

Calculator Inactive. Answer on this sheet. Show all work in neat and logical steps.
Write complete sentences to answer word problems. Time: 45 minutes

1. Perform the indicated operations: $\frac{1}{x+5} + \frac{2}{3x-9} - \frac{2x-5}{x^2-6x+9}$

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2. Crystal travels 15 km on a bicycle in the same time that it takes Yasmine to drive 40 km in her motorcycle. Crystal travels 20 km/hr slower than Yasmine. At what speeds are Crystal and Yasmine each traveling?

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3. Mohammed can deliver 200 newspapers in 3 hours. When Nicole joins him, they can distribute 200 newspapers together in 2 hours. How long would it take Nicole to deliver 200 newspapers alone?

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4. Determine the equations of the VA and HA. If none, write none.

	Equation(s) of VA	Equation of HA
a) $f(x) = \frac{3x+2}{x^2-1}$		
b) $g(x) = \frac{3x^2-3}{x^2+1}$		

5. Determine the coordinates of any holes of the following. If none, write none.

a) $m(x) = \frac{x^2-4}{x^2+4}$

b) $h(x) = \frac{x^2+x-2}{x+2}$

c) $k(x) = \frac{x-5}{5-x}$

6. Determine the locations (x - coordinates) of the discontinuities of $y = \frac{x^2-2x-8}{x^2+x-2}$ and state what kind of discontinuity each is.

7. Make a sketch of $f(x) = \frac{1}{x}$ (on graph paper). Use the graph to evaluate:

a) $\lim_{x \rightarrow 1} f(x)$

b) $\lim_{x \rightarrow \infty} f(x)$

c) $\lim_{x \rightarrow -\infty} f(x)$

d) $\lim_{x \rightarrow 0^+} f(x)$

e) $\lim_{x \rightarrow 0^-} f(x)$

ANSWER THE FOLLOWING ON GRAPH PAPER:

8. Sketch $h(x) = \frac{x^2+x-2}{x+2}$ accurately and state its domain and range.

9. Complete the table for the rational function $y = \frac{x^2-2x-8}{x^2+x-2}$. Then, sketch $f(x)$ on graph paper. Plot and label the coordinates of points on each branch.

Hole(s)	x - int	y - int	Eq ⁿ of VA	Eq ⁿ of HA	Domain	Range

10. Sketch $f(x) = \frac{x+1}{x^2+2x-3}$ on graph paper, labeling any intercepts, holes,

asymptotes and additional points on each branch to help you sketch the graph.

BONUS: Does the rational function $y = \frac{x^2+1}{x^2-x-2}$ cross its horizontal asymptote? If yes, solve for the point where this occurs. If no, prove algebraically why not.