

# Instructions

- Complete the problems as if this were an actual test.
  - 70-80 minutes of uninterrupted time. (this means no phones, Netflix, snapchat, etc...I promise you will survive 😊)
  - Don't use your calculator on the NonCalc problems
  - No help from notes, friends, google, etc.
- After you have completed the problems, grade your test using the key provided.
- Try extra problems similar to the ones you missed until you feel like you understand those concepts.

## Non-Calculator

Perform the indicated operations and simplify.

1.  $\frac{7}{6x} - \frac{x+4}{2x^2}$

2.  $\frac{x-3}{2x-1} + \frac{x+5}{2x^2+9x-5}$

3.  $\frac{2x}{x+4} \cdot \frac{3x+12}{10x^3}$

4.  $\frac{4x-24}{x^2-6x+5} \div \frac{-6x+36}{x^2-8x+15}$

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

Solve for x.

6.  $\frac{x}{2} + \frac{1}{3} = \frac{5}{6}$

7.  $\frac{6}{x^2+8x+12} + \frac{4}{x+6} = \frac{4}{x+2}$

Find the indicated information for the following rational functions.

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

VA: \_\_\_\_\_

HA: \_\_\_\_\_

Hole: \_\_\_\_\_

x-int: \_\_\_\_\_

y-int: \_\_\_\_\_

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

Slant Asymptote: \_\_\_\_\_

VA: \_\_\_\_\_

10. Write a rational function that has the following characteristics.

VA:  $x = 1$  and  $x = -2$

HA:  $y = 0$

Hole:  $(-3, \frac{1}{40})$

11. State the end behavior of the following functions:

a.  $f(x) = \frac{-35x^{52}-x^{34}+6}{5x^2+2}$

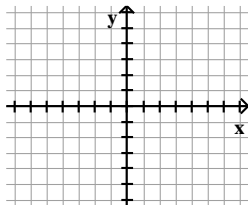
b.  $g(x) = \frac{(2x+3)^2(-x+1)^3}{6-x^2}$

12. Solve for x.

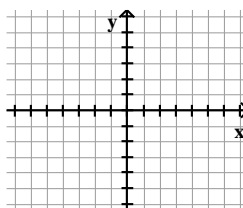
$$2(x - 3)^2 + 6 = 54$$

13. Graph the following.

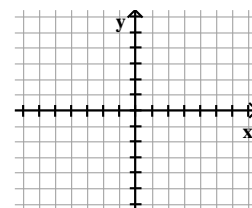
a.  $f(x) = -2(x + 1)^2 - 3$



b.  $g(x) = \frac{1}{2}\sqrt{x + 3}$

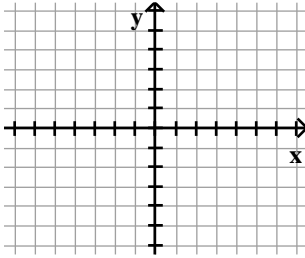


c.  $h(x) = 2|x - 1|$



14. Graph the following. Make sure you identify asymptotes, holes, and intercepts.

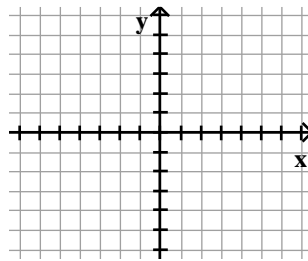
$$f(x) = \frac{x^2+x-2}{x^3-4x}$$



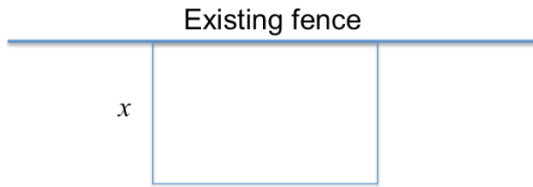
**Calculator Section**

15. Sketch a graph with the following characteristics.

- VA:  $x = -1$  (odd)
- VA:  $x = 3$  (odd)
- SA:  $y = x + 2$
- y-int:  $(0, 4)$
- x-int:  $(2, 0)$  odd
- x-int:  $(5, 0)$  even



16. You have 300 feet of fencing.



- a. Write an equation for the area in terms of the width.
- b. Find the maximum area. Include units.
- c. Find the dimensions that will yield the maximum area. Include units.