6+6x}{2x+3}$

7.  $f(x) = \frac{x+3}{x^2+6x+9}$

10. Laren was hired to do a consulting job by a law firm. She earns a flat fee of \$2,000 plus a *per diem*<sup>1</sup> of \$200.

a) Determine a function for the total pay *per day* she received for this job: \_\_\_\_\_

b) As she takes more days to complete the job, does her total pay increase or decrease?

c) As she takes more days to complete the job, does her pay per day increase or decrease? Explain in a complete sentence or two.

d) What is the limit that her pay per day trends toward as the number of days approaches infinity? Explain in a sentence or two. [If you're confused by that, assume she takes 10,000 days to complete the job and calculate her pay per day. Then assume she takes 50,000 days...]

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<sup>1</sup> *per diem* means "per day" (from Latin). It refers to an amount that is paid or charged per day.