

Salisbury 2CP Unit 5 You Can (No Calculator)

You should be able to demonstrate the following skills by completing the associated problems. It is highly suggested that you read over your notes before attempting this You Can. More practice problems can be found in the homework, other problems in the textbook, and on the Big Ideas website.

Test Part I: Thursday, December 20, 2018

- Recognize and solve direct and inverse variation problems, including word problems**

For #1-7, tell whether x and y show *direct variation*, *inverse variation*, or neither.

1. $3xy = 1$ 2. $\frac{5}{x} = y$ 3. $x + y = 6$ 4. $\frac{x}{7} = y$ 5. $\frac{4}{5}x = y$

6.

x	1.5	2.5	4	7.5	10
y	13.5	22.5	36	67.5	90

7.

x	2	4	6	8
y	24	16	12	4

8. If y varies directly as x and $y=35$ when $x=7$, find y when $x=11$.

9. If y varies inversely as x and $y=2$ when $x=2$, find y when $x=1$.

10. When temperature is held constant, the volume V of a gas is inversely proportional to the pressure P of the gas on its container. A pressure of 32 pounds per square inch results in a volume of 20 cubic feet. What is the pressure if the volume becomes 10 cubic feet?

11. The length S that a spring will stretch varies directly with the weight F that is attached to the spring. If a spring stretches 20 inches with 25 pounds attached, how far will it stretch with 15 pounds attached?

- Determine under what conditions a rational expression is undefined.**

12. $\frac{3x^2 - 2x - 8}{3x^2 - 12}$

13. $\frac{2p}{p^2 - 2p + 1}$

14. $\frac{x^2 - 11x + 24}{x^3 - 18x^2 + 80x}$

- Multiply and divide rational expressions**

15. $\frac{ab}{xy} \cdot \frac{x}{a^3b^2}$

16. $\frac{a^2b^2c^3d}{xy} \div \frac{ac^3d^2}{x^5}$

17. $\frac{\frac{x-4}{x^2+6x+9}}{\frac{x^2-2x-8}{3+x}}$

18. $\frac{16x^2-9}{4x+3} \cdot \frac{25x^2-1}{5x+1}$

19. $\frac{x^2-11x+24}{x^2-18x+80} \div \frac{x^2-9x+20}{x^2-15x+50}$

- Add and subtract rational expressions**

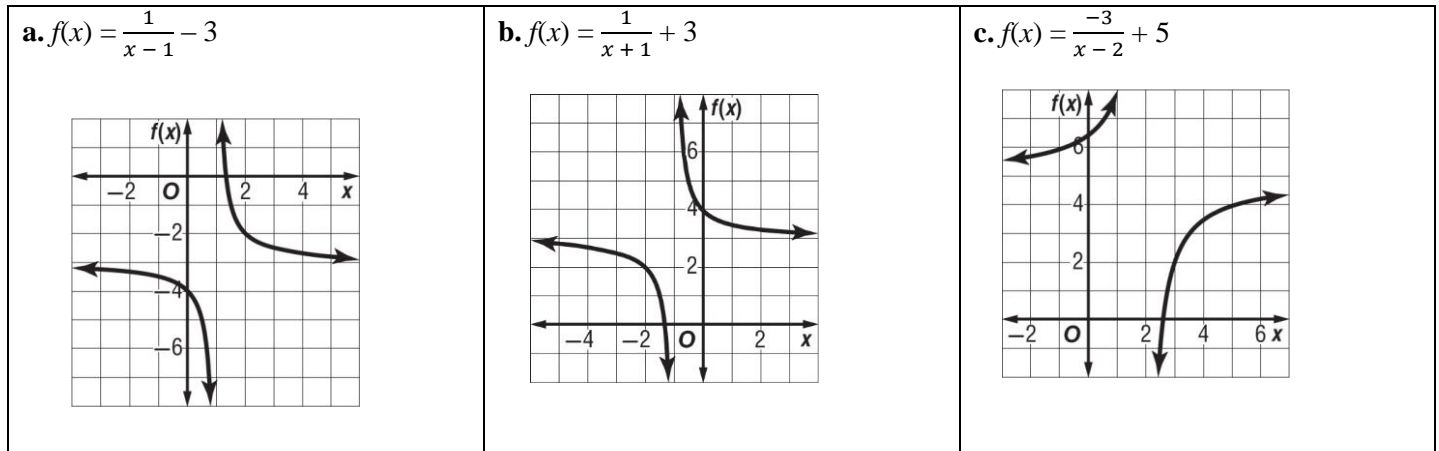
20. $\frac{5}{12x^4y} - \frac{1}{5x^2y^3}$

21. $\frac{k+3}{k^2+6k+9} - \frac{7}{2k+6}$

22. $\frac{\frac{x}{y}-1}{1+\frac{1}{x}}$

Part II Wednesday, January 9, 2018

23. Given a graph of a rational function, identify characteristics of rational functions including domain and range, asymptotes, intervals of increasing and decreasing, and end behavior, using appropriate mathematical notation.



24. Graph a rational function using transformations. Label and show asymptotes with dashed lines.

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

b. $f(x) = \frac{2x+1}{x-3}$

c. $f(x) = \frac{x+4}{3x-2}$

25. Rewrite the function in the form $g(x) = \frac{a}{x-h} + k$. Graph the function. Describe the graph of g as a transformation of the graph $f(x) = \frac{a}{x}$.

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

b. $f(x) = \frac{3x-4}{2x+1}$

26. Solve a rational equation and identify extraneous solutions.

a. $\frac{y}{y+1} = \frac{2}{3}$

b. $\frac{9}{t-3} = \frac{t-4}{t-3} + \frac{1}{4}$

c. $\frac{2}{y+2} + \frac{y}{y-2} = \frac{y^2+4}{y^2-4}$

27. For an application involving rational functions, write an equation representing the situation and solve. For each problem below, write an equation represent the situation and define the variables. Solve the problem. Also, review the warm-up and homework from the Rational Functions Application Day.

a. Jason can water all the plants at the botanical garden in 32 minutes. Celia can water them in 25 minutes. If they work together, how long will it take for them to water the plants?

b. How many liters of 20% alcohol solution should be added to 40 liters of a 50% alcohol solution to make a 30% solution?