Name:_____ Date:_____

HW M12P Section 3.4 Rational Functions

1. What is a rational function? How is a rational function different from a polynomial function? Explain:

2. How do the graphs of rational functions differ from polynomial functions?

3. What does the numerator of a rational function tell you? Explain:

4. Explain how to find the vertical asymptotes of a rational function in the form of $y = \frac{ax^2 + bx + c}{(x-d)(x-e)}$

5. When given a rational function, how do you find the equation of the slanted asymptote? Explain:

6. What is the purpose of finding the remainder when dividing the numerator by the denominator? What does the remainder tell you? Explain:

7. What is the purpose of finding the slanted asymptote? How can the slanted asymptote be used to graph a rational function? Explain:

8. Suppose you divided the numerator by the denominator and got a remainder of zero. What does this tell you about the rational function? Explain:

9. How do you tell whether if a rational function will be above or below the slanted asymptote? Explain:

10. Given each graph below, indicate which of the following belongs to a rational function? Explain

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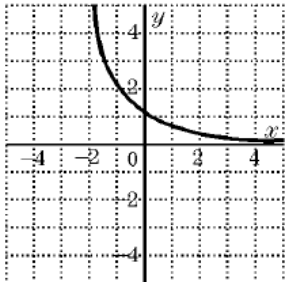

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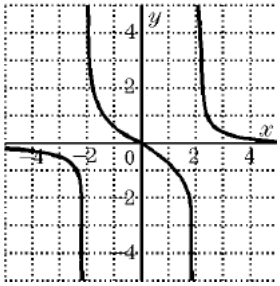

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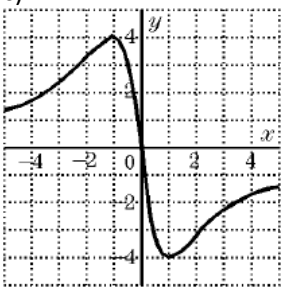

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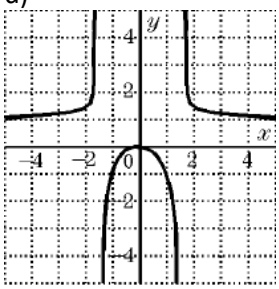

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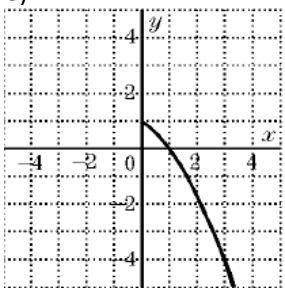

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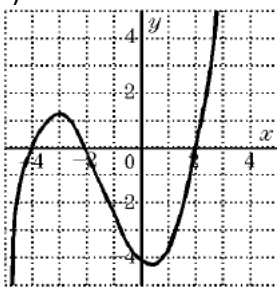

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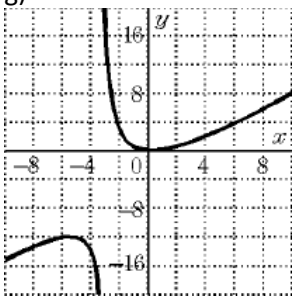

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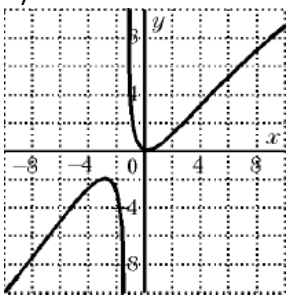

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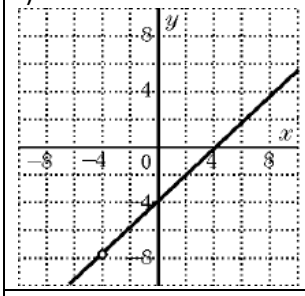

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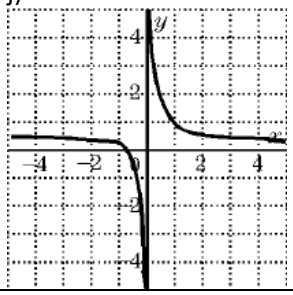

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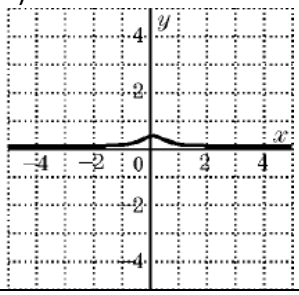

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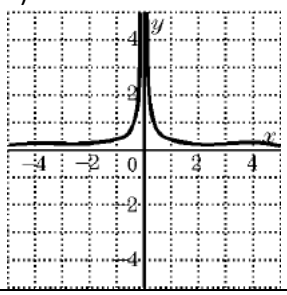

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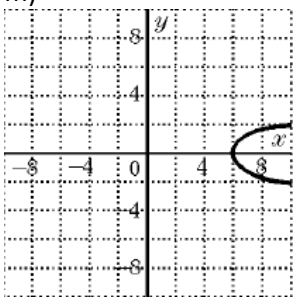

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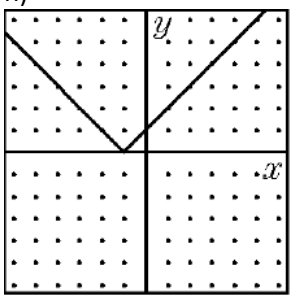

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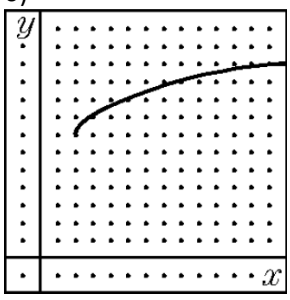

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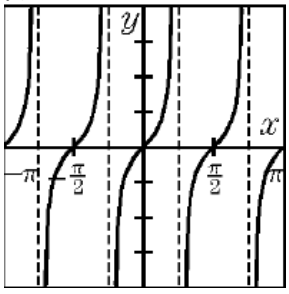


11. Indicate whether if the statement is A) Always True B) Sometimes True C) False

i) All polynomial functions are rational functions: _____

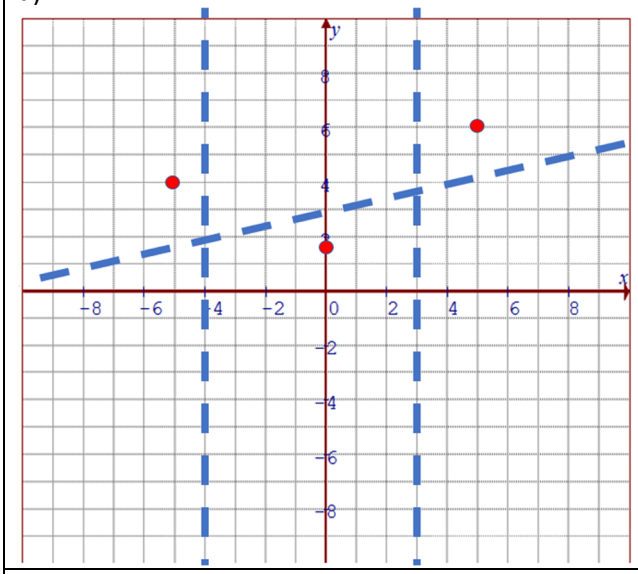
ii) All rational functions are polynomial functions: _____

iii) All reciprocal functions are rational functions: _____

iv) Rational functions have more than one asymptotes: _____

12. Given each equation with the asymptotes and the given points on the graph, indicate how the graph of the rational function would look like:

a)



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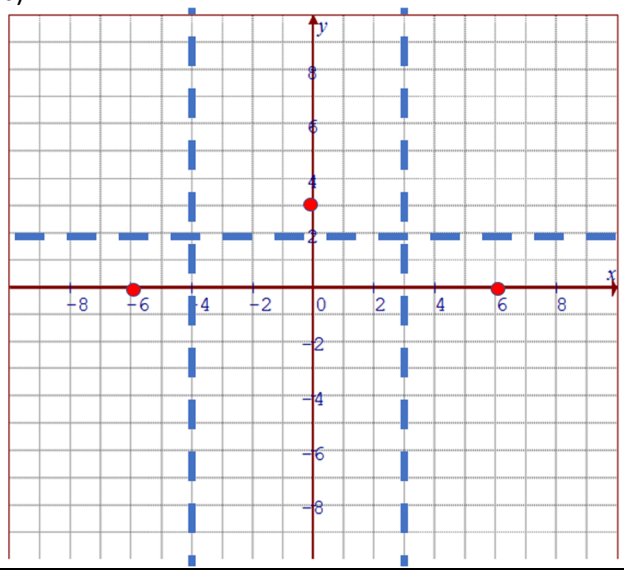

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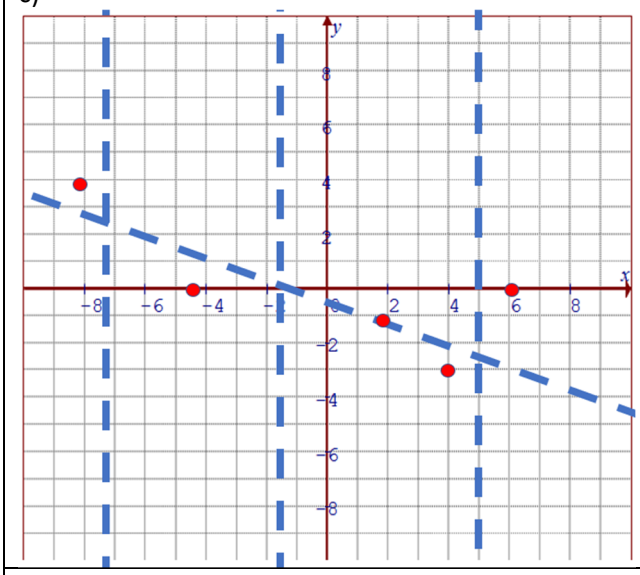

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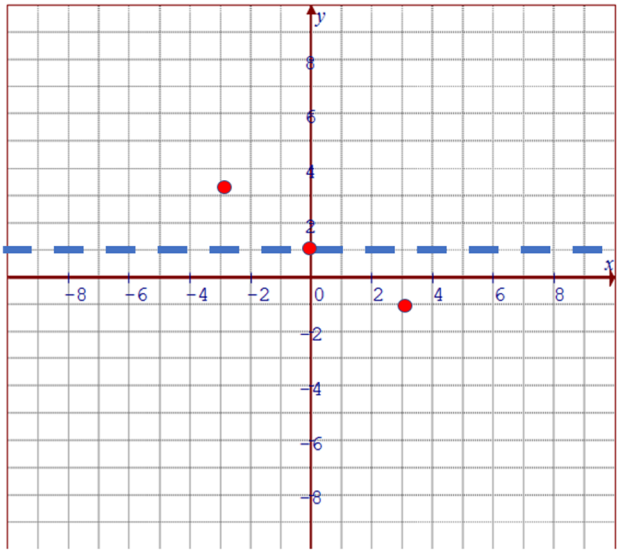

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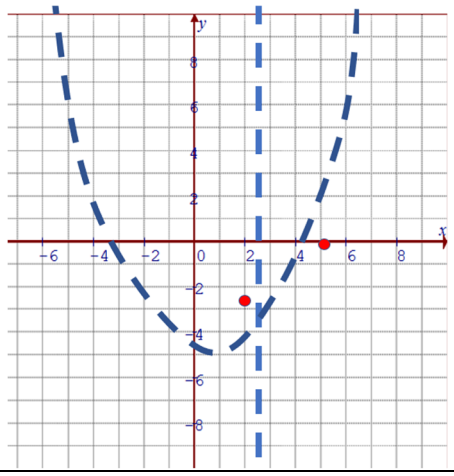

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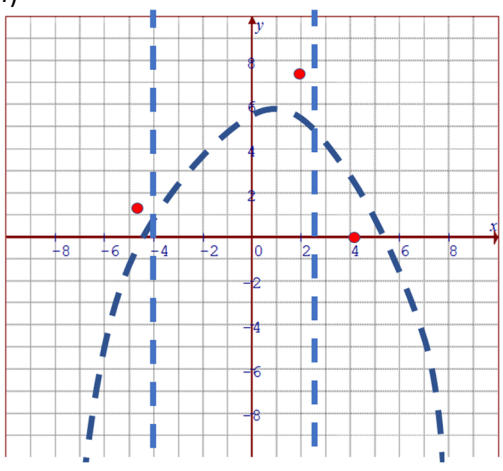
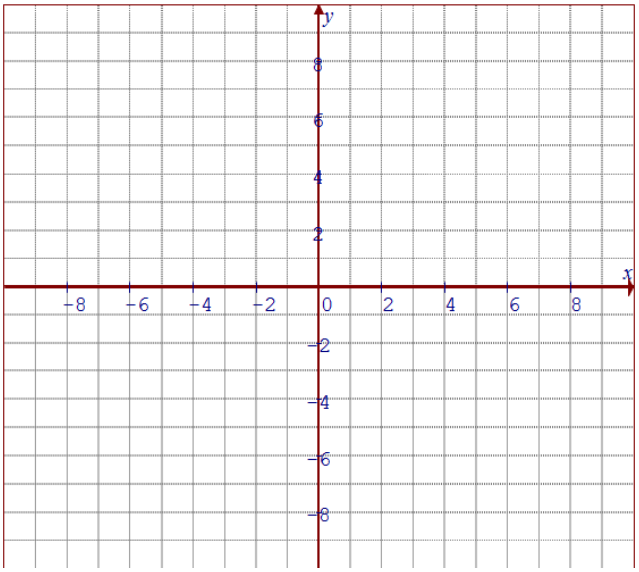


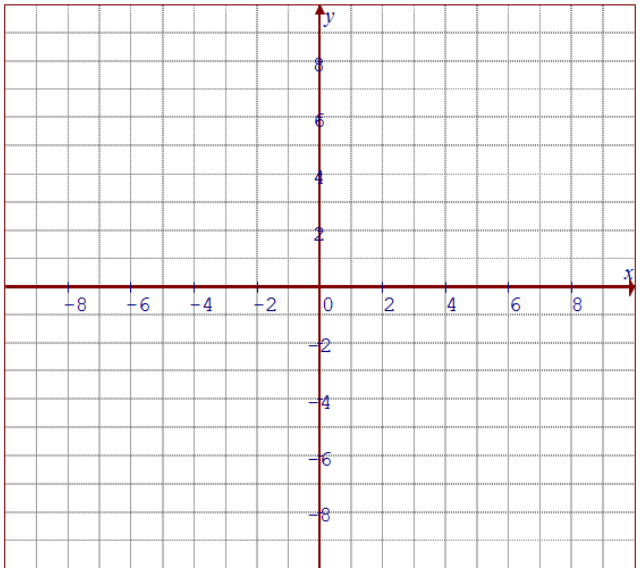
13. Given each rational function, find the equations of the slanted asymptotes, remainder, and then graph the function:

a) $y = \dfrac{x^2+4x+9}{x+1}$



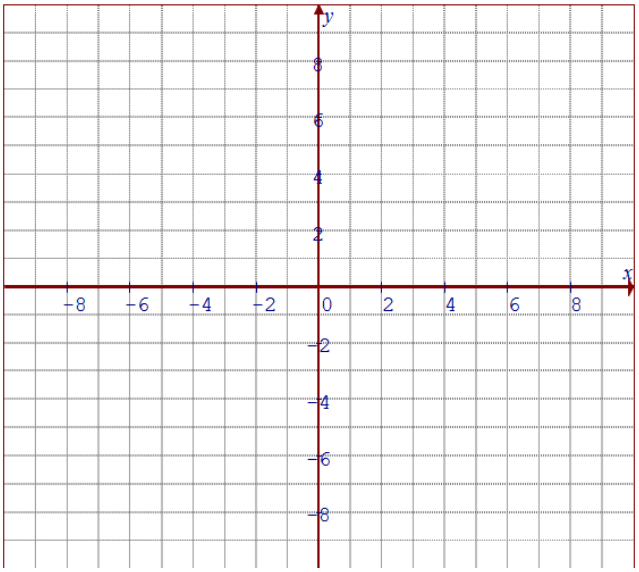
Quotient: Remainder:

b) $y = \dfrac{4x^2+5x-3}{x+1}$



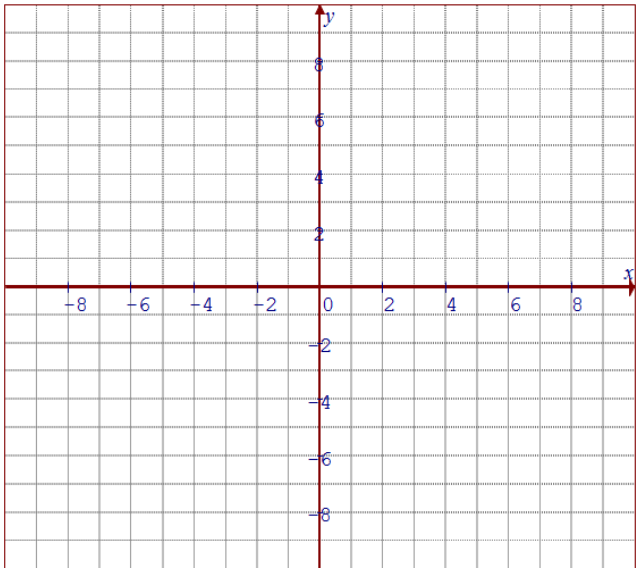
Quotient: Remainder:

c) $y = \dfrac{3x^2+2x+10}{x^2-4}$



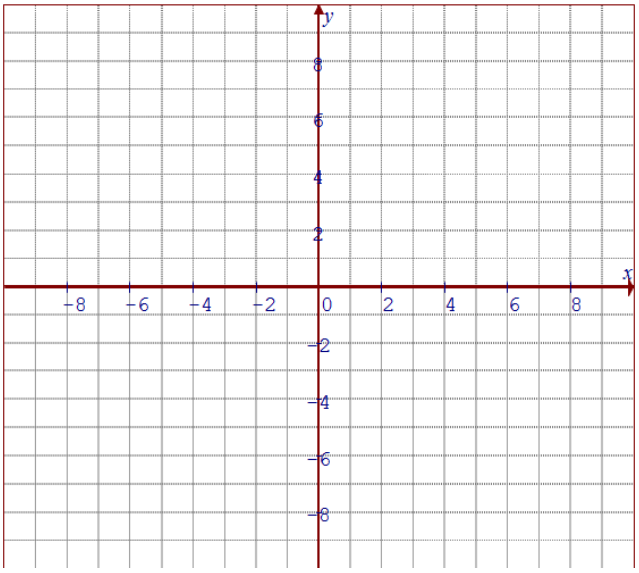
Quotient: Remainder:

d) $y = \dfrac{x^3+4x^2+4x+12}{x^2-1}$



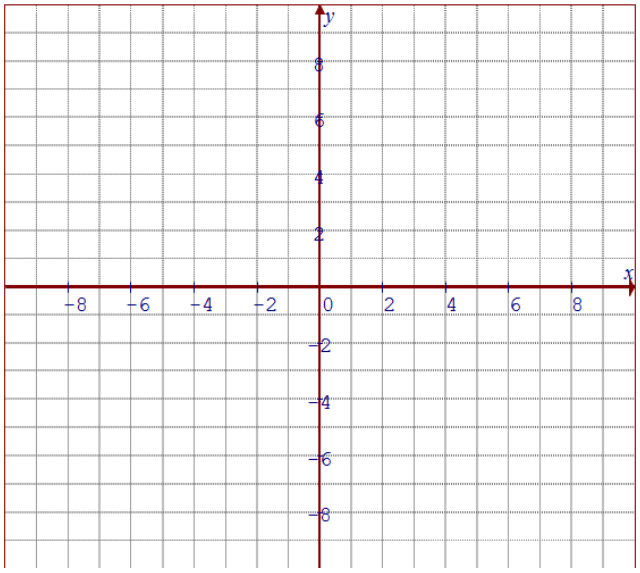
Quotient: Remainder:

e) $y = \dfrac{2x^3 + 4x^2 + 15}{x^2 + 2}$



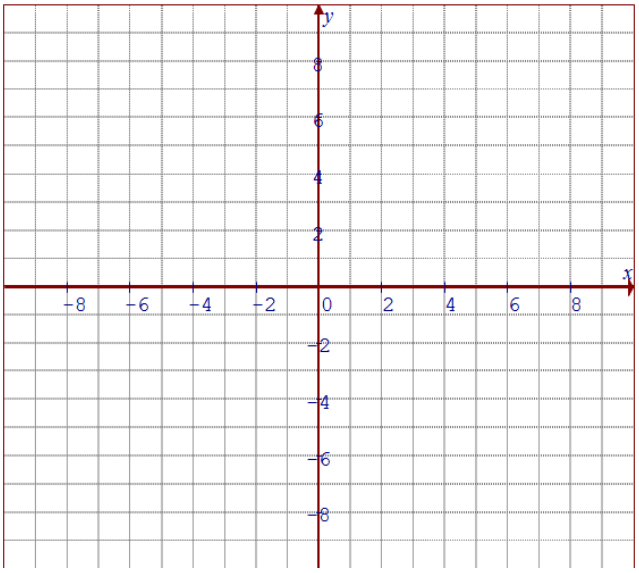
Quotient: Remainder:

f) $y = \dfrac{2x^2 - 3x + 2}{3x - 4}$



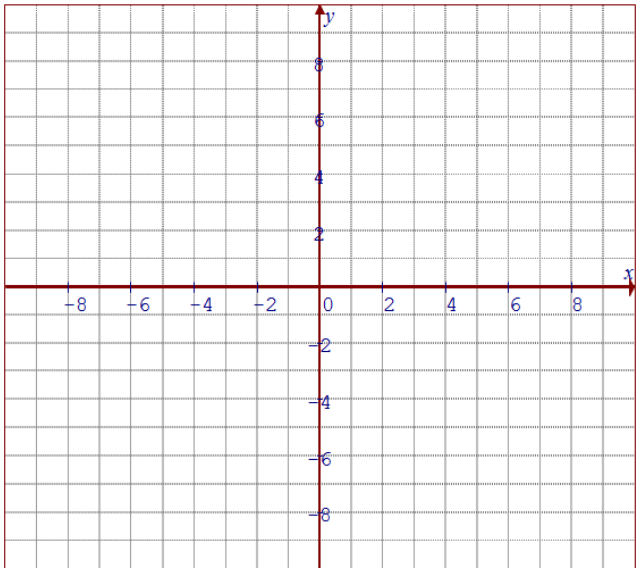
Quotient: Remainder:

g) $y = \dfrac{x - 9}{x^2 + 3x}$



Quotient: Remainder:

h) $y = \dfrac{x + 1}{x^2 + x - 6}$



Quotient: Remainder:

14. The following function has a remainder of zero. $y = \dfrac{(2x-3)(x+2)(x+5)}{(x+2)(x+5)}$

a) What are the x-intercepts of the function?

b) Are there any vertical asymptotes with the equation?

c) What is the equation of the slanted asymptotes?

d) What are the "y" values when "x" is equal to -2 or -5? Explain:

e) How does the rational function look like? Explain:

15. Given the following rational function: $y = \dfrac{(2x+3)(x-4)+x+7}{x^2+2x-3}$

a) What are the equations of the vertical asymptotes?

b) What is the equation of the slanted asymptotes?

c) What is the remainder when you divide the numerator by the denominator?

d) Does the function intersect the slanted asymptote? Explain how you would find out ? If yes, where does the graph intersect the slanted asymptote?

e) Graph the function with the grid provided