① $\frac{25y^{10} \times z^{14}}{49x^4 z^6 y^{2/3}} = \frac{25y^{28/3} z^8}{49x^3}$

② $\frac{y^3 z^{11}}{x^8} = \frac{y^3 z^{11}}{x^8}$

③ $\frac{x^9 z^{12}}{125 y^{15}}$

④ $\frac{1}{x^{17/2}}$

⑤ $(2x-3y)(2x-3y)(2x-3y)$ (could use Binomial Thrm)

$(4x^2 - 12xy + 9y^2)(2x-3y)$

$8x^3 - 12x^2y - 24x^2y + 36xy^2 + 18xy^2 - 27y^3$

$8x^3 - 36x^2y + 54xy^2 - 27y^3$

⑥ $2x^4 - 3x^2 - 3x^4 = -x^4 - 3x^2$

⑦ $(4x^3 - 6x^2)(x-1) - (x^4 - 2x^3)$

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

$3x^4 - 8x^3 + 6x^2$

⑧ $x(x^3 + 64) = x(x+4)(x^2 - 4x + 16)$

⑨ $3x^2 + 5x + 2$

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

⑩ $9(x^2 - 9y^2)$

$9(x+3y)(x-3y)$

(11) $(x-3)^3(x+2)\left[(x+2)-(x-3)\right]$

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

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

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

(13) $\frac{(4x+1)(x-5)}{(2x+1)(x-1)} \div \frac{(x+3)(x-1)}{(x+1)(x+1)} \cdot \frac{(1-x)(1+x)}{(4x+1)(4x-1)}$

$\frac{-1(x-5)(x-1)}{(2x+1)(4x+1)(x+1)}$

(14) $1+\frac{1}{x} = \frac{x+1}{x}$

(15) $\frac{(x+5)^4}{(3x-3)^2} + \frac{(x+5)^3}{(3x-1)} = \frac{(x+5)^4(3x-1)+(x+5)^3(3x-3)^2}{(3x-3)^2(3x-1)}$

(16) $\frac{5(2x-1)(x+2)+3x(x+2)-x(2x-1)}{15x(2x-1)(x+2)}$

(17) $\frac{1+2x}{x} \cdot \frac{x}{4x-1} = \frac{1+2x}{4x-1}$

(18) $\frac{3(x+4)+1}{\frac{x+4}{1-(x-4)}} = \frac{3x+13}{x+4} \cdot \frac{x-4}{5-x}$

(19) $x^2+2x-8=0$

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

$\{-4, 2\}$

(20) $(3x-1)^2=-12$

$3x-1=\pm 2i\sqrt{3}$

Imaginary really do not exist

$x=\frac{1\pm 2i\sqrt{3}}{3}$

(21) $x^3=\frac{27}{8}$

$x=\frac{3}{2}$

(22) $6-x-2=-4x-12$

$4-x=4x-12$

$16=5x$

$x=\frac{16}{5}$

(23) $\frac{6}{(x+2)(x-1)}+\frac{3}{x(x-1)}=\frac{5}{x-1}$

$6x+3(x+2)=5x(x+2)$

$6x+3x+6=5x^2+10x$

$0=5x^2+x-6$

$0=(5x+6)(x-1)$

$\{\frac{-6}{5}, 1\}$ extraneous

-360

-9

(24) $4x-8=0$

$x=2$

(25) $18x^2-9x-20=0$

$(3x-4)(6x+5)$

$\{\frac{4}{3}, \frac{-5}{6}\}$

$\frac{9\pm\sqrt{81-4(18)(-20)}}{36}$

$\frac{9\pm 39}{36}=$

(26) $x^3=\frac{27}{81}=\frac{3^3}{3^4}$

$x=\frac{3}{3\sqrt[3]{3}}=\frac{1}{\sqrt[3]{3}}$

(27) $\sqrt[3]{x+3} = 6$

$x + 3 = 6^3$

$x = 6^3 - 3$

(28) $3x^2 - 11x + 6 = 0$

$(3x - 2)(x - 3)$

$\left\{\frac{2}{3}, 3\right\}$

(29) $x^4 = \frac{16}{81}$

$x = \pm \frac{2}{3}$

(30) $6 = 2x + 2 - 1$

$6 = 2x + 1$

$5 = 2x$

$x = \frac{5}{2}$

(31) $m = \frac{5+7}{3-2} = \frac{12}{1}$

$y - 5 = 12(x - 3)$

OR

$y + 7 = 12(x - 2)$

(32) $m = \frac{3}{5}$

$\perp m = \frac{-5}{3}$

$y + 7 = \frac{-5}{3}(x - 2)$

(33) $F(-4) = 11$ $F(-3) = 3$ $F(0) = 3$ $F(2) =$ DNE

(34) $f(-x) = -3x^4 - 5x^2 + 7 = F(x)$

Even. Symmetry about y-axis (line)

(35) $F(-x) = -x^3 + 5x = -F(x)$

odd. Symmetry about origin (point)

(36) Reflect over x-axis. Vertical Stretch by factor of 3. Right 5

(37) Vertical condense by factor $\frac{1}{4}$.

Down 5

(38) $$\frac{3(x+h)-7-(3x-7)}{h} = \frac{3x+3h-7-3x+7}{h}$$

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

(39) $$\frac{(x+h)^3-(x)^3}{h} = 3x^2$$

(40) a) x^2+5x-4

b) x^3-3x^2-5x+3

c) $\frac{x^2-1}{5x-3}$

d) $(5x-3)^2-1 =$
$25x^2-30x+8$

(41) a) $\sqrt{5x+1}+2x$

b) $2x\sqrt{5x-1}$

c) $\frac{\sqrt{5x-1}}{2x}$

d) $\sqrt{10x-1}$

(42) a) 1 b) 4 c) -1 d) -1 e) 4 f) -2

(43) -5

1	-12	-55	150
↓	-5	85	-150
1	-17	30	0

$x^2-17x+30$

$(x-15)(x-2)$

$\{2, 15, -5\}$

(44) -8

5	36	-33	-8
↓	-40	32	8
5	-4	-1	0

$5x^2-4x-1$

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

$\{-8, -\frac{1}{5}, 1\}$

(45) $(-\infty, \infty)$

(46) $2x - 4 = 0$

$x = 2$

$(-\infty, 2) \cup (2, \infty)$

(47) $\sqrt{2x-8} > 0$

$x > 4$

$(4, \infty)$

(48) $(-\infty, 0) \cup (0, \infty)$

(49) $\sqrt{2x^2-8} > 0$

$2x^2 > 8$

$x^2 > 4$

$x > \pm 2$

$(-\infty, -2) \cup (2, \infty)$

(50) HA: $y = 0$

VA: $x = 3$ $x = -2$

(51) HA: $y = 1$

VA: $x = 1$

(52) HA: None

Oblique: None

POD: $x = -3$

VA: None

(53) HA: None

Oblique exists

VA: $x = 1$

(54) They are inverses because

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

(55) They are inverses because

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

(56) $2^{x^2-x-4} = 4$

$x^2 - x - 4 = 2$

$x^2 - x - 6 = 0$

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

$\{3, -2\}$

(57) $x = \sqrt{1331}$

or $11^{3/2}$

(58) $e^{1/2} = e^{3x}$

$\frac{1}{2} = 3x$

$x = \frac{1}{6}$

(59) $x = \log_2 \frac{1}{4}$

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

$x = -2$

(60) $\frac{1}{3} \log_2 32$

$\frac{1}{3} \cdot 5 = \frac{5}{3}$

(61) $x^6 = 64$

$x = 2$

(62) $5^2 = x$

$x = 25$

(63) $3^2 \cdot 3^{x-3} = 3^{3(-2x)}$

$2 + x - 3 = -6x$

$-1 = -7x$

$x = \frac{1}{7}$

(64) $\frac{2}{3} \log_m x + \frac{5}{3} \log_m y - \frac{7}{3} \log_m z$

(65) $2 \log_7 (x+3) + \log_7 (2x-7)$

(66) $\log_m \frac{\sqrt[3]{x}}{\sqrt[4]{y+2}}$

(67) $\frac{x^2-9}{x+3} = 10$

$x^2 - 9 = 10x + 30$

$x^2 - 10x - 39 = 0$

$(x-13)(x+3)$

$x = 13, \cancel{x = -3}$

↑ extraneous

(68) $(x \quad)(x \quad) = 0$

Not factorable

$\frac{-2 \pm \sqrt{4-4(-4)}}{2} = \frac{-2 \pm \sqrt{20}}{2}$

$-1 \pm \sqrt{5}$

(69) $ix = 4$

"Imaginary" "exist" as well, but they don't exist

(70) $10^{x+7} = 13$

$(x+7)\ln 10 = \ln 13$

$x = \frac{\ln 13}{\ln 10} - 7$ or $\log 13 - 7$

(71) $x - 2 = 0$

$x = 2$

$e^{-x} = 0$

Never

(72) $4x^2 + 4 = 4x^2 + 4x + 1$

$4 = 4x + 1$

$x = \frac{3}{4}$

(73) $x^{5/3} = 0 \quad (6-x)^{4/3} = 0$

$x = 0 \quad x = 6$

(74) $\ln(4x) = 8$

$e^8 = 4x$

$x = \frac{e^8}{4}$

(75) $\log_2(x^2 - 2x - 3) = 1$

$x^2 - 2x - 3 = 2$

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

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

$\frac{2 \pm \sqrt{24}}{2} = 1 \pm \sqrt{6}$

$1+\sqrt{6}$ only

(76) $3 = x + 2x + 2$

$3 = 3x + 2$

$x = \frac{1}{3}$

(77) ~~x^2~~ $+6x+9+$ ~~x^2~~ $+8x+16 =$ ~~$2x^2$~~ -16

$14x + 25 = -16$

$14x = -41$

$x = \frac{-41}{14}$

(78) $\frac{e^{2x}}{e^x} = \frac{4e^x}{e^x}$

$e^{2x-x} = 4$

$\ln e^{2x-x} = \ln 4$

$2x - x = \ln 4$

$x = \ln 4$

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

$0 = x^2 - 11x + 28$

$(x-4)(x-7)$

~~4~~, 7

↑ extraneous

(80) $\ln(x^2 - 12x + 32) = 6$

$x^2 - 12x + 32 = e^6$

Ugh... put in Calculator ☺

$x = 26.184$

(81) $e^{4x} = 8$

$\ln e^{4x} = \ln 8$

$\frac{4x}{4} = \frac{\ln 8}{4}$

$x = \ln \sqrt[4]{8}$

(82) $\sin 2x = \sin x$

$2\sin x \cos x - \sin x = 0$

$\sin x = 0 \quad \cos x = \frac{1}{2}$

$\{0, \pi, \frac{\pi}{3}, \frac{5\pi}{3}\}$

(83) $2x = \frac{\pi}{4}, \frac{7\pi}{4} + 2n\pi$

$x = \frac{\pi}{8}, \frac{7\pi}{8} + n\pi$

$\{\frac{\pi}{8}, \frac{7\pi}{8}, \frac{9\pi}{8}, \frac{15\pi}{8}\}$

(84) $\cos^2 x - \cos x = 0$

$\cos x(\cos x - 1) = 0$

$\cos x = 0 \quad \cos x = 1$

$\left\{-\frac{\pi}{2}, \frac{\pi}{2}, 0\right\}$

(85) ~~$x = 0$~~ ← can not take $\ln 0$

$x = 5.749$

(86) None

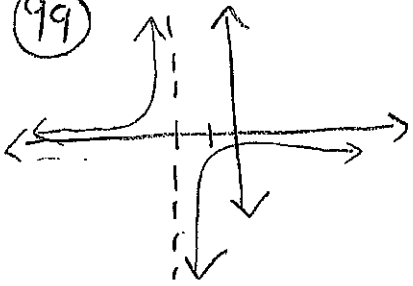
(87) 0 (88) 1 (89) $\frac{\sqrt{2}}{2}$ (90) -1

(91) $-\frac{\sqrt{3}}{2}$ (92) $\frac{1}{2}$ (93) -1 (94) $\frac{\sqrt{3}}{3}$

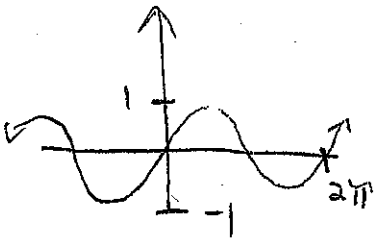
(95) $-\sqrt{3}$ (96) DNE (97) $\cos\left(\frac{\pi}{6}\right) = \frac{\sqrt{3}}{2}$

(98) $\sin^{-1}\left(\frac{-1}{2}\right) = -\frac{\pi}{6}$

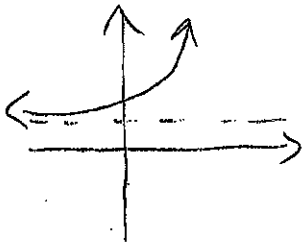
(99)



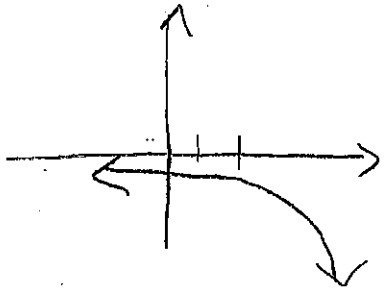
(100)



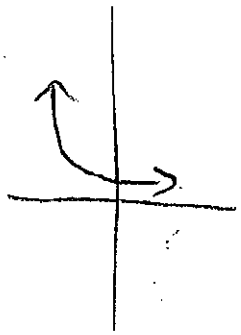
(101)



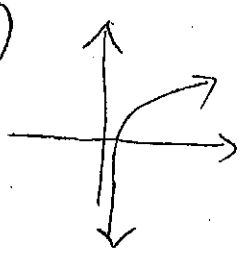
(102)



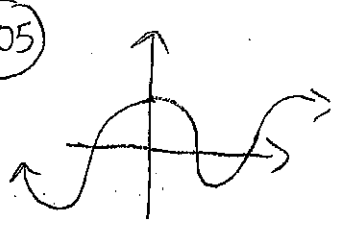
(103)



(104)



(105)



106) $-2(2)-1=-2+K$
$K=-3$

107) $-4=-2+K$
$K=-2$

108) $4K+5=16-4$
$K=7/4$

109) $18-K=12-6$
$K=12$

110) $1=K-1$
$K=2$

111) $1+K=3$
$K=2$

112) $9=3m+K$ and $K=-2-1+7$
$\Leftarrow$ $K=4$
$9=3m+4$
$m=5/3$

113) 0 114) $\pi/4$ 115) π 116) $-\pi/4$

117) $2\pi/3$ 118) $5\pi/6$ 119) π 120) $3\pi/4$

121) $5\pi/6$ 122) $-\pi/3$ 123) $-\pi/2$ 124) undefined
domain of $\cos^{-1}$ is $[-1,1]$