Name Answer key

Date _____

Ms. Schmidt

Pre-Calculus

Test 7 Review Answer Sheet

1a)

$$\frac{x}{x^2+3x-10}+\frac{6x-1}{x^2+3x-10}=\frac{5}{x+5}$$

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

$$x+6x-1=5(x-2)$$

$$7x-1=5x-10$$

$$2x-1=-10$$

$$2x=-9$$

$$\boxed{x=\frac{-9}{2}}$$

1b)

$$\frac{x^2+7x+12}{4x^2-2x}-\frac{x-3}{4x-2}=\frac{1}{2x^2-x}$$

$$\frac{x^2+7x+12}{2x(2x-1)}-\frac{x-3}{2(2x-1)}=\frac{1}{x(2x-1)}$$

$$x^2+7x+12-[x^2-3x]=2$$

$$x^2+7x+12-x^2+3x=2$$

$$10x+12=2$$

$$10x=-10$$

$$\boxed{x=-1}$$

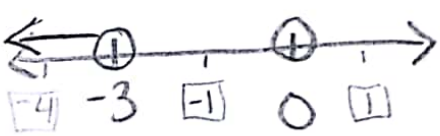
2a)

$$\frac{4}{3x^2}+\frac{1}{3x}<\frac{1}{3x^2}$$ C.P. $x=0$

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

$$4+x=1$$

$$x=-3$$



$(-\infty,-3)$

2b)

$$\frac{6}{x+3}\geq 1-\frac{3}{x+3}$$ C.P. $x=-3$

$$\frac{6}{x+3}=1-\frac{3}{x+3}$$

$$6=x+3-3$$

$$6=x$$

$(-3,6]$

3a)

$a^1 b^0 \cdot a^4 b^{-1} \cdot 3a^4 b^{-3}$

$3a^9 b^{-4} \rightarrow \frac{3a^9}{b^4}$

3b)

$-x^4 y^{-3} \cdot y x^2 \cdot (2yx^{-1})^{-2}$

$-x^4 y^{-3} \cdot y x^2 \cdot 2^{-2} y^{-2} x^2$

$-2^{-2} x^8 y^{-4}$

$\frac{-x^8}{2^2 y^4} \rightarrow \frac{-x^8}{4y^4}$

3c)

$(x^{-1} y^{-\frac{4}{3}})^{\frac{1}{2}} \cdot x^2 y^{1/4}$

$x^{-1/2} y^{-\frac{2}{3}} \cdot x^2 y^{1/4}$

$x^{3/2} y^{-5/12}$

$\frac{x^{3/2}}{y^{5/12}}$

3d)

$\frac{(yx^{1/2})^{4/3}}{xy^2 \cdot x^{-\frac{5}{4}} y^2}$

$\frac{y^{\frac{4}{3}} x^{\frac{2}{3}}}{xy^2 \cdot x^{-\frac{5}{4}} y^2} \rightarrow \frac{y^{\frac{4}{3}} x^{\frac{2}{3}}}{x^{-1/4} y^4}$

$y^{-8/3} x^{11/12} \rightarrow \frac{x^{11/12}}{y^{8/3}}$

4a)

$\frac{(4x^2y^5)^{2/3}}{\sqrt[3]{(4x^2y^5)^2}}$

$\sqrt[3]{16x^4y^{10}}$

$\sqrt[3]{8x^3y^9} \sqrt[3]{2xy}$

$2xy^3 \sqrt[3]{2xy}$

4b)

$5(xy^3)^{-3/2} \rightarrow \frac{5}{(xy^3)^{3/2}}$

$\frac{5}{\sqrt{x^3y^9}} \leftarrow \frac{5}{\sqrt{(xy^3)^3}}$

$\sqrt{x^2y^8} \sqrt{xy}$

$xy^4 \sqrt{xy} \rightarrow \frac{5}{xy^4\sqrt{xy}}$

5a)

$x^{-2}\sqrt[5]{x^3y^4} \cdot y\sqrt{x^3y}$

$x^{-2} \cdot (x^3y^4)^{1/5} \cdot y\,(x^3y)^{1/2}$

$x^{-2} \cdot x^{3/5} y^{4/5} \cdot y\, x^{3/2} y^{1/2}$

$x^{1/10} y^{\frac{23}{10}}$

5b)

$\frac{\sqrt[3]{x^2y^4}}{\sqrt[4]{xy^7}} \rightarrow \frac{(x^2y^4)^{1/3}}{(xy^7)^{1/4}} \rightarrow \frac{x^{\frac{2}{3}} y^{\frac{4}{3}}}{x^{1/4} y^{7/4}}$

$x^{\frac{5}{12}} y^{-\frac{5}{12}}$

$\frac{x^{5/12}}{y^{5/12}}$

6a)

$13 = 2\sqrt{5x+1}$ -7 $+7$

$\frac{20}{2} = \frac{2\sqrt{5x+1}}{2}$

$(10)^2 = (\sqrt{5x+1})^2$

$100 = 5x+1$ -1

$\frac{99}{5} = \frac{5x}{5}$

$\frac{99}{5} = x$

Check

$13 = 2\sqrt{5(\frac{99}{5})+1} - 7$

$13 = 13$ ✓

6b)

$x = 6 + \sqrt{20-2x}$

$-6 \quad -6$

$(x-6)^2 = (\sqrt{20-2x})^2$

$x^2 - 12x + 36 = 20 - 2x$

$+2x \quad -20 \quad -20 + 2x$

$x^2 - 10x + 16 = 0$

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

$x = 8$ ~~$x = 2$~~

Check

$x = 8$

$8 = 6 + \sqrt{20-2(8)}$

$8 = 8$ ✓

~~$x = 2$~~

~~$2 = 6 + \sqrt{20-2(2)}$~~

7a)

$256 = (x-22)^{3/4}$ ~~$4/3\ (3/4)$~~

$\pm 64 = x - 22$

$64 = x-22$ $\quad -64 = x-22$

$+22 \quad +22 \quad +22 \quad +22$

$86 = x \quad -42 = x$

Check

$86 = x$

$256 = (86-22)^{4/3}$ ✓

$-42 = x$

$256 = (-42-22)^{4/3}$ ✓

7b)

$-\frac{25}{7} = -4(2x-11)^{-\frac{1}{2}} - 3$

$+3 \quad +3$

$-\frac{4}{7} = -4(2x-11)^{-1/2}$

$-4 \quad -4$

$\frac{1}{7} = (2x-11)^{-1/2}$ (-2) (-2)

$49 = 2x - 11$

$+11 \quad +11$

$60 = 2x$

$30 = x$

Check

$-\frac{25}{7} = -4(2x-11)^{-1/2} - 3$

✓

8a) $3^{3n} = 3^{2-n}$

$3n = 2 - n$

$+n \quad +n$

$4n = 2$

$n = 1/2$

Check

$3^{3(1/2)} = 3^{2-1/2}$

$3^{3/2} = 3^{3/2}$ ✓

8b) $36^{x+1} = 216^{3-3x}$

$(6^2)^{x+1} = (6^3)^{3-3x}$

$2x + 2 = 9 - 9x$

$11x + 2 = 9$

$-2 \quad -2$

$11x = 7$

$x = 7/11$

Check

$36^{7/11+1} = 216^{3-3(7/11)}$ → ✓

8c) $81^{-3x+3} = \left(\frac{1}{243}\right)^{2x}$

$(3^4)^{-3x+3} = (3^{-5})^{2x}$

$-12x + 12 = -10x$

$12 = 2x$

$6 = x$

Check

$81^{-3(6)+3} = \left(\frac{1}{243}\right)^{2(6)}$

✓

8d) $16^{2x-2} \cdot 64 = 32^{-3x}$

$(2^4)^{2x-2} \cdot 2^6 = (2^5)^{-3x}$

$8x - 8 + 6 = -15x$

$8x - 2 = -15x$

$23x = 2$

$x = 2/23$

Check

$16^{2(2/23)-2} \cdot 64 = 32^{-3(2/23)}$ ✓

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

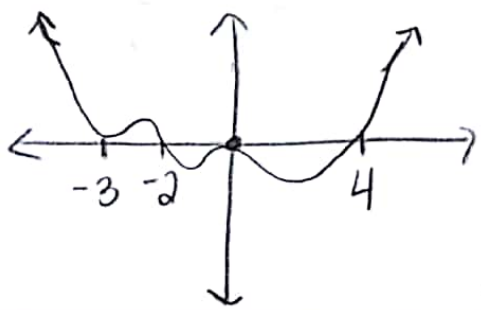
D: $x^2 \cdot x^2 \cdot x \cdot x = x^6$

end behavior

$x \to \infty \quad f(x) \to \infty$

$x \to -\infty \quad f(x) \to \infty$

	$x^2 = 0$	$x+3=0$	$x-4=0$	$x+2=0$
	$x=0$	$x=-3$	$x=4$	$x=-2$
multiplicity →	Bounce	Bounce	Cross	Cross



9b) $f(x) = (-x^3 + 25x)(x^2 - 4x - 5)$

D: $-x^3 \cdot x^2 = -x^5$

end behavior

$x \to \infty \quad f(x) \to -\infty$

$x \to -\infty \quad f(x) \to \infty$

$-x(x^2-25)(x-5)(x+1)$

$-x(x+5)(x-5)(x-5)(x+1)$

$-x(x+5)(x-5)^2(x+1)$

	$-x=0$	$x+5=0$	$x-5=0$	$x+1=0$
	$x=0$	$x=-5$	$x=5$	$x=-1$
	cross	cross	bounce	cross