

# PICKENS COUNTY SCHOOLS

Standards-Based Assignment Packet

Subject/Grade: Pre-Cal-Grade12

**You can go to youtube and type in the name of the concept and watch math teachers explain the concepts FOR FREE. DO THIS IF YOU FORGET HOW TO DO SOMETHING!!!!!!!**

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**1) Multiplying Polynomials  
No Calculator!!!**

1.  $(x + 7)^2$

2)  $(x - 11)^2$

3.  $(x + 4)^3$

4.  $(x + h)^3$

5.  $(x + 1)(x^2 - 3x - 4)$

6.  $(x + h)(x^2 + 3xh + 8)$

7.  $(a + b)^2$

**2) Factoring  
No Calculator!!**

Factor each polynomial **completely**. If the polynomial cannot be factored write prime.

1)  $2x^2 - 128$

2)  $x^2 - 10x + 24$

3)  $a^3 - 64b^3$

4)  $5x^2 + 40x - 10$

5)  $2x^2 - 11x + 12$

6)  $x^3 + 16x^2 + 64x$

7)  $x^3 + 3x^2 - 4x - 12$

8)  $24x^2 - 54$

9)  $6x^3 - 18x^2$

10)  $5c^2 + 4cd - d^2$

11)  $27y^3 + 125$

12)  $20x^2 - 4x - 72$

13)  $-x^2 + 100$

14)  $4x^4 - 64$

15)  $a^4 - 2a^2 + 1$

16)  $9x^3 + 12x^2 - 45x$

17)  $n^2 - 2n - np + 2p$

18)  $24x^2 + 4x - 60$

**3) Adding & Subtracting Fractions  
No Calculator!!!**

*Simplify each expression.*

$$1. \frac{2}{3} + \frac{5}{7}$$

$$2. \frac{1}{6} - \frac{5}{18}$$

$$3. \frac{6}{x} + 5$$

$$4. \frac{3x}{4y} - 7$$

$$5. \frac{3}{x^2} - \frac{4}{x}$$

$$6. \frac{x}{x+5} + \frac{7x}{x^2 - 25}$$

$$7. \frac{6}{5x} + \frac{4}{9x} - \frac{1}{3x}$$

$$8. \frac{8}{x^2 - 4x + 4} + \frac{2}{x-2}$$

$$9. \frac{x}{x^2 - 9} + \frac{5}{4x-12}$$

$$10. \frac{5x}{x-5} + \frac{x+5}{x+2}$$

$$11. \frac{3}{x+3} - \frac{4}{3x}$$

**4) Multiplying & Dividing Fractions**  
**No Calculator!!!**

*Simplify each expression.*

$$1. \frac{4}{5} \cdot \frac{2}{3}$$

$$2. \frac{1}{9} \cdot -\frac{3}{7}$$

$$3. \frac{\frac{2}{7}}{\frac{4}{9}}$$

$$4. \frac{\frac{11}{7}}{-\frac{7}{18}}$$

$$5. \frac{-\frac{2}{3}}{5}$$

$$6. \frac{x}{\frac{5}{3}}$$

$$7. \frac{4}{13} \cdot \frac{x}{7}$$

$$8. \frac{x+2}{5x} \cdot \frac{-7}{4x}$$

$$9. \frac{11}{10} \cdot 9x$$

$$10. \frac{\frac{8}{3x}}{\frac{5x}{7}}$$

$$11. \frac{\frac{7x+2}{5x-3}}{\frac{9x+4}{6x+7}}$$

$$12. \frac{x}{\frac{2}{5}}$$

$$13. \frac{y}{\frac{z}{7}}$$

$$14. \frac{2 + \frac{3}{7}}{4 - \frac{1}{7}}$$

Remember you cannot cancel at the beginning!!!

$$15. \frac{1 + \frac{1}{x}}{1 - \frac{1}{x}}$$

$$16. \frac{\frac{x}{3} - 4}{\frac{x}{3} + 7}$$

**5) Rationalize the Denominator  
No Calculator!!**

$$1) \frac{2}{3-\sqrt{2}}$$

$$2) \frac{\sqrt{7}}{\sqrt{3}+4}$$

$$3) \frac{4+\sqrt{3}}{2-\sqrt{3}}$$

$$4) \frac{2+\sqrt{2}}{6+\sqrt{2}}$$

$$5) \frac{3i-2}{5i-3}$$

$$6) \frac{6-i\sqrt{2}}{6+i\sqrt{2}}$$

$$7) \frac{3+7i}{7i}$$

**6) Solve Quadratic Equations  
No Calculator!!**

*Find all real and imaginary solutions for all problems.*

*Solve the following by factoring.*

1)  $x^2 = 3x + 4$

2)  $9x = 10x^2$

3)  $8x^2 + 2x = 1$

4)  $x(x - 5) = 36$

5)  $(x - 6)(x - 8) = 24$

*Solve the following by using the square root property.*

6)  $3x^2 + 2 = 0$

7)  $(x + 5)^2 - 12 = 0$

8)  $(2x - 5)^2 = -11$

9)  $5(4x - 3)^2 = 30$

10)  $\frac{(y + 4)^2}{2} = 18$

*Solve the following by completing the square.*

11)  $x^2 + 10 = 8x$

12)  $x^2 - 5x + \frac{41}{4} = 0$

13)  $2x^2 + 16x + 39 = 0$

*Solve the following using the Quadratic Formula. You should have the Quadratic Formula memorized.*

14)  $3x^2 = 2 - 9x$

15)  $5x^2 - 2x = -4$

16)  $12x^2 = x + 6$

**7) Parent Function Graphs & Finding Domain  
No Calculator!!**

PART 1: Be able to sketch the following 11 parent function graphs: [“c” implies any one constant number]

$$y = c, y = x, y = |x|, y = x^2, y = x^3, y = \sqrt{x}, y = a^x, y = \log x, y = \frac{1}{x}, y = \sin x, y = \cos x$$

PART 2: State the domain of each function using interval notation. See answer key for further explanation if needed.

$$1) f(x) = \sqrt{2x - 5}$$

$$2) f(x) = \frac{x}{5-x}$$

$$3) f(x) = 4x + 5$$

$$4) f(x) = 3x^2 - 4x + 9$$

$$5) f(x) = \frac{x}{x+4}$$

$$6) f(x) = \sqrt{-2x + 5}$$

$$7) f(x) = \frac{1}{3x^2 - 27}$$

$$8) f(x) = \frac{1}{x^2 - 10x + 24}$$

**8) Rational Equations  
No Calculator!!!**

*Solve each rational equation. Remember the quadratic formula!!!*

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

$$2. 4 = \frac{5}{x} + \frac{2}{3}$$

$$3. \frac{2}{x} + \frac{3x-1}{x+3} = 4$$

$$4. \frac{4x-3}{x-2} = 6 - \frac{x+6}{x+2}$$

$$5. \frac{2}{x+5} + \frac{6}{x^2 - 25} = \frac{3}{x-5}$$

$$6. \frac{13x+20}{x^2 + 13x + 42} - \frac{4}{x+6} = \frac{6}{x+7}$$

**9) Logarithms  
No Calculator!!!**

*Write each equation in logarithmic form.*

1.  $4^2 = 16$

2.  $5^{-3} = \frac{1}{125}$

*Write each equation in exponential form.*

3.  $\log_3 81 = 4$

4.  $\log_{49} 7 = \frac{1}{2}$

*Evaluate each expression.*

5.  $\log 100$

6.  $\log_2 32$

7.  $\log_3 \frac{1}{81}$

8.  $\log_{64} 4$

9.  $\log_5 5^8$

*Solve each equation.*

10.  $\log_7 x = 3$

11.  $\log_8(5x - 11) = 2$

12.  $\log_x 6 = \frac{1}{2}$

$$13. \log_3 \frac{1}{27} = x$$

$$14. \log_4 x + 3 = \log_4 (5x^2)$$

$$15. \log 125 = 3 \log x$$

$$16. 2 \log_9 3 - \log_9 5 = \log_9 x$$

$$17. \log_4 x + \log_4 2 = 3$$

$$18. \log_3(x+1) - \log_3(x-1) = 4$$

## 10) Radical Equations

Solve each equation.

$$1. \sqrt{x} = 5$$

$$2. \sqrt{x-7} = 8$$

$$3. \sqrt{2x+3} = 15$$

$$4. 5\sqrt{x+7} = 15$$

$$5. \sqrt{4x+1} - 2 = x$$

$$6. \sqrt{x+2} = 1 + \sqrt{x}$$

$$7. \sqrt{3x} + \sqrt{3x-8} = 2$$

## 11) Absolute Value Equations

Solve each of the following equations. Remember to set up 2 equations.

$$1. |x + 4| = 6$$

$$2. |2x - 3| = 51$$

$$3. |5x - 4| = x$$

$$4. |6x + 7| = x$$

$$5. |3x + 1| = x - 3$$

$$6. |4x - 5| = 5x - 4$$

# Pre-Calculus First Semester Review

## NON CALCULATOR

Unit 1: 21–37
Unit 2: 1–18, 38–49
Unit 3: 19, 20, 50–60

[1.2] Find the domain. Express the answer in interval notation.

1.  $f(x) = \log_3(2x + 5)$

2.  $f(x) = \frac{\sqrt{7-x}}{x+4}$

[1.2] Prove algebraically whether the function is even, odd, or neither.

3.  $f(x) = 3x^3 - 2x$

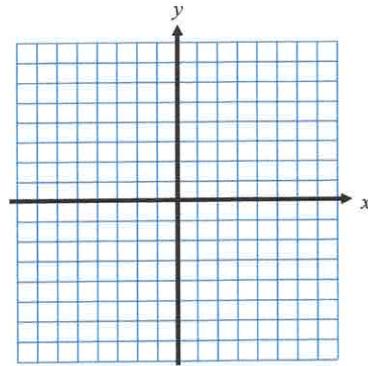
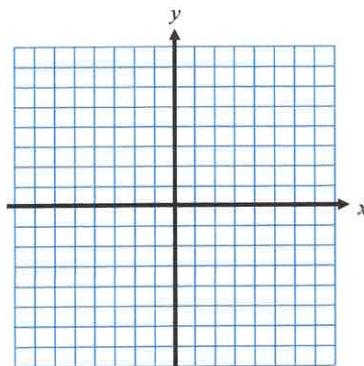
4.  $f(x) = -2x^4 - 4x + 7$

For question 5–10, find following:

- (a) Identify the parent function.
- (b) State the transformation rule or describe the transformation.
- (c) Graph the function including key points and any asymptotes.

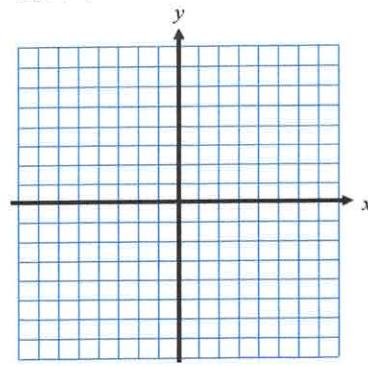
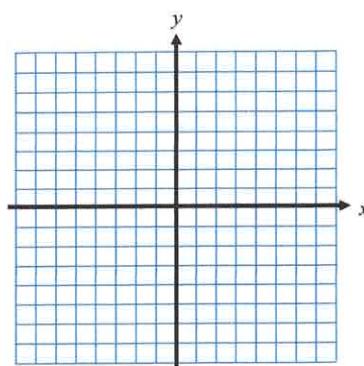
[1.5] 5.  $f(x) = -3|2x + 6| + 4$

[1.5] 6.  $f(x) = \log_4(x - 2)$

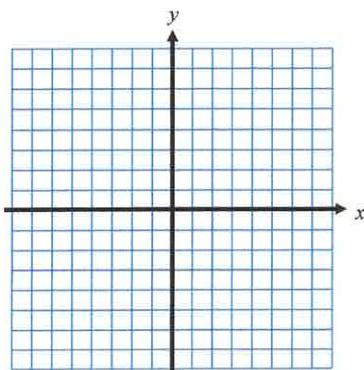


[1.5] 7.  $f(x) = 3^{x-2} + 1$

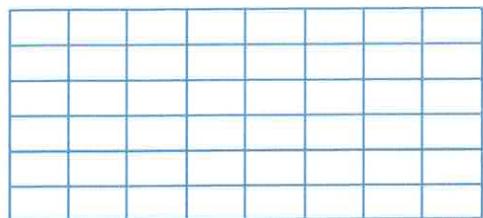
[1.5] 8.  $f(x) = \frac{1}{2x+4} - 3$



[1.5] 9.  $f(x) = 3\sqrt{4-x}$

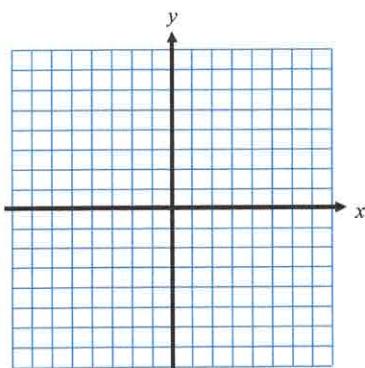


[GrTrg] 10.  $f(x) = 3 \sin(2x - \pi) - 1$

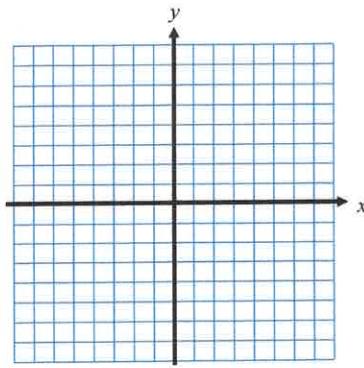


[1.3] Graph the piecewise-defined function. State whether the function is continuous or discontinuous at  $x = 0$ .

11.  $f(x) = \begin{cases} x & \text{if } x \leq 0 \\ x^2 & \text{if } x > 0 \end{cases}$



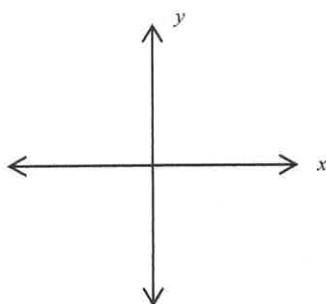
12.  $f(x) = \begin{cases} -|x| & \text{if } x \leq 0 \\ 2 & \text{if } x > 0 \end{cases}$



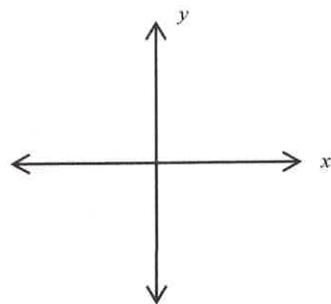
[2.3] For each function below...

- Determine the degree.
- Describe the end behavior using **limit** notation.
- Find the zeros of the function with their multiplicities.
- Sketch a graph of the function including zeros, multiplicities and end behavior.

13.  $f(x) = -4(x+2)^3(2x-3)^2$



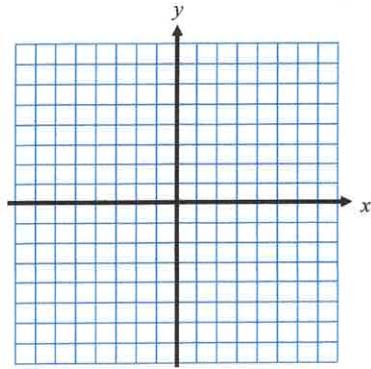
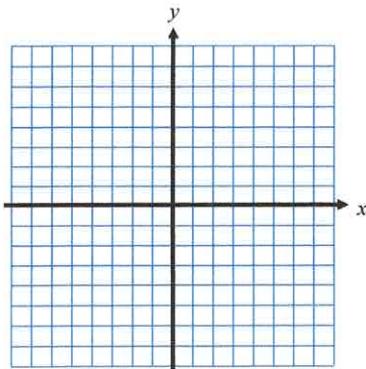
14.  $f(x) = x^4 - 36x^2$



[2.7] Find (if it exists) the a) equations of any horizontal or slant asymptote, b) equations of any vertical asymptote(s) and coordinates of any holes, c)  $x$ -intercept and  $y$ -intercept, and d) graph the function including additional points in each region of the domain OR using a sign chart.

15.  $g(x) = \frac{4x^2 - x - 5}{x^2 - 2x - 3}$

16.  $g(x) = \frac{-2x}{x^2 - x - 6}$



[2.7] 17. Use the rational function below, along with the listed attributes, to graph the function. Include additional points in each region of the domain.

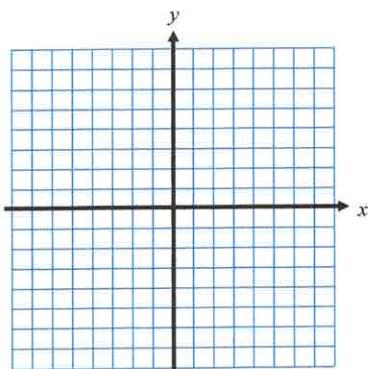
$$f(x) = \frac{x^3 + x^2 - 9x - 9}{x^2 + 2x - 3} = \frac{(x+3)(x-3)(x+1)}{(x+3)(x-1)}$$

SA:  $y = x - 1$

VA:  $x = 1$

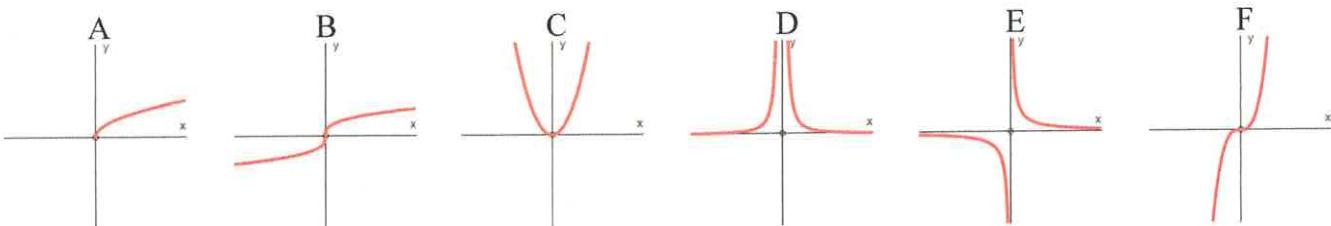
$x$ -intercepts:  $(3, 0)$  and  $(-1, 0)$

$y$ -intercept:  $(0, 3)$



[2.7] 18. Describe the end behavior of the rational function in question 40 using limit notation.

[2.2] For questions 19 & 20, identify the letter of the graph below that best matches the given function.



19.  $f(x) = \frac{1}{2}x^{-5}$

20.  $f(x) = 3x^{1/4}$

**Graphing Calculator Allowed**

Solve algebraically showing all steps. Check for extraneous roots. Write your answers in interval notation where appropriate.

[P3] 21.  $2(5 - 2y) - 3(1 - y) \geq y + 1$

[P5] 22.  $-3 \leq 1 - 2x < 7$

[P5] 23.  $4x^2 - 7x + 5 = 0$

[P6] 24.  $|-x + 4| - 3 > 7$

[2.6] 25.  $(x - 4)^2 + 18 = 9$

[2.8] 26.  $\frac{3x}{x+1} + \frac{5}{x-2} = \frac{15}{x^2 - x - 2}$

[P5] Solve by graphing. Note the procedure used.

27.  $3x - 2 = \sqrt{x + 4}$

28.  $0 = x^3 + x^2 - 5x + 3$

[2.5] 29. Write in  $a + bi$  form:  $\frac{2+4i}{3-2i}$

[2.6] Find a polynomial equation with the given zeros. a) Write the function as a product of linear and irreducible quadratic factors and b) Express function in standard form.

30.  $-1, 2 - i$

31.  $3, 4i$

[2.6] Find the zeros of the function **and** write the function as a product of linear and irreducible quadratic factors all with real coefficients.

32.  $f(x) = x^3 - x^2 - x - 2$ , given zero  $x = 2$

33.  $f(x) = x^4 + 3x^3 - 3x^2 + 3x - 4$ ,  
given zeros  $x = 1$  and  $x = -4$

Solve questions 34-36 using as sign chart.

[P6] 34.  $12x^3 - 14x^2 - 6x \geq 0$

[2.9] 35.  $\frac{2x+1}{x^2+2x-3} \leq 0$

[2.9] 36.  $\frac{2}{x+1} - \frac{3}{x-5} > 0$

[3.5] 37. Solve algebraically and check graphically.

a)  $2(5)^x = 26$

b)  $4 + 3e^{x-5} = 157$

c)  $\ln\left(\frac{x}{5}\right) = -0.2$

d)  $5 = 21 - 2 \log_3(x-7)$

c)  $\log(x) + \log(x+21) = 2$

d)  $\log_2(x-1) - \log_2(2x-3) = 3$

[1.2] 38. Find all a) local maxima and minima and b) identify intervals on which the function is increasing and decreasing.

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

[1.2] Graph the function and tell whether or not it has a point of discontinuity at  $x = 0$ . If there is a discontinuity, tell whether it is removable or non-removable.

$$39. \ f(x) = \frac{|x|}{x}$$

$$40. \ h(x) = \frac{x^2 + x}{x}$$

[1.3] Using the twelve basic parent functions provided in the box, list the equation of the function(s) that fit the description given.

$$f(x) = x$$

$$f(x) = \ln x$$

$$f(x) = e^x$$

$$f(x) = x^2$$

$$f(x) = |x|$$

$$f(x) = x^3$$

$$f(x) = \sqrt{x}$$

$$f(x) = \frac{1}{x}$$

$$f(x) = \sin x$$

$$f(x) = \cos x$$

$$f(x) = \text{int}(x)$$

$$f(x) = \frac{1}{1 + e^{-x}}$$

41. Bounded (3 functions).

42. Increasing on the entire domain (6 functions).

43. Even (3 functions).

[1.4] Given  $f(x) = (x - 4)^2$ ,  $g(x) = 2x - 3$  and  $h(x) = \sqrt{x + 5}$ . Find and simplify the answer.

$$44. \ f \square h(4)$$

$$45. \ h(g(x))$$

$$46. \ (g - f)(x)$$

$$47. \ (fg)(x)$$

[1.4] 48. Given:  $f(x) = x^3 + 2$ . Find  $f^{-1}(x)$ .