4.6 Application of exponential functions

30) $A = P e^{rt}$

Given: $r = 2.75\% = 0.0275$

$P = \$60,000$

$A = \$70,000$

what is t (in years)?

$70,000 = 60,000\ e^{.0275t}$

$\frac{70,000}{60,000} = \frac{7}{6} = e^{.0275t}$

$\ln\left(\frac{7}{6}\right) = \ln e^{.0275t} = .0275t$

so $t = \frac{1}{.0275} \ln\left(\frac{7}{6}\right) = 5.6$ years

5.1 Systems of linear equations

ex: The sum of two numbers is 34.
The difference of these two number is 10.
What are the two numbers?

Let x = 1st number

y = 2nd number

ex (contd)

$$x + y = 34$$
$$x - y = 10$$

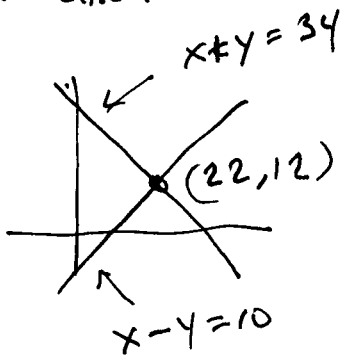
Three methods:

(1) Solve by graphing

(2) Solve by substitution

(3) Solve by elimination

(1) By graphing



(2) Substitution

$$x + y = 34$$
$$x - y = 10 \Rightarrow x = y + 10$$ Sub into 1st:

$$(y+10) + y = 34$$
$$2y + 10 = 34$$
$$2y = 24$$
$$y = 12$$ Then $x = (12) + 10 = 22$

☆ (3) Elimination:

$$x + y = 34 \quad \leftarrow \text{Two ways to write } 34$$
$$x - y = 10 \quad \leftarrow \text{" " " " } 10$$
$$2x = 44 \Rightarrow x = 22$$ Now, back-substitute:

$$22 + y = 34$$
$$y = 12$$ $(x, y) = (22, 12)$

24) 1st: $12x - 5y = 9$

2nd. $3x - 8y = -18$

1st: $12x - 5y = 9$

$-4 \cdot$ 2nd: $-12x + 32y = 72$

$27y = 81 \Rightarrow y = 3$

$3x - 8(3) = -18$

$3x - 24 = -18$

$3x = 6$

$x = 2$

Answer: $(x, y) = (2, 3)$

48) ① $2x + y + z = 9$

② $-x - y + z = 1$

③ $3x - y + z = 9$

① + ② = ④: $x + 2z = 10$

① + ③ = ⑤: $5x + 2z = 18$

$-1 \cdot$ ④: $-x - 2z = -10$

⑤: $5x + 2z = 18$

⑥: $4x = 8 \Rightarrow x = 2$

Now back-substitute

24 cont'd) Use (4) ..

$$2 + 2z = 10 \Rightarrow 2z = 8$$

$$\text{so } z = 4$$

Use (1) $2(2) + y + 4 = 9$

$$y + 8 = 9$$

$$y = 1$$

$$(x, y, z) = (2, 1, 4)$$