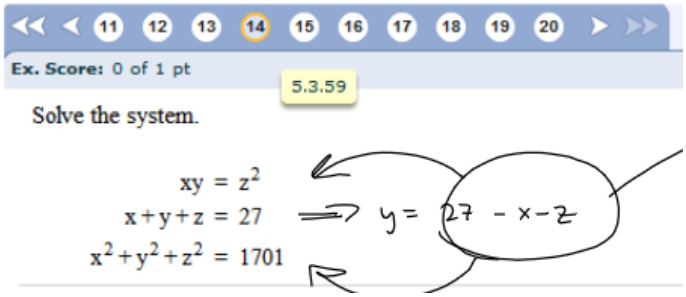

$(27-x-z)^2 = (27-(x+z))^2 = 27^2 - 2(27)(x+z) + (x+z)^2$

$= 729 - 54x - 54z + x^2 + 2xz + z^2$

After subbing for y using E2.

E1 $x(27-x-z) = z^2$

E3 $x^2 + (27-x-z)^2 + z^2 = 1701$

$x^2 + 729 - 54x - 54z + x^2 + 2xz + z^2 + z^2 = 1701$

1701 − 729 = 972

E3 $2x^2 + 2z^2 - 54x - 54z + 2xz = 972$

E1 $27x - x^2 - xz = z^2$

E1 $27x - x^2 - xz - z^2 = 0$

Too big & messy.

2E1 $54x - 2x^2 - 2xz - 2z^2 = 0$

E3 $2x^2 + 2xz + 2z^2 - 54x - 54z = 972$

Cancel

2E1 + E3 $-54z = 972$

$z = -18$

This gives system:

E1 $xy = z^2$

E2 $y = 27 - x - z$

E3 $z = -18$

$\Rightarrow$ E1 $xy = (-18)^2 = 324$

E2 $y = 27 - x + 18$

$y = 45 - x$ Send to E1:

$x(45-x) = 324$

$45x - x^2 = 324$

$-x^2 + 45x - 324 = 0$

$x^2 - 45x + 324 = 0$

$-45x = -20x - 25x$

6, 8, 18, 144, 180

2 | 324
2 | 162
3 | 81
3 | 27
3 | 9
3

want to add to 45

mch.

Magic # is 324

$-45 = -20-25$ 500

$= -15-30$ 450

$= -10-35$ 350

$= -12-33$ 396

$= -11-34$ 374

$= -9-36$ 324 / Sweet!

33
12
46
33
396

34
11
74
340
374

5 36
9
324

$x^2-45x+324$

$= x^2-9x-36x+324$

$= x(x-9)-36(x-9)$

$= (x-36)(x-9) \Rightarrow x \in \{9, 36\}$

$x=9$: $y = 45-x = 45-9 = 36$

So $(9, 36, -18) = (x, y, z)$

$x=36$: $y = 45-36 = 9$

$(x, y, z) = (36, 9, -18)$

Annuities are geometric series!

$a + ar + ar^2 + \dots + ar^{n-1} = a\left(\frac{1-r^n}{1-r}\right)$ or $a\left(\frac{r^n-1}{r-1}\right)$

$R + R(1+i) + R(1+i)^2 + \dots + R(1+i)^{n-1} = R\left[\frac{(1+i)^n - 1}{i}\right]$

since $1+i-1 = i$ is the $r-1$ in denominator

Banker wants 8% compounded monthly.
You're making payments to get her that.

$$P(1+i)^n = P\left(1+\frac{.08}{12}\right)^{12t}$$

Loan Amount is P
= Present Value

Your Deal:

$$R + R(1+i) + \dots + R(1+i)^{n-1} = R\left[\frac{(1+i)^n - 1}{i}\right].$$

So:

$$P(1+i)^n = R\left[\frac{(1+i)^n - 1}{i}\right]$$

is where Amortization Formulas come from.

P = Amt borrowed

R = Necessary Payments

Check out Mortgage Calculators online