Math 1111 Practice Problems Test 3 Solutions

1) Not a polynomial because $\frac{4}{3}$ is not an integer. (Third Choice)

2) yes Polynomial of degree 4. (A)

3) $(x+3)(x+1)(x-3)(x-5)$

4) $(x+1)(x+2)(x+2)$

$$\begin{array}{r} x+2 \\ \underline{x+2} \\ x^2+2x \\ \quad +2x+4 \\ \hline x^2+4x+4 \\ \quad\quad x+1 \\ \hline x^3+4x^2+4x \\ \quad\quad x^2+4x+4 \end{array}$$

x^3+5x^2+8x+4 answer

5) find domain (set denominator $=0$)

$(x-4)(x+7)=0$

$x=4$ $x=-7$

6) find domain (set denominator $=0$)

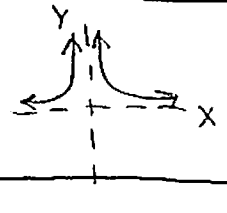
$2x^2-9x-5=0$

$(2x+1)(x-5)=0$

$2x+1=0$ | $x-5=0$

$x=-\frac{1}{2}$ | $x=5$

7) shift right 2 & up 2, basic graph $y=\frac{1}{x^2}$



8) V.A (set denom $=0$) $x+8=0$ $x=-8$

H.A. (same degree) $y=\frac{a_n}{b_n}=\frac{14}{1}=14$

S.A. none

9) V.A. (set denom = 0) $9x^4 = 0$ $x^4 = 0$ $x = 0$

H.A. (bottom heavy) $y = 0$

S.A none

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10) calculator (B)

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11) $f(x) = 3x \quad g(x) = 4x^2 + 2$

a) $(f \circ g)(4) = f[g(4)] = f[4(4)^2+2] = f[66] = 3(66) = 198$

b) $(g \circ f)(2) = g[f(2)] = g[3(2)] = g(6) = 4(6)^2+2 = 146$

c) $(f \circ f)(11) = f[f(11)] = f[3(11)] = f[3] = 3(3) = 9$

d) $(g \circ g)(0) = g[g(0)] = g[4(0)^2+2] = g(2) = 4(2)^2+2 = 18$

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12) $f(x) = 2x^2 - 1 \quad g(x) = 4 - \frac{1}{2}x^2$

a) $(f \circ g)(4) = f[g(4)] = f[4 - \frac{1}{2}(4)^2] = f[-4] = 2(-4)^2 - 1 = 31$

b) $(g \circ f)(2) = g[f(2)] = g[2(2)^2-1] = g(7) = 4 - \frac{1}{2}(7)^2 = \frac{8}{2} - \frac{49}{2} = \frac{-41}{2}$

c) $f \circ f(1) = f[f(1)] = f[2(1)^2-1] = f[1] = 2(1)^2 - 1 = 1$

d) $g \circ g(0) = g[g(0)] = g[4 - \frac{1}{2}(0)^2] = g[4] = 4 - \frac{1}{2}(4)^2 = -4$

13) $f(x) = 3\sqrt{x}$ $g(x) = 2x$

a) $(f \circ g)(4) = f[g(4)] = f[2(4)] = f(8) = 3\sqrt{8} = 3(2\sqrt{2}) = 6\sqrt{2}$

b) $(g \circ f)(2) = g[f(2)] = g(3\sqrt{2}) = 2(3\sqrt{2}) = 6\sqrt{2}$

c) $(f \circ f)(1) = f[f(1)] = f[3\sqrt{1}] = f(3) = 3\sqrt{3}$

d) $(g \circ g)(0) = g[g(0)] = g[2(0)] = g(0) = 2(0) = 0$

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14) $f(x) = 11x$ $g(x) = \frac{1}{11}x$ equal yes!

$(f \circ g)(x) = f[g(x)] = 11\left(\frac{1}{11}x\right) = x$

$(g \circ f)(x) = g[f(x)] = \frac{1}{11}(11x) = x$

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15) $f(x) = 6x - 5$ $g(x) = \frac{1}{6}(x+5)$

$(f \circ g)(x) = f[g(x)] = 6\left(\frac{1}{6}(x+5)\right) - 5 = x + 5 - 5 = x$

$(g \circ f)(x) = g[f(x)] = \frac{1}{6}(6x - 5 + 5) = \frac{1}{6}(6x) = x$

equal? yes

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16) no not one to one HLT Bailo

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17) inverse $\{(0,-5), (3,-10), (-3,7), (-15,0), (-14,3)\}$

domain $\{0, 3, -3, -15, -14\}$

range $\{-5, -10, 7, 0, 3\}$

18) $f(x) = x^3 - 2$ $\quad g(x) = \sqrt[3]{x+2}$

a) $f[g(x)] = (\sqrt[3]{x+2})^3 - 2 = x+2-2 = x$ ✓

no values excluded

b) $g(f(x)) = \sqrt[3]{x^3-2+2} = \sqrt[3]{x^3} = x$ ✓

no values excluded

c) yes they are inverses

$f(g x) = g(f(x)) = x$

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19) choice (B)

function $\{(-3,-3), (-2,0), (1,2), (3,4)\}$

inverse $\{(-3,-3), (0,-2), (2,1), (4,3)\}$

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20) $f(x) = 2x$

a) find inverse

$y = 2x$

$\frac{x}{2} = \frac{2y}{2}$

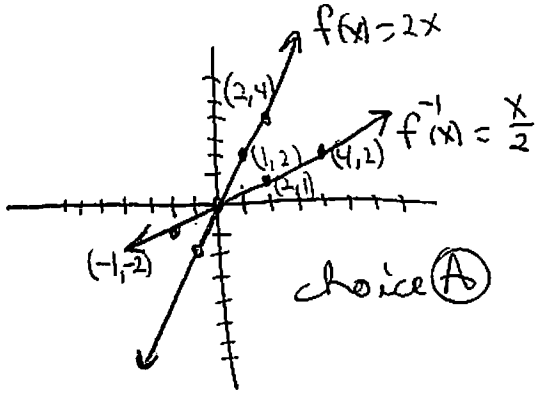
$y = \frac{x}{2}$

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

b) $f(x)$ all reals D + R

c) $f^{-1}(x)$ all reals D + R

d)



choice (A)

21) $f(x) = 8x+2$

a) find inverse

$y = 8x+2$

$x = 8y+2$

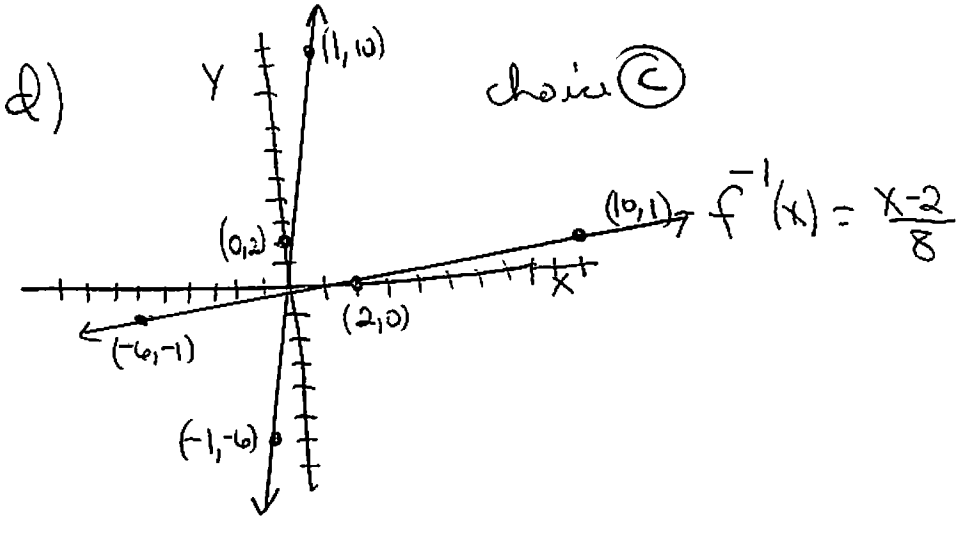
$x-2 = 8y$

$y = \frac{x-2}{8}$

$\boxed{f^{-1}(x) = \frac{x-2}{8}}$

b) all reals for $f(x)$ D + R

c) all reals for $f^{-1}(x)$ D + R

d) 

choice (c)

$f^{-1}(x) = \frac{x-2}{8}$

$f(x) = 8x+2$