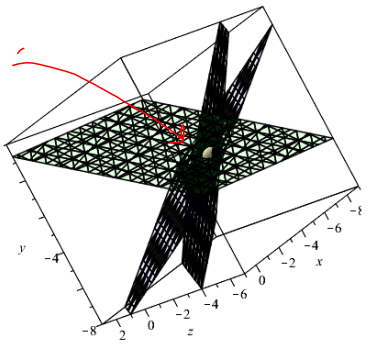
Systems of Linear Equations

$x+y+z=-11$

$2x+4y+2z=-28$

$-x+6y-3z=-2$



Chapter 4 Review Question: From Section 5.2 #83.

$10,000 invested for 6 years at 3.5% apr, compounded quarterly.

$P = 10,000$, $t = 6$ yrs, $r = \frac{3.5}{100} = .035$, $m = 4$ periods per year.

$A(t) = P\left(1+\frac{r}{m}\right)^{mt} = P(1+i)^n$, where

$i = \frac{r}{m}$ & $n = mt$ = # of periods total $= 4 \cdot 6 = 24 = n$

$i = \frac{r}{m}$ = interest rate per period $= \frac{.035}{4} = .00875 = i$

0.8750000000e-2 means $.875 \times 10^{-2} = .00875$

My way:

$P\left(1+\frac{r}{m}\right)^{mt} = 10000\left(1+\frac{.035}{4}\right)^{4.6}$ in one calculation.

Students tend to do it this way

$P(1+i)^n = 10000(1+.00875)^{24} \approx \$12,325.52$

$\frac{.035}{4} = 0.008750000000$

$10000 \cdot \left(1+\frac{.035}{4}\right)^{4 \cdot 6} \approx 12325.51701 \approx \$12,325.52$ to nearest penny.

$10000 \cdot (1+.00875)^{24} \approx 12325.51701$

```
10000(1+.035/4)^
(4*6)
     12325.51701
10000(1+.035/4)^
4*6
     62127.72363
```

Sweet!

Notice when no parentheses around the 4*6 in the exponent, we get this:

$\left(1000(1+.00875)^4\right)(6)$

GOAL

$ax+by+cz=d$

$ey+fz=g$

$hz=w$

$x+y+z=-11$ E1

$2x+4y+2z=-28$ E2

$-x+6y-3z=-2$ E3

MAKE zeros under x:

$-2E1+E2$:

$-2E1\quad -2x-2y-2z=22$

$E2\quad 2x+4y+2z=-28$

$2y=-6$

$E1+E3$:

$E1\quad x+y+z=-11$

$E3\quad -x+6y-3z=-2$

$7y-2z=-13$

New System:

$x+y+z=-11$

$2y=-6$

$7y-2z=-13$

Cleanup:

$x+y+z=-11$ E1

$y=-3$ E2

$7y-2z=-13$ E3

Next: Get a 0 underneath the y:

$-7E2+E3$

$-7E2$: $-7y=21$

$E3\quad 7y-2z=-13$

$-2z=8$

$x-3-4=-11$

$x=-4$

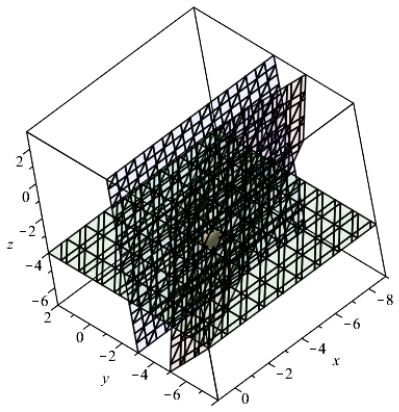
New system:

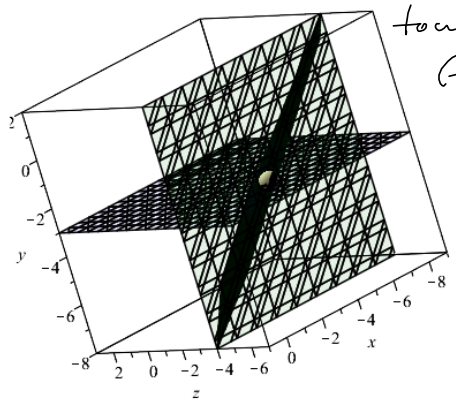
$x+y+z=-11$

$y=-3$

$z=-4$

Still 3 planes. Still seem to touch at $(-4,-3,-4)$





$x + 3y + 2z = -5$
$2x + y - 2z = -15$
$4x - 2y + z = 15$

Section 5.2 #17

$-2E1 + E2$

$-2x - 6y - 4z = 10$
$2x + y - 2z = -5$

$-5y - 6z = -5$

$-4E1 + E3$:

$-4E1: \quad -4x - 12y - 8z = 20$
$E3: \quad 4x - 2y + z = 15$

$-14y - 7z = 35$

New:

$x + 3y + 2z = -5$
$-5y - 6z = -5$
$-14y - 7z = 35$

$-14E2 + 5E3$

$-14E2 = \quad 70y + 84z = 70$
$5E3 \quad -70y - 35z = -175$

$49z = -105$

$z = \frac{-105}{49} = \frac{-15}{7}$

A mistake here, somewhere