

Name: _____ Per. _____ Date: _____ Score: _____

2016 Spring Final Review #1

1. Describe how you find the horizontal asymptote of a rational function. Create an example for each type.
2. Describe how you would find a vertical asymptote. Create a rational function with asymptotes at $x = 3$ and $x = 2$.
3. Describe how you would find the x intercept of a rational function. Create one with a intercept at $(5,0)$ and $(0,0)$.
4. Describe how you will find the y intercept. Create one that has an intercept at $(0,-4)$.
5. Describe how you would find a hole in the graph of a rational function. Create a rational function with a hole at $x = 4$.
6. Using the parent graph of $f(x) = \frac{1}{x}$ determine the equations of the new functions using the given transformations.
 - a) $G(x)$ is shifted 2 units to the right and stretched vertically by a factor of 2
 - b) $H(x)$ is shifted down 4 units and is reflected over the x axis
 - c) $K(x)$ is stretched vertically by a factor of 3, reflected over the x axis and to the left
7.
 - a) Create a rational function with no vertical asymptote.
 - b) Create a rational function with no x intercept.
8.
 - a) A cabin in the woods cost \$2000 per week plus \$45 per person to rent. What is the equation to find he cost per person.
 - b) What are some values that wouldn't make sense in this problem?

Find the HA,VA, x and y intercepts and Identify any holes. Also identify the domains.

9. $f(x) = \frac{3x-5}{x+6}$

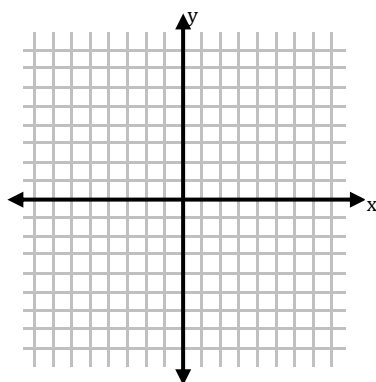
10. $f(x) = \frac{x-2}{x^2-9}$

11. $f(x) = \frac{x^3-64}{x^2-x}$

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

Graphs. Determine the vertical & horizontal asymptote, x & y intercepts, and domain & range of each function.

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

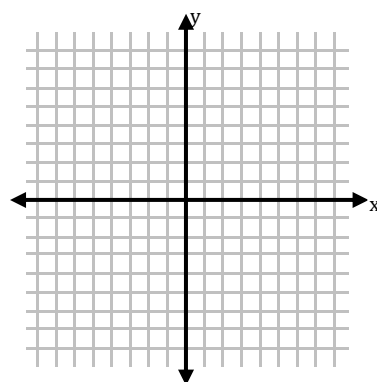


VA: _____ HA: _____

x-int: _____ y-int: _____

Domain : _____ Range : _____

14. $f(x) = \frac{x+4}{2x^2+9x+4}$



VA: _____ HA: _____ hole: _____

x-int: _____ y-int: _____

Domain : _____ Range : _____

Simplify or solve. Be sure to state excluded values, if any.

15. $\frac{x^2-16}{x^3+64}$

16. $\frac{x^2+7x+6}{x^2+x} \cdot \frac{x^2-4x-21}{x^2-49}$

17. $\frac{6x^2+7x-3}{6x^2} \div 2x^2+3x$

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

19. $\frac{3x}{3x^2-3} + \frac{4}{x-1} + \frac{5}{6x}$

20. $\frac{\frac{x}{2}-5}{6+\frac{3}{x}}$

Solve each equation. Be sure to check for extraneous solutions.

21. $\frac{2x-4}{x^2-10x+16} = \frac{2}{x+2}$

22. $\frac{2x}{x-3} = \frac{3x}{x^2-9} + 2$

23. Convert 195° into radians.

24. Convert $\frac{3\pi}{5}$ into degrees.

Solve on the interval $[0, 2\pi)$.

25. $4 \cos^2 x - 1 = 0$

26. $3 \tan^2 x - 1 = 0$

For $\sin x = -\frac{4}{5}$ and $\pi < x < \frac{3\pi}{2}$, find the following:

27. $\csc(x)$

28. $\cos(x)$

29. $\sec(x)$

30. $\tan(x)$

Graph the following:

31. $f(x) = 3 \sin(2x) + 1$

32. $f(x) = \frac{1}{2} \tan\left(x - \frac{\pi}{4}\right)$

Find a co-terminal angle.

33. 38° that is positive.

34. $\frac{7\pi}{4}$ that is negative.

Simplify.

35. $\cot x + \tan x$

36. $\frac{1 - \sin^2 x}{1 + \cot^2 x}$

Evaluate the following: Use on the interval $[0, 2\pi]$ for the Θ and use exact values for the ration

37. $\cos 30$

38. $\sin 225$

39. $\tan 120$

40. $\sin^{-1} \frac{\sqrt{3}}{2}$

41. $\cos^{-1}(1)$

42. $\tan^{-1}\left(-\frac{\sqrt{3}}{3}\right)$

43. Given a person is 6ft tall, and is currently casting an 8ft shadow. What is the angle the sun makes with the ground at the tip of the person shadow?

44. A jet leaves a runway whose bearing is $S72^\circ W$ from the control tower. After flying 63 miles, the jet turns 90° and flies on a bearing of $N18^\circ W$ for 48 miles.

a) Find the bearing from the control tower to the jet.

b) Find the distance the jet is away from the control tower.

45. For the following sets of data, calculate the mean and standard deviation of the data. Describe the mean and standard deviation in words after calculating it.

a. The data set below gives the prices (in dollars) of cordless phones at an electronics store.

35, 50, 60, 60, 75, 65, 80

b. The data set below gives the numbers of home runs for the 10 batters who hit the most home runs during the 2005 Major League Baseball regular season.

51, 48, 47, 46, 45, 43, 41, 40, 40, 39

Answers:

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

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

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

4. Example $f(x) = \frac{(x+4)(x-4)}{x-4}$

5. Substitute $x = 4$ into the reduced function to find the y-value. The hole would be at $(4, f(4))$

6a. $G(x) = \frac{2}{x-2}$

6b. $H(x) = -\frac{1}{x} - 4$

6c. $K(x) = -\frac{3}{x}$

7a. Example $f(x) = \frac{1}{x^2+1}$

7b. Example $f(x) = \frac{1}{x^2+1}$

8a. $C(x) = \frac{2000+45x}{x}$ or $C(x) = \frac{2000}{x} + 45$

8b. Negative people, Zero people, Fractional people

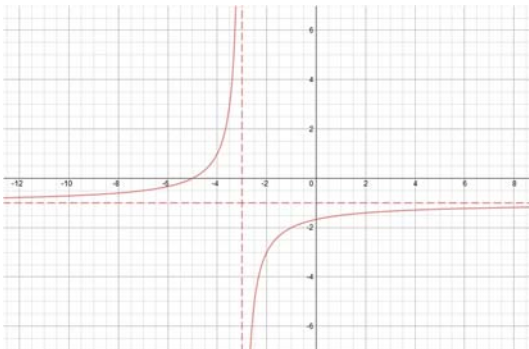
9. $HA: y = 3$, $VA: x = -6$, $x\text{-int.} = \frac{5}{3}$, $y\text{-int.} = -\frac{5}{6}$

10. $HA: y = 0$, $VA: x = \pm 3$, $x\text{-int.} = 2$, $y\text{-int.} = \frac{2}{9}$

11. $HA: \text{none}$, $VA: x = 0, 1$, $x\text{-int.} = 4$, $y\text{-int.} = \text{none}$

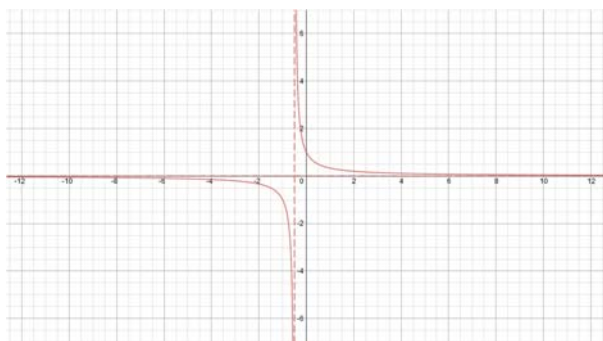
12. $HA: y = \frac{1}{2}$, $VA: x = -\frac{1}{2}$, $x\text{-int.} = 4$, $y\text{-int.} = -4$, hole at $x = -4$

13.



$VA: x = -3$, $HA: y = -1$, $x\text{-int.} = -5$, $y\text{-int.} = -\frac{5}{3}$, $D: (-\infty, -3) \cup (-3, \infty)$, $R: (-\infty, -1) \cup (-1, \infty)$

14.



VA: $x = -\frac{1}{2}$, HA: $y = 0$, x -int. = *none*, y -int. = 1, Hole: $\left(-4, -\frac{1}{7}\right)$

$D: (-\infty, -4) \cup \left(-4, -\frac{1}{2}\right) \cup \left(-\frac{1}{2}, \infty\right)$, $R: (-\infty, 0) \cup (0, \infty)$

15. $\frac{x-4}{(x^2-4x+16)}$ $x \neq -4$

16. $\frac{(x+6)(x+3)}{x(x+7)}$ $x \neq 0, -1, \pm 7$

17. $\frac{3x-1}{6x^3}$ $x \neq 0, -\frac{3}{2}, \frac{1}{3}$

18. $\frac{x+5}{x}$

19. $\frac{35x^2+24x-5}{6x(x+1)(x-1)}$

20. $\frac{x(x-10)}{6(2x+1)}$

21. No Solutions

22. -6

23. $\frac{13\pi}{12}$

24. 108°

25. $\frac{\pi}{3}, \frac{2\pi}{3}, \frac{4\pi}{3}, \frac{5\pi}{3}$

26. $\frac{\pi}{6}, \frac{5\pi}{6}, \frac{7\pi}{6}, \frac{11\pi}{6}$

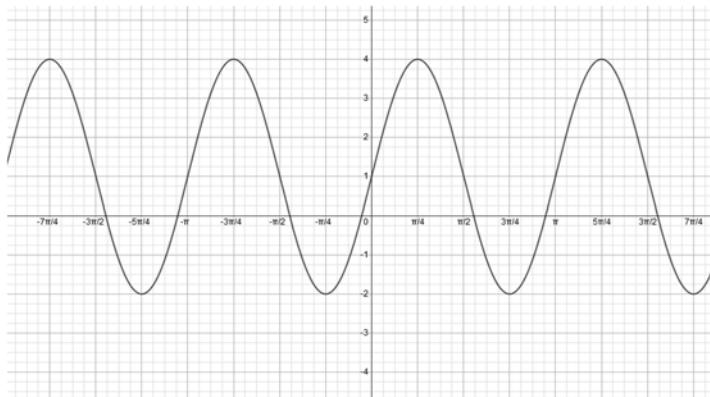
27. $-\frac{5}{4}$

28. $-\frac{3}{5}$

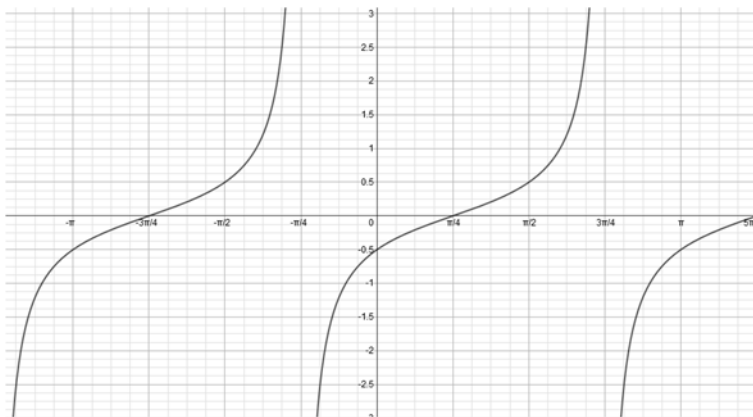
29. $-\frac{5}{3}$

30. $\frac{4}{3}$

31.



32.



33. 398°

34. $-\frac{\pi}{4}$

35. $\csc x \sec x$

36. $\sin^2 x \cos^2 x$

37. $\frac{\sqrt{3}}{2}$

38. $-\frac{\sqrt{2}}{2}$

39. $-\sqrt{3}$

40. $\frac{\pi}{3}, \frac{2\pi}{3}$

41. $0, 2\pi$

42. $\frac{5\pi}{6}, \frac{11\pi}{6}$

43. 36.9°

44. $N71^\circ W$

45. 79 miles

46. Mean = 60.714; Standard Deviation = 13.997

47. Mean = 44; Standard Deviation = 3.8