Name____ Date____________

Pre-Calculus Review Test #2

1. Given the following polynomials perform the indicated operation:

$f(x)=2x-7$ $\quad g(x)=4x^2+2x-3$ $\quad h(x)=4x^3-6x^2+2x$ $\quad j(x)=2x$

a. $g(x)+h(x)$ b. $h(x)-g(x)$ c. $f(x)g(x)$ d. $\dfrac{h(x)}{j(x)}$

2. Find the difference quotient in simplest form for each function. $\dfrac{f(x+h)-f(x)}{h}$, $h \neq 0$

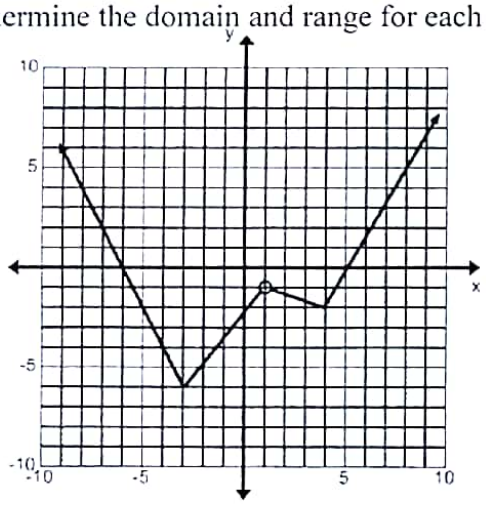
a. $f(x)=3x+1$ b. $f(x)=2x^2-3x+5$

3. Given $f(x)$ find $f^{-1}(x)$:

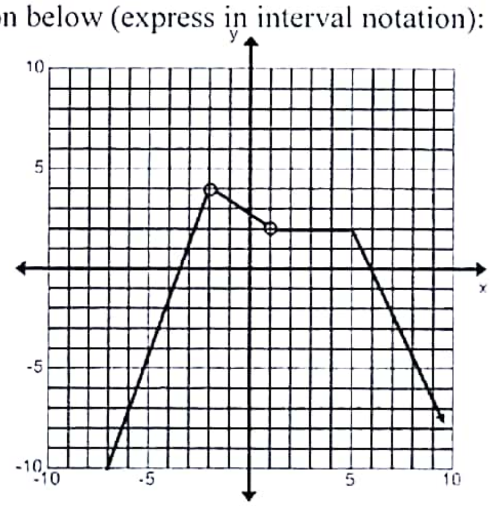
a. $f(x)=3x+5$ *b.* $g(x)=\sqrt[3]{5x}+9$ *c.* $h(x)=\dfrac{5}{2}x-\dfrac{3}{2}$

4. Determine the domain and range for each of the function below (express in interval notation):

a.



b.



5. Given the function verify $(f\circ f^{-1})(x)=x$, algebraically:

a. $f(x)=3x-5$ b. $f(x)=\sqrt{2x+7}$

6. Factor Completely:

a. $8x^4 + 27xy^3$ b. $6x^4 - 11x^2 - 10$ c. $10x^2 - 5x - 6x + 3$ d. $4x^4 - 13x^2 + 9$

7. Expand the binomial:

a. $\left(2x - y\right)^5$ b. $\left(3a^2 + 2b^3\right)^4$

8. Find the nth term:

a. 4th term $\left(x - 2y\right)^9$

b. last term $\left(3x^2 + 2y^3\right)^7$

c. middle term $\left(x - 3y^2\right)^6$

9. Given the functions find the indicated composition:

a. $f\left(x\right) = 3x + 5$ $g\left(x\right) = 2x + 1$
$f\left(g\left(x\right)\right)$

b. $f\left(x\right) = x - 5$ $g\left(x\right) = 2x^2 + 3x - 4$
$\left(g \circ f\right)\left(x\right)$

10. Solve each equation using the indicated procedure and express in simplest radical form:

a. Complete the Square
$2x^2 - 16x + 8 = 0$

b. Quadratic Formula
$x^2 - 2x = 5$

Name: Answer Key Pd: ______ Date: ______

Ms. Schmidt Pre-Calculus

Review for Test #2

1a) $g(x) + h(x)$

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

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

1b) $h(x) - g(x)$

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

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

$4x^3 - 10x^2 + 3$

1c) $(fg)(x)$

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

$8x^3 + 4x^2 - 6x - 28x^2 - 14x + 21$

$8x^3 - 24x^2 - 20x + 21$

1d) $\frac{h(x)}{g(x)}$

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

$2x^2 - 3x + 1$

2a) $f(x) = 3x + 1$

$\frac{f(x+h) - f(x)}{h}$

$\frac{[3(x+h)+1] - [3x+1]}{h}$

$\frac{\cancel{3x} + 3h \cancel{+1} - \cancel{3x} \cancel{-1}}{h}$

$\frac{3\cancel{h}}{\cancel{h}} = 3$

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

$\frac{f(x+h) - f(x)}{h}$

$\frac{[2(x+h)^2 - 3(x+h) + 5] - [2x^2 - 3x + 5]}{h}$

$\frac{[2(x^2 + 2xh + h^2) - 3x - 3h + 5] - [2x^2 - 3x + 5]}{h}$

$\frac{\cancel{2x^2} + 4xh + 2h^2 \cancel{- 3x} - 3h \cancel{+5} \cancel{- 2x^2} \cancel{+ 3x} \cancel{- 5}}{h}$

$\frac{4xh + 2h^2 - 3h}{h}$

$\frac{\cancel{h}(4x + 2h - 3)}{\cancel{h}} = 4x + 2h - 3$

3a) $y=3x+5$

$x=3y+5$

$-5 \quad -5$

$\frac{x-5}{3}=\frac{\cancel{3}y}{\cancel{3}}$

$\frac{x-5}{3}=y=f^{-1}(x)$

3b) $g(x)=\sqrt[3]{5x}+9$

$x=\sqrt[3]{5y}+9$

$-9 \quad -9$

$(x-9)^3=(\sqrt[3]{5y})^3$

$\frac{(x-9)^3}{5}=\frac{\cancel{5}y}{\cancel{5}}$

$\frac{(x-9)^3}{5}=y=g^{-1}(x)$

3c) $h(x)=\frac{5}{2}x-\frac{3}{2}$

$x=\frac{5}{2}y-\frac{3}{2}$

$+\frac{3}{2} \quad +3/2$

$\left(\frac{2}{5}\right)x+\frac{3}{2}=\frac{5}{2}y\left(\frac{2}{5}\right)$

$\frac{2}{5}x+\frac{3}{5}=y=h^{-1}(x)$

4a) D: $(-\infty,1)\cup(1,\infty)$

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

4b) D: $(-\infty,-2)\cup(-2,1)\cup(1,\infty)$

R: $(-\infty,4)$

5a) $f(x)=3x-5$

$x=3y-5$

$+5 \quad +5$

$\frac{x+5}{3}=\frac{\cancel{3}y}{\cancel{3}}$

$\frac{x+5}{3}=y=f^{-1}(x)$

$(f\circ f^{-1})(x)$

$\cancel{3}\left(\frac{x+5}{\cancel{3}}\right)-5$

$x+\cancel{5}-\cancel{5}$

x

Yes they are inverses!

5b) $f(x)=\sqrt{2x+7}$

$(x)^2=(\sqrt{2y+7})^2$

$x^2=2y+7$

$-7 \quad -7$

$\frac{x^2-7}{2}=\frac{\cancel{2}y}{\cancel{2}}$

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

$(f\circ f^{-1})(x)$

$\sqrt{2\left(\frac{x^2-7}{2}\right)+7}$

$\sqrt{x^2\cancel{-7}\cancel{+7}}$

$\sqrt{x^2}$

x

Yes they are inverses!

6a) $8x^4+27xy^3$ $\quad a=2x$, $b=3y$

$x(8x^3+27y^3)$

$x(2x+3y)(4x^2-6xy+9y^2)$

6b) $6x^4-11x^2-10$

$6x^4+4x^2-15x^2-10$

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

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

6c) $(10x^2-5x)(-6x+3)$

$5x(2x-1) \quad -3(2x-1)$

$(5x-3) \quad (2x-1)$

6d) $4x^4-13x^2+9$

$4x^4-4x^2-9x^2+9$

$4x^2(x^2-1) \quad -9(x^2-1)$

$(4x^2-9) \quad (x^2-1)$ DOTS!

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

7a) $n=5 \quad r=5,4,3,2,1,0$

${}_5C_5\,(2x)^5(-y)^0=(1)(32x^5)(1)$

${}_5C_4\,(2x)^4(-y)^1=(5)(16x^4)(-y)$

${}_5C_3\,(2x)^3(-y)^2=(10)(8x^3)(y^2)$

${}_5C_2\,(2x)^2(-y)^3=(10)(4x^2)(-y^3)$

${}_5C_1\,(2x)^1(-y)^4=(5)(2x)(y^4)$

${}_5C_0\,(2x)^0(-y)^5=(1)(1)(-y^5)$

$32x^5-80x^4y+80x^3y^2-40x^2y^3$
$+10xy^4-y^5$

7b) $n=4 \quad r=4,3,2,1,0$

${}_4C_4\,(3a^2)^4(2b^3)^0=(1)(81a^8)(1)$

${}_4C_3\,(3a^2)^3(2b^3)^1=(4)(27a^6)(2b^3)$

${}_4C_2\,(3a^2)^2(2b^3)^2=(6)(9a^4)(4b^6)$

${}_4C_1\,(3a^2)^1(2b^3)^3=(4)(3a^2)(8b^9)$

${}_4C_0\,(3a^2)^0(2b^3)^4=(1)(1)(16b^{12})$

$81a^8+216a^6b^3+108a^4b^6+96a^2b^9$
$+16b^{12}$

8a) $r=9,8,7,\boxed{6},5,4,3,2,1,0 \quad n=9$

${}_9C_6\,(x)^6(-2y)^3$

$(84)(x^6)(-8y^3)=-672x^6y^3$

8b) $r=7,6,5,4,3,2,1,0 \quad n=7$

${}_7C_0\,(3x^2)^0(2y^3)^7$

$(1)(1)(128y^{21})=128y^{21}$

8c) $n=6 \quad n=6,5,4,\boxed{3},2,1,0$

${}_6C_3\,(x)^3(-3y^2)^3$

$(20)(x^3)(-27y^6)=-540x^3y^6$

9a) $f(x)=3x+5 \quad g(x)=2x+1$

$f(g(x))=3(2x+1)+5$

$=6x+3+5$

$f(g(x))=6x+8$

9b) $(g\circ f)(x) \quad f(x)=x-5$

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

$(g\circ f)(x)=2(x-5)^2+3(x-5)-4$

$=2(x^2-10x+25)+3x-15-4$

$=2x^2-20x+50+3x-15-4$

$(g\circ f)(x)$

$=2x^2-17x+31$

10a)

$\frac{1}{2}(-8)=(-4)^2=16$

$2x^2-16x+8=0$

$-8 \quad -8$

$\frac{2x^2-16x}{2}=\frac{-8}{2}$

$x^2-8x+16=-4+16$

$\sqrt{(x-4)^2}=\sqrt{12}$

$x-4=\pm\sqrt{12}$

$+4 \quad +4$

$x=\pm\sqrt{12}+4$

10b)

$x^2-2x=5$

$-5 \quad -5$

$x^2-2x-5=0$

$a=1$

$b=-2$

$c=-5$

$\frac{-(-2)\pm\sqrt{(-2)^2-4(1)(-5)}}{2(1)}$

$\frac{2\pm\sqrt{4+20}}{2}$

$\frac{2\pm\sqrt{24}}{2}$ $\sqrt{4}=2$, $\sqrt{6}$

$\frac{\cancel{2}\pm\cancel{2}\sqrt{6}}{\cancel{2}}=1\pm\sqrt{6}$