Fubini

$V = \int_1^7 \left[\int_2^5 xy + 3\,dy\right] dx$

$V = \int_1^7 \left(\frac{y^2}{2}x + 3y \Big|_2^5\right) dx$

$V = \int_1^7 \left(\left(\frac{25}{2}x + 15\right) - (2x + 6)\right) dx$

$V = \int_1^7 \left(\frac{21}{2}x + 9\right) dx$ Not complete!

10/17/14

$(x-4)^2 + (y-1)^2 = 9$

$V = \iint_R 3x + 2y + 8\,dA$ Double integral.

$\int_{x_2}^{x} \int_{y_2}^{y} 3x + 2y + 8\,dy\,dx$ Integrated integral

→ to find limits of integration.

$(y-1)^2 = 9 - (x-4)^2$

$y - 1 = \pm\sqrt{9-(x-4)^2}$

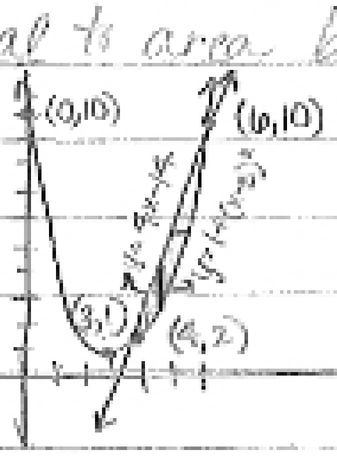
$y = 1 \pm \sqrt{9-(x-4)^2}$

$y = 1 + \sqrt{9-(x-4)^2}$

$y_2 = 1 - \sqrt{9-(x-4)^2}$

$x = 7$
$x_2 = 1$ } look at geometry.

Volume of solid w/ ceiling $z = xy + x + 1$ over base equal to area bound by $y = 1 + (x-3)^2$ & $y = 4x - 14$



$1 + (x-3)^2 = 4x - 14$

$1 + x^2 - 6x + 9 = 4x - 14$

$0 = x^2 - 10x + 24 = (x-4)(x-6)$

MORE ON NEXT PAGE...

Sunshine
Daisy
Unicorn
Bryan
Popsicle

$V=\iint_R dV = \iint_R xy+x+1\, dA$

$= \int_4^6 \int_{1+(x-3)^2}^{4x-14} xy+x+1\, dy\, dx$

OR....

$= \iint xy+x+1\, dx\, dy$

→ Gotta pick one!

$\frac{1}{4}(y+14)=x$

$\pm\sqrt{y-1} = x-3$

$3\pm\sqrt{y-1} = x \rightarrow 3+\sqrt{y-1}$ B/c we're right of vertex.

$= \int_2^{10} \int_{\frac{y+14}{4}}^{3+\sqrt{y-1}} xy+x+1\, dx\, dy$

lets pick the first one b/c no one likes $\sqrt{\quad}$'s

(There will always be constants for outter most integrals — for double & tripple integrals.)

$\int_4^6 \int_{1+(x-3)^2}^{4x-14} xy+x+1\, dx\, dy$

$= \int_4^6 \left[\frac{1}{2}xy^2+xy+y\right]_{y=1+(x-3)^2}^{4x-14} dx$

$= \int_4^6 \left(\frac{1}{2}x(4x-14)^2 + x(4x-14) + 4x-14\right) - \left(\frac{1}{2}x(1+(x-3)^2)+x+1\right)(1+(x-3)^2)$

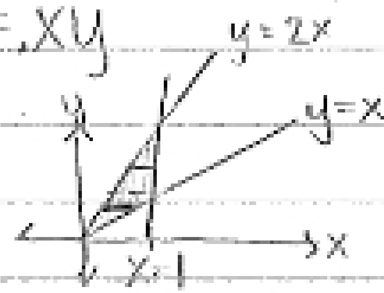
$= \int_4^6 (2x^2-7x+x+1)4x-14 - (2x^2-7x+1)(4x-14) - f(x) \cdots dx$

finish on your own...

Odenthal didn't want to finish...

$f(x,y) = xy$

Area



$V = \iint_A xy\,dA$

$V = \int_0^1 \int_{y/2}^{y} xy\,dx\,dy + \int_1^2 \int_{y/2}^{1} xy\,dx\,dy$ ← Have to break into 2 problems (integrals) if you do dx dy

$V = \int_0^1 \int_x^{2x} xy\,dy\,dx$

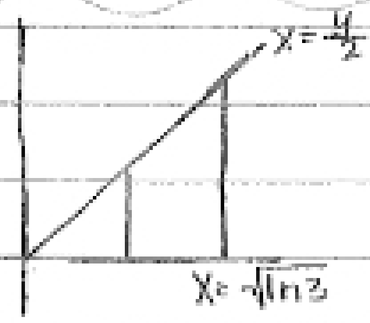
$= \int_0^1 \frac{1}{2}xy^2 \Big|_x^{2x} dx$

$= \int_0^1 \frac{1}{2}x(2x)^2 - \frac{1}{2}x(x^2)\,dx$

$= \int 2x^3 - \frac{1}{2}x^3\,dx = \int_0^1 \frac{3}{2}x^3\,dx$

$(\frac{3}{2})(\frac{1}{4})x^4 \Big|$

$\frac{3}{8}(1-0)^0 = \boxed{3/8}$



$\iint e^{x^2}\,dA$

Kinda like a hw problem. If on exam, probably change order of dx & dy

$\int e^{x^2}dx$ → can't integrate! thus can't do dx first!

$\int_0^{\sqrt{\ln 3}} \int_0^{2x} e^{x^2}\,dy\,dx$

$= \int_0^{\sqrt{\ln 3}} ye^{x^2} \Big|_0^{2x} dx = \int_0^{\ln 3} 2xe^{x^2} = e^{x^2} \Big|_0^{\sqrt{\ln 3}} = e^{\ln 3} - e^0$

$= 3 - 1 = \boxed{2}$