

Name Answer key

Date _____

Ms. Schmidt

Pre-Calculus

Final Review #2

1) $f(x) = \sqrt{2x-3}$

$y = \sqrt{2x-3}$

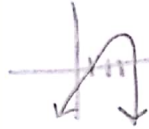
$x^2 = (\sqrt{2y-3})^2$

$x^2 = 2y - 3$
 $+3 \quad +3$

$\frac{x^2+3}{2} = \frac{2y}{2}$

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

2) $y = -x^2 + 6x - 8$



Increasing $(-\infty, 3)$

Decreasing $(3, \infty)$

Constant N/A

3) $f(x) = 2x - 3$ $g(x) = 8x^2$

$(g \circ f)(x)$

$8(2x-3)^2$

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

$32x^2 - 96x + 72$

4) $f(x) = \frac{x^3 - 3x - 14}{x^2 - 4x - 5}$

V.A $\rightarrow x^2 - 4x - 5 = 0$
 $(x-5)(x+1) = 0$
 $x = 5 \quad x = -1$

HA $\rightarrow \frac{x^3}{x^2} = \text{DNE}$

SA $\rightarrow x^2 - 4x - 5 \overline{) x^3 + 0x^2 - 3x - 14}$
 $-(x^2 - 4x^2 - 5x)$
 $4x^2 + 2x - 14$
 $-(4x^2 - 16x - 20)$
 $18x + 6$

$y = x + 4 \leftarrow \text{SA}$

5)

$$\log 729 = \log 8^{-2-x}$$

$$\frac{\log 729}{\log 8} = \frac{(-2-x) \log 8}{\log 8}$$

$$\frac{3.1699\dots}{+2} = \frac{-2-x}{+2}$$

$$\frac{5.1699\dots}{-1} = \frac{-x}{-1}$$

$$x = -5.1699 \approx \boxed{-5.170}$$

6)

$$\log_2 \frac{x^2 \sqrt{y}}{w^3}$$

$$\log_2 x^2 + \log_2 \sqrt{y} - \log_2 w^3$$

$$2 \log_2 x + \frac{1}{2} \log_2 y - 3 \log_2 w$$

7)

$$f(x) = x^4 - x^2 + 1 \text{ at } (2, 13)$$

$$\lim_{x \rightarrow a} \frac{[x^4 - x^2 + 1] - [2^4 - 2^2 + 1]}{x - 2}$$

$$\lim_{x \rightarrow a} \frac{x^4 - x^2 + 1 - 13}{x - 2}$$

$$\lim_{x \rightarrow a} \frac{x^4 - x^2 - 12}{x - 2} = \frac{(x^2 - 4)(x^2 + 3)}{x - 2}$$

$$\lim_{x \rightarrow a} \frac{(x-2)(x+2)(x^2+3)}{x-2} =$$

$$(a+2)(a^2+3)$$

$$(2+2)(2^2+3) = (4)(7) = \boxed{28}$$

8)

$$\lim_{x \rightarrow 2} \frac{4 - \sqrt{18-x}}{x-2} \cdot \frac{(4 + \sqrt{18-x})}{(4 + \sqrt{18-x})}$$

$$\lim_{x \rightarrow 2} \frac{16 - (18-x)}{x-2(4 + \sqrt{18-x})} = \lim_{x \rightarrow 2} \frac{x-2}{x-2(4 + \sqrt{18-x})}$$

$$\lim_{x \rightarrow 2} \frac{1}{4 + \sqrt{18-x}} = \frac{1}{4 + \sqrt{18-2}} = \frac{1}{4 + \sqrt{16}}$$

$$\frac{1}{8}$$

$$9) \frac{[a(x+h)^2 - (x+h) + a] - [ax^2 - x + a]}{h}$$

$$\lim_{h \rightarrow 0} \frac{ax^2 + 4xh + ah^2 - x - h + a - ax^2 + x - a}{h}$$

$$\lim_{h \rightarrow 0} \frac{4xh + ah^2 - h}{h} = \lim_{h \rightarrow 0} 4x + ah - 1$$

$$= 4x - 1 = f'(x)$$

$$f'(2) = 4(2) - 1 = 8 - 1 = 7$$

Tangent

$$y - 5 = 7(x - 2)$$

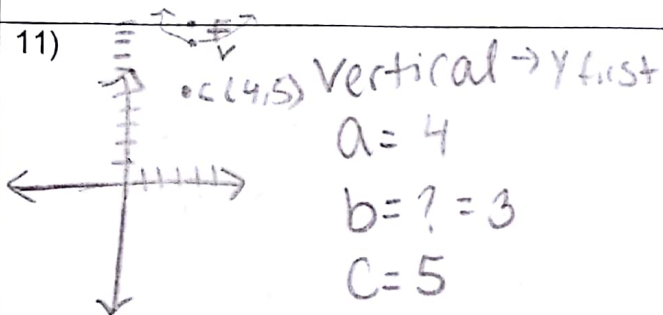
$$10) \frac{[a(x+h)^3 - (x+h) + a] - [ax^3 - x + a]}{h}$$

$$\frac{ax^3 + 3bx^2h + 3bxh^2 + 2h^3 - x - h + a - ax^3 + x - a}{h}$$

$$\frac{3bx^2h + 3bxh^2 + 2h^3 - h}{h}$$

$$3bx^2 + 3bxh + 2h^2 - 1$$

11)



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

$$4^2 + b^2 = 5^2$$

$$b^2 = 9$$

$$b = 3$$

$$\frac{(y-5)^2}{16} - \frac{(x-4)^2}{9} = 1$$

12)

$$a^3 + 27$$

$$\sqrt[3]{a^3} = a \quad \sqrt[3]{27} = 3$$

$$(a+3)(a^2 - 3a + 9)$$

SOAP!

13)

$$(x^6 - 2x^4) + (3x^2 - 6)$$

$$x^4(x^2 - 2) + 3(x^2 - 2)$$

$$(x^4 + 3)(x^2 - 2)$$

14)

$$m^6 - 25n^8$$

DOTS!

$$(m^3 - 5n^4)(m^3 + 5n^4)$$

15)

$$(3x + 2)^4$$

$$4C_4 (3x)^4 (2)^0 = (1)(81x^4)(1) = 81x^4$$

$$4C_3 (3x)^3 (2)^1 = (4)(27x^3)(2) = 216x^3$$

$$4C_2 (3x)^2 (2)^2 = (6)(9x^2)(4) = 216x^2$$

$$4C_1 (3x)^1 (2)^3 = (4)(3x)(8) = 96x$$

$$4C_0 (3x)^0 (2)^4 = (1)(1)(16) = 16$$

$$81x^4 + 216x^3 + 216x^2 + 96x + 16$$

16)

$$\begin{array}{r} 2x - 5 \\ 3x + 1 \overline{) 6x^2 - 13x + 5} \\ \underline{-(6x^2 + 2x)} \\ -15x + 5 \\ \underline{-(15x - 5)} \\ 10 \end{array}$$

NO it is not a factor because it does not divide evenly.

17)

$$\frac{4x^8 - x^2}{32x^7}$$

$$\frac{-4x^{10}}{32x^7}$$

$$\frac{-x^3}{8}$$

18)

$$\left(\frac{3x^{-2}y^9}{z}\right)^{-3}$$

$$\frac{3^{-3}x^6y^{-27}}{z^{-3}}$$

$$\frac{x^6z^3}{27y^{27}}$$

19)

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

$$\frac{3+x}{x^2} \cdot \frac{x^2}{x^2-9}$$

$$\frac{\cancel{3+x}}{\cancel{x^2}} \cdot \frac{\cancel{x^2}}{\cancel{(x+3)}(x-3)} = \frac{1}{x-3}$$

20)

NO

Question!