

Name Answer Key

Ms. Schmidt

Date \_\_\_\_\_

Pre-Calculus

Final Review #7

1)

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

$$g(x) = 8x^2 + 2x - 1$$

$$8(2x-3)^2 + 2(2x-3) - 1$$

$$8(4x^2 - 12x + 9) + 4x - 6 - 1$$

$$32x^2 - 96x + 72 + 4x - 6 - 1$$

$$32x^2 - 92x + 65$$

2a)

$$f(x) = -4|x| + 5$$

$$D: (-\infty, \infty)$$

$$R: [5, \infty)$$



2b)  $f(x) = 3x^2 - 4$

$$D: (-\infty, \infty)$$

$$R: [-4, \infty)$$



3)

$$\begin{array}{r}
 5x - 7 - \frac{21}{x-2} \\
 x-2 \overline{) 5x^2 - 17x - 12} \\
 \underline{-(5x^2 - 10x)} \phantom{-12} \\
 -7x - 12 \\
 \underline{-(-7x + 14)} \\
 -26
 \end{array}$$

$$5x - 7 - \frac{21}{x-2}$$

4)

$$\frac{\frac{1}{x^2} - 1 \cdot \frac{x^2}{x^2}}{\frac{x}{x} + \frac{1}{x}} = \frac{\frac{1-x^2}{x^2}}{\frac{x+1}{x}}$$

$$\frac{(1-x)(1+x)}{x^2} = \frac{(1-x)(1+x)}{x^2} \cdot \frac{x}{x} = \frac{1-x}{x}$$

$$\frac{(1-x)(\cancel{1+x})}{x^2} \cdot \frac{x}{\cancel{1+x}} = \frac{1-x}{x}$$

5)

$$81^{-3x+3} = \left(\frac{1}{243}\right)^{2x}$$

$$(3)^{3(-3x+3)} = (3)^{-5(2x)}$$

$$3(-3x+3) = -5(2x)$$

$$\begin{array}{r} -9x + 9 = -10x \\ +10x \qquad +10x \end{array}$$

$$\begin{array}{r} x + 9 = 0 \\ -9 \quad -9 \end{array}$$

$$x = -9$$

6)

$$\log \frac{c^3 \sqrt{a}}{\sqrt{b}}$$

$$\log c^3 + \log \sqrt{a} - \log \sqrt{b}$$

$$\log c^3 + \log a^{\frac{1}{2}} - \log b^{\frac{1}{2}}$$

$$3 \log c + \frac{1}{2} \log a - \frac{1}{2} \log b$$

7)

$$\log_4 x + \log_4 (x+6) = 2$$

$$\log_4 \overset{\curvearrowleft}{x(x+6)} = 2$$

$$4^2 = x(x+6)$$

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

$$0 = x^2 + 6x - 16$$

$$0 = (x+8)(x-2)$$

$$x = -8 \quad x = 2$$

8)

$$\sec x - \tan x \sin x = \frac{1}{\sec x}$$

$$\frac{1}{\cos x} - \frac{\sin x}{\cos x} \cdot \frac{\sin x}{1} = \frac{1}{\sec x}$$

$$\frac{1}{\cos x} - \frac{\sin^2 x}{\cos x} = \frac{1}{\sec x}$$

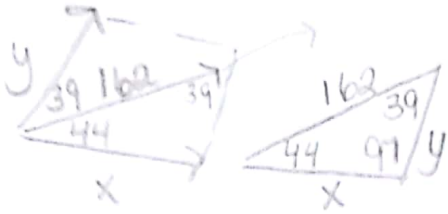
$$\frac{1 - \sin^2 x}{\cos x} = \frac{1}{\sec x}$$

$$\frac{\cos^2 x}{\cos x} = \frac{1}{\sec x}$$

$$\cos x = \frac{1}{\sec x}$$

$$\frac{1}{\sec x} = \frac{1}{\sec x} \checkmark$$

9)



$$\frac{x}{\sin 39} = \frac{162}{\sin 97}$$

$$\frac{x \sin 97}{\sin 97} = \frac{162 \sin 39}{\sin 97}$$

$$x = 102.7 \text{ lbs}$$

$$\frac{y}{\sin 44} = \frac{162}{\sin 97}$$

$$\frac{y \sin 97}{\sin 97} = \frac{162 \sin 44}{\sin 97}$$

$$y = 113.4 \text{ lbs}$$

11)

$$g(x) = \begin{cases} k\sqrt{x+1} & 0 \leq x < 3 \\ 5-x & 3 < x < 5 \end{cases} \quad x=3$$

$$f(3) = k\sqrt{3+1} = 2k$$

$$\lim_{x \rightarrow 3^+} g(x) = \lim_{x \rightarrow 3^-} g(x)$$

$$5-3 = 2k$$

$$2 = 2k$$

$$1 = k$$

10)

$$4x^2 + 5y^2 + 8x - 20y = 56$$

$$4x^2 + 8x + 5y^2 - 20y = 56$$

$$4(x^2 + 2x) + 5(y^2 - 4y) = 56$$

$$\frac{4(x+1)^2 + 5(y-2)^2}{80} = 80$$

$$\frac{(x+1)^2}{20} + \frac{(y-2)^2}{16} = 1$$

$$a = \sqrt{20} = 2\sqrt{5}$$

$$a^2 = b^2 + c^2$$

$$b = 4$$

$$20 = 16 + c^2$$

$$c = 2$$

$$4 = c^2$$

$$2 = c$$

$$\text{Center } (-1, 2)$$

$$\text{Foci } (-3, 2) (1, 2)$$

$$\text{Vertices } (-1+2\sqrt{5}, 2) (-1-2\sqrt{5}, 2)$$

$$(-1, 6) (-1, -2)$$

12a)

$$\lim_{x \rightarrow 2} \frac{x^2 + 4x - 12}{x^2 - 2x} = \frac{0}{0}$$

$$\lim_{x \rightarrow 2} \frac{(x+6)(x-2)}{x(x-2)}$$

$$\lim_{x \rightarrow 2} \frac{x+6}{x} = \frac{2+6}{2} = \frac{8}{2} = 4$$

12b)

$$\lim_{x \rightarrow 2} \frac{2 - \sqrt{x+2}}{x-2} = \frac{0}{0}$$

$$\lim_{x \rightarrow 2} \frac{2 - \sqrt{x+2}}{x-2} \cdot \frac{2 + \sqrt{x+2}}{2 + \sqrt{x+2}}$$

$$\lim_{x \rightarrow 2} \frac{2 - (x+2)}{(x-2)(2 + \sqrt{x+2})} = \frac{-x-2}{(x-2)(2 + \sqrt{x+2})}$$

$$\lim_{x \rightarrow 2} \frac{-1}{2 + \sqrt{x+2}} = \frac{-1}{2 + \sqrt{4}} = \frac{-1}{4}$$

13)

$$\frac{7x+7}{x^2-3x-10} = \frac{A(x+2)}{x-5} + \frac{B(x-5)}{x+2(x-5)}$$

$$7x+7 = Ax+2A+Bx-5B$$

$$7x = Ax+Bx \rightarrow (7=A+B) \quad 5$$

$$7 = 2A-5B \rightarrow 7 = 2A-5B$$

$$35 = 5A + 5B$$

$$7 = 2A - 5B$$

$$42 = 7A$$

$$6 = A$$

$$7 = A+B$$

$$7 = 6+B$$

$$1 = B$$

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

14)

$A = \pm \frac{1}{2}$  determinant

$$A = \pm \frac{1}{2} \begin{vmatrix} -2 & 2 & 1 \\ 1 & 3 & 1 \\ 3 & 0 & 1 \end{vmatrix}$$

$$A = -\frac{1}{2}(-11) = \frac{11}{2}$$

$$15) \quad \begin{array}{l} -x+5y+z=-9 \\ -6x-3y+4z=-21 \\ -2x+2y-4z=-10 \end{array} \quad \begin{array}{l} -4+5(-1)+z=9 \\ -9+z=9 \\ z=0 \end{array}$$

$$\begin{array}{l} -4 \\ (-x+5y+z=-9) \\ -6x-3y+4z=-21 \end{array} \quad \begin{array}{l} -6x-3y+4z=-21 \\ -2x+2y-4z=-10 \end{array}$$

$$4x-20y-4z=36$$

$$-6x-3y+4z=-21$$

$$-2x-23y=15$$

$$-4(-2x-23y=15)$$

$$-8x-y=-31$$

$$8x+92y=-60$$

$$-8x-y=-31$$

$$91y=-91$$

$$(4, -1, 0)$$

$$y=-1$$