

1. Determine the vertical asymptotes and holes in the rational function below.

$$f(x) = \frac{9x^3 - 9x^2 - 25x + 25}{9x^2 + 27x + 20}$$

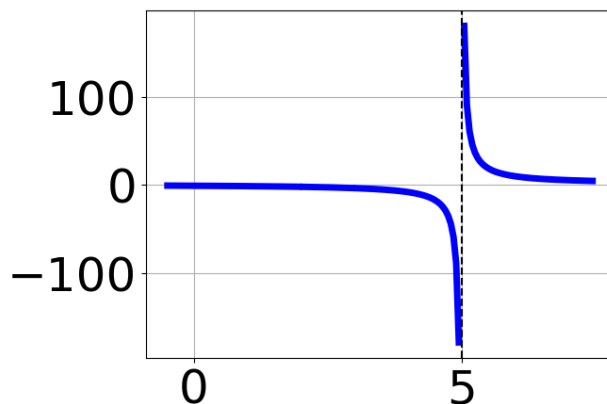
- A. Vertical Asymptotes of  $x = -1.333$  and  $x = -1.667$  with no holes.
  - B. Vertical Asymptotes of  $x = -1.333$  and  $x = 1.667$  with a hole at  $x = -1.667$
  - C. Vertical Asymptote of  $x = -1.333$  and hole at  $x = -1.667$
  - D. Holes at  $x = -1.333$  and  $x = -1.667$  with no vertical asymptotes.
  - E. Vertical Asymptote of  $x = 1.0$  and hole at  $x = -1.667$
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2. Determine the horizontal and/or oblique asymptotes in the rational function below.

$$f(x) = \frac{16x^3 - 24x^2 - 7x + 15}{4x^2 - 9x - 9}$$

- A. Horizontal Asymptote of  $y = 3.0$  and Oblique Asymptote of  $y = 4x + 3$
  - B. Horizontal Asymptote of  $y = 4.0$  and Oblique Asymptote of  $y = 4x + 3$
  - C. Horizontal Asymptote of  $y = 4.0$
  - D. Horizontal Asymptote at  $y = 3.0$
  - E. Oblique Asymptote of  $y = 4x + 3$ .
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3. Which of the following functions *could* be the graph below?



- A.  $f(x) = \frac{x^3 + x^2 - 14x - 24}{x^3 + 10x^2 + 31x + 30}$
- B.  $f(x) = \frac{x^3 + 4x^2 - x - 4}{x^3 - 10x^2 + 31x - 30}$
- C.  $f(x) = \frac{x^3 + x^2 - 14x - 24}{x^3 + 10x^2 + 31x + 30}$
- D.  $f(x) = \frac{x^3 - 1x^2 - 14x + 24}{x^3 - 10x^2 + 31x - 30}$
- E. None of the above are possible equations for the graph.

4. Determine the vertical asymptotes and holes in the rational function below.

$$f(x) = \frac{12x^3 + 59x^2 + 29x - 60}{8x^2 + 6x - 9}$$

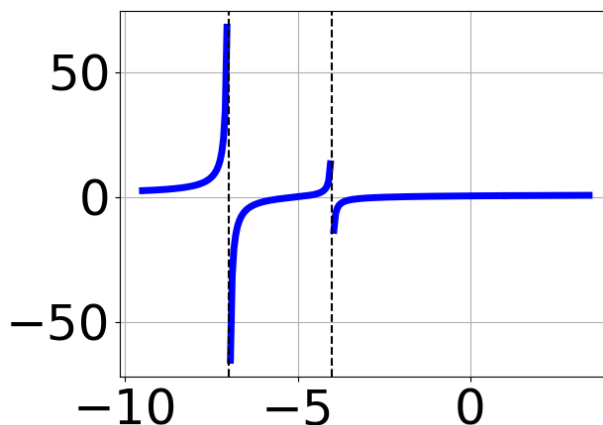
- A. Vertical Asymptotes of  $x = -1.5$  and  $x = -1.667$  with a hole at  $x = 0.75$
- B. Vertical Asymptote of  $x = -1.5$  and hole at  $x = 0.75$
- C. Vertical Asymptotes of  $x = -1.5$  and  $x = 0.75$  with no holes.
- D. Holes at  $x = -1.5$  and  $x = 0.75$  with no vertical asymptotes.
- E. Vertical Asymptote of  $x = 1.5$  and hole at  $x = 0.75$

5. Determine the horizontal and/or oblique asymptotes in the rational function below.

$$f(x) = \frac{12x^3 - 23x^2 - 8x + 12}{-20x^3 - 18x^2 + 15x - 18}$$

- A. None of the above
  - B. Vertical Asymptote of  $y = 2$
  - C. Horizontal Asymptote of  $y = -0.600$
  - D. Vertical Asymptote of  $y = 0.600$
  - E. Horizontal Asymptote of  $y = 0$
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6. Which of the following functions *could* be the graph below?



- A.  $f(x) = \frac{x^3 - 6x^2 + 3x + 10}{x^3 - 10x^2 + 17x + 28}$
  - B.  $f(x) = \frac{x^3 - 6x^2 + 3x + 10}{x^3 - 10x^2 + 17x + 28}$
  - C.  $f(x) = \frac{x^3 + 5x^2 - 4x - 20}{x^3 + 10x^2 + 17x - 28}$
  - D.  $f(x) = \frac{x^3 + 6x^2 + 3x - 10}{x^3 + 10x^2 + 17x - 28}$
  - E. None of the above are possible equations for the graph.
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7. Determine the horizontal and/or oblique asymptotes in the rational function below.

$$f(x) = \frac{12x^3 - 83x^2 + 165x - 100}{4x^2 + 15x - 25}$$

- A. Oblique Asymptote of  $y = 3x - 32$ .
  - B. Horizontal Asymptote of  $y = 3.0$  and Oblique Asymptote of  $y = 3x - 32$
  - C. Horizontal Asymptote of  $y = -5.0$  and Oblique Asymptote of  $y = 3x - 32$
  - D. Horizontal Asymptote at  $y = -5.0$
  - E. Horizontal Asymptote of  $y = 3.0$
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8. Determine the vertical asymptotes and holes in the rational function below.

$$f(x) = \frac{6x^3 - 41x^2 + 89x - 60}{12x^2 - 25x + 12}$$

- A. Vertical Asymptote of  $x = 0.5$  and hole at  $x = 1.333$
  - B. Vertical Asymptotes of  $x = 0.75$  and  $x = 1.333$  with no holes.
  - C. Vertical Asymptotes of  $x = 0.75$  and  $x = 2.5$  with a hole at  $x = 1.333$
  - D. Vertical Asymptote of  $x = 0.75$  and hole at  $x = 1.333$
  - E. Holes at  $x = 0.75$  and  $x = 1.333$  with no vertical asymptotes.
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9. Determine the horizontal and/or oblique asymptotes in the rational function below.

$$f(x) = \frac{5x^2 - 19x + 12}{20x^3 - 51x^2 - 47x + 60}$$

- A. Horizontal Asymptote of  $y = 0.250$  and Oblique Asymptote of  $y = 4x + 5$

- B. Horizontal Asymptote at  $y = 3.000$
  - C. Horizontal Asymptote of  $y = 0.250$
  - D. Horizontal Asymptote of  $y = 0$
  - E. Oblique Asymptote of  $y = 4x + 5$ .
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10. Determine the vertical asymptotes and holes in the rational function below.

$$f(x) = \frac{6x^3 - 17x^2 - 3x + 20}{8x^2 - 10x - 25}$$

- A. Vertical Asymptotes of  $x = -1.25$  and  $x = 2.5$  with no holes.
  - B. Vertical Asymptote of  $x = 0.75$  and hole at  $x = 2.5$
  - C. Holes at  $x = -1.25$  and  $x = 2.5$  with no vertical asymptotes.
  - D. Vertical Asymptotes of  $x = -1.25$  and  $x = 1.333$  with a hole at  $x = 2.5$
  - E. Vertical Asymptote of  $x = -1.25$  and hole at  $x = 2.5$
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