

2003 Lemont

① Prgm: Algebra
Polynomials, Binom Expans

A=3
B=-2
C=1
D=0
N=6

$-4320x^3$

k = -4320

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

$x = 5y - 2$

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

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

$3(x-1) = y$

$f(x) = \frac{x+2}{5}$

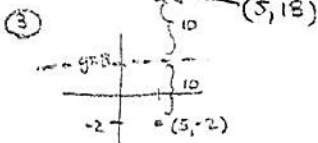
$g(x) = 3(x-1)$

$f(6) = \frac{6+2}{5}$

$g(3) = 3(3-1) = 6$

$= \frac{8}{5}$

$f(g(3)) = \frac{8}{5}$



$(5, 18)$

④ minor $\rightarrow 2b = 8$
axis $b = 4$

vertices $(12, 2) \rightarrow (-2, 2)$

$2a = 14$ major axis
 $a = 7$

center $\rightarrow (5, 2)$

$\frac{(x-5)^2}{7^2} + \frac{(y-2)^2}{4^2} = 1$

$\frac{(x-5)^2}{49} + \frac{(5-2)^2}{16} = 1$

$16(x-5)^2 + 49(9) = 784$

$16(x-5)^2 + 441 = 784$

$16(x-5)^2 = 343$

$(x-5)^2 = \frac{343}{16}$

$x-5 = \pm \frac{7\sqrt{7}}{4}$

$\sqrt{}$ Quadrant, not negative

$x = 5 \pm \frac{7\sqrt{7}}{4}$
 $5 + \frac{7\sqrt{7}}{4}$

⑤ $3(\ln x)^2 - 5\ln x - 2 = 0$

$3y^2 + 5y - 2 = 0$ $y = \ln x$

$(3y-1)(y+2) = 0$

$y = \frac{1}{3}$ $y = -2$

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

$x = e^{1/3}$ $x = e^{-2}$

$e^{1/3}, e^{-2}$

⑥ $11! + 9!$

$11 \cdot 10 \cdot 9! + 9!$

$9!(11 \cdot 10 + 1)$

$9!(111)$

$9!(37 \cdot 3)$

↓ prime

37

⑦ $8\sin^3 x - 6\sin x + 1 = 4\cos^2 x$

graph it!

$x = 330^\circ$
↓
convert to radians

$330 \left(\frac{\pi}{180}\right) = \frac{11\pi}{6}$

⑧

$$\begin{array}{r} -4 \quad 2 \quad 5 \quad -11 \quad 4 \\ \quad \quad -8 \quad 12 \quad -4 \\ \hline 2 \quad -3 \quad 1 \quad 0 \end{array}$$

asympt $= 2x^2 - 3x + 1$

vertex \rightarrow graph it

$(.75, -.125)$

$\left(\frac{3}{4}, -\frac{1}{8}\right)$

⑨

$$\begin{array}{cccc} 3 & x & 2 & 3 \\ x & 1 & -2 & x \\ -1 & 2 & x & -1 \end{array} = x^2$$

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

$-x^3 + 9x + 14 = x^2$

$x = -2, 3.1925$

-2

\rightarrow not an integer

⑩

$\pm \sqrt{7-24i} = \pm(4-3i) = -4+3i, 4-3i$