Name Answer key

Ms. Schmidt

Date _____

Pre-Calculus

Final Review #6

1a)

$9xy^{20} - 81xz^{12}$

$9x(y^{20} - 9z^{12})$

$9x(y^{10} - 3z^6)(y^{10} + 3z^6)$

1b)

$a^3 - 125$

$(a-5)(a^2+5a+25)$

1c)

$4x^2 - 18x + 20$

$2(2x^2 - 9x + 10)$

$20x^2$

$5 \cdot 4$

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

$x(2x-5) - 2(2x-5)$

$2(x-2)(2x-5)$

2)

$4C_4 (x^2)^4 (y^3)^0 = (1)(x^8)(1)$

$4C_3 (x^2)^3 (y^3)^1 = (4)(x^6)(y^3)$

$4C_2 (x^2)^2 (y^3)^2 = (6)(x^4)(y^6)$

$4C_1 (x^2)^1 (y^3)^3 = (4)(x^2)(y^9)$

$4C_0 (x^2)^0 (y^3)^4 = (1)(1)(y^{12})$

$x^8 + 4x^6y^3 + 6x^4y^6 + 4x^2y^9 + y^{12}$

3)

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

$x = 3y^3 + 2$

$-2 \quad -2$

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

$\sqrt[3]{\frac{x-2}{3}} = \sqrt[3]{y^3}$

$\sqrt[3]{\frac{x-2}{3}} = f^{-1}(x)$

4)

$f(x) = 3x^8 - 2x^3 + 9x^2 + 1$

zeros 8

extremas 7

5)

$$3x+2 \overline{)\,12x^3 + 20x^2 + 11x + 2}$$

$$4x^2 + 4x + 1$$

$-(12x^3 + 8x^2)$ ↓

$12x^2 + 11x$

$-(12x^2 + 8x)$ ↓

$3x + 2$

$-(3x + 2)$

0

Yes it is a factor because there is no remainder.

6)

$$\left(\frac{9a^2b^{-3}c}{81a^6b^{-4}c^3}\right)^{-2}$$

$$\frac{9^{-2}a^{-4}b^6c^{-2}}{81^{-2}a^{-12}b^8c^{-6}}$$

$$\frac{81^2a^8c^4}{9^2b^2}$$

$$\boxed{\frac{81a^8c^4}{b^2}}$$

7)

$2(\ln x + 4\ln y) - 5\ln z$

$2(\ln x + \ln y^4) - \ln z^5$

$2(\ln xy^4) - \ln z^5$

$\ln (xy^4)^2 - \ln z^5$

$\ln \frac{(xy^4)^2}{z^5}$

8)

$4x^2 + 32x + 9y^2 - 36y = -64$

$4(x^2 + 8x) + 9(y^2 - 4y) = -64$

$+64 \quad +36$

$4(x+4)^2 + 9(y-2)^2 = 36$

$\frac{36}{36}$

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

$a = 3 \quad a^2 = b^2 + c^2$

$b = 2 \quad 9 = 4 + c^2$

$c = \sqrt{5} \quad 5 = c^2$

foci $(-4 \pm \sqrt{5}, 2)$

Center $(-4, 2)$

vertices $(-1, 2)$ $(-7, 2)$

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

9a)

$\tan -340$

$-340 \quad$ Q I

$+360 \quad$ R $20°$

$20 \quad$ S +

$\tan 20°$

9b)

$\csc -295$

$-295 \quad$ Q I

$+360 \quad$ R 65

$65 \quad$ S +

$\csc 65$

9c)

$\cos 245$

Q III

R $245-180=65$

S −

$-\cos 245$

10)

$$\frac{\csc x - \sin x}{\sin x \csc x} = \csc x - \sin x$$

$$\frac{\frac{1}{\sin x} - \sin x}{\sin x \cdot \frac{1}{\sin x}} = \csc x - \sin x$$

$$\frac{\frac{1}{\sin x} - \sin x}{\frac{\sin x}{\sin x}} = \csc x - \sin x$$

$$\frac{1}{\sin x} - \sin x = \csc x - \sin x$$

$$\csc x - \sin x = \csc x - \sin x$$

11)

$\log_5(x^2-4) + \log_5 4 = 1$

$\log_5 4(x^2-4) = 1$

$5^1 = 4x^2 - 16$

$\frac{21}{4} = \frac{4x^2}{4}$

$\frac{21}{4} = x^2$

$x = \frac{\sqrt{21}}{2}$ $\quad x = -\frac{\sqrt{21}}{2}$

12)

$$\lim_{h\to 0} \frac{2(x+h)^3 - (x+h)^2 - [2x^3 - x^2]}{h}$$

$$\lim_{h\to 0} \frac{2x^3 + 6x^2h + 6xh^2 + 2h^3 - x^2 - 2xh - h^2 - 2x^3 + x^2}{h}$$

$$\lim_{h\to 0} \frac{6x^2h + 6xh^2 + 2h^3 - 2xh - h^2}{h}$$

$$\lim_{h\to 0} 6x^2 + 6xh + 2h^2 - 2x - h$$

$f'(x) = 6x^2 - 2x$

$f'(4) = 6(4)^2 - 2(4) = 88$

$f(4) = 112$

T: $y - 112 = 88(x-4)$

N: $y - 112 = -\frac{1}{88}(x-4)$