$a=0,\ b=3,\ c=4,\ d=3$

$[b+1,\ b+3]=[3+1,\ 3+3]=[4,6]$

1) $f(x)=(a+1)x^2+(d+1)x+c$

$f(x)=(0+1)x^2+(3+1)x+4$

$f(x)=x^2+4x+4$

$$\int_4^6 f(x)\,dx=\int_4^6 x^2+4x+4\,dx=\frac{x^3}{3}+\frac{4x^2}{2}+4x\Big|_4^6=$$

$$\frac{x^3}{3}+2x^2+4x\Big|_4^6=$$

$$\frac{(6)^3}{3}+2(6)^2+4(6)-\left(\frac{(4)^3}{3}+2(4)^2+4(4)\right)=98.666$$

$A=98.666$

$a=0, b=3, c=4, d=3$

2) $f(x)=-x^2+2x+c+d+1, \ g(x)=x-c$

$f(x)=-x^2+2x+4+3+1, \ g(x)=x-4$

$f(x)=-x^2+2x+8, \ g(x)=x-4$

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

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

$$0=x^2-2x-8+x-4$$

$$0=\underbrace{x^2-x-12}_{(x-4)(x+3)}$$

$$x-4=0 \Rightarrow x=\underline{4}, \quad x+3=0 \Rightarrow x=\underline{-3}$$

$$\int_{-3}^{4}(f(x)-g(x))dx = \int_{-3}^{4}(-x^2+2x+8-(x-4))dx =$$

$$\int_{-3}^{4} -x^2+x+12\,dx = \frac{-x^3}{3}+\frac{x^2}{2}+12x \Big|_{-3}^{4} =$$

$$-\frac{(4)^3}{3}+\frac{4^2}{2}+12(4)-\left(\frac{-(-3)^3}{3}+\frac{(-3)^2}{2}+12(-3)\right)=57.166\ldots$$

$A=57.1666\ldots$

$a=0, b=3, c=4, d=3$

$[b+1, b+3] = [3+1, 3+3] = [4, 6]$

3) $f(x) = (a+1)\operatorname{sen}([c+1]x) + d$

$f(x) = (0+1)\operatorname{sen}([4+1]x) + 3$

$f(x) = \operatorname{sen}(5x) + 3$

$V = \pi \int_4^6 (\operatorname{sen}(5x)+3)^2 =$

$\pi \int_4^6 (\operatorname{sen}^2(5x) + 6\operatorname{sen}(5x) + 9)\,dx$

$\pi \int_4^6 \left(\frac{1}{2} - \frac{1}{2}\cos(10x) + 6\operatorname{sen}(5x) + 9\right) dx$

$\pi \left(\frac{19}{2}x - \frac{1}{2}\left(\frac{1}{10}\right)\operatorname{sen}(10x) - 6\left(\frac{1}{5}\right)\cos(5x)\right)\Big|_4^6 =$

$\pi \left(\frac{19}{2}x - \frac{1}{20}\operatorname{Sen}(10x) - \frac{6}{5}\cos(5x)\right)\Big|_4^6 =$

$\pi \left(\frac{19}{2}(6) - \frac{1}{20}\operatorname{Sen}(10(6)) - \frac{6}{5}\cos(5(6))\right) - \left(\pi\left(\frac{19}{2}(4) - \frac{1}{20}\operatorname{Sen}(10(4)) - \frac{6}{5}\cos(5(4))\right)\right.$

$V = 60.8121$