Using Graphs to Solve Equations

Example 1: Solve for x:

a. $2^x = 32$.

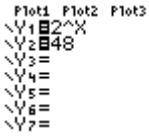
Using a table of values (or perhaps from experience), $x = 5$.

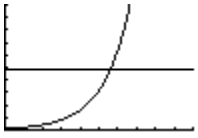
x	y
0	1
1	2
2	4
3	8
4	16
5	32
6	64

b. $2^x = 48$.

From the table, 48 lies between 32 and 64, so x is somewhere between 5 and 6. We could use "guess-and-check" here, but we'll opt for something a bit more efficient.

Using a graphing calculator, we plot $y = 2^x$ and $y = 48$. We use the "intersect" function from the CALC menu to determine x.

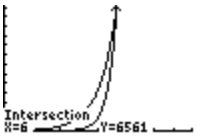




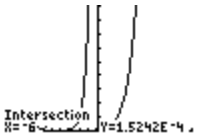
Thus, to 3 decimal places, $x = 5.585$.

Example 2: Solve for x:

a. $3^{x+2} = 9^{x-2}$



b. $3^{x-2} = 9^{x+2}$

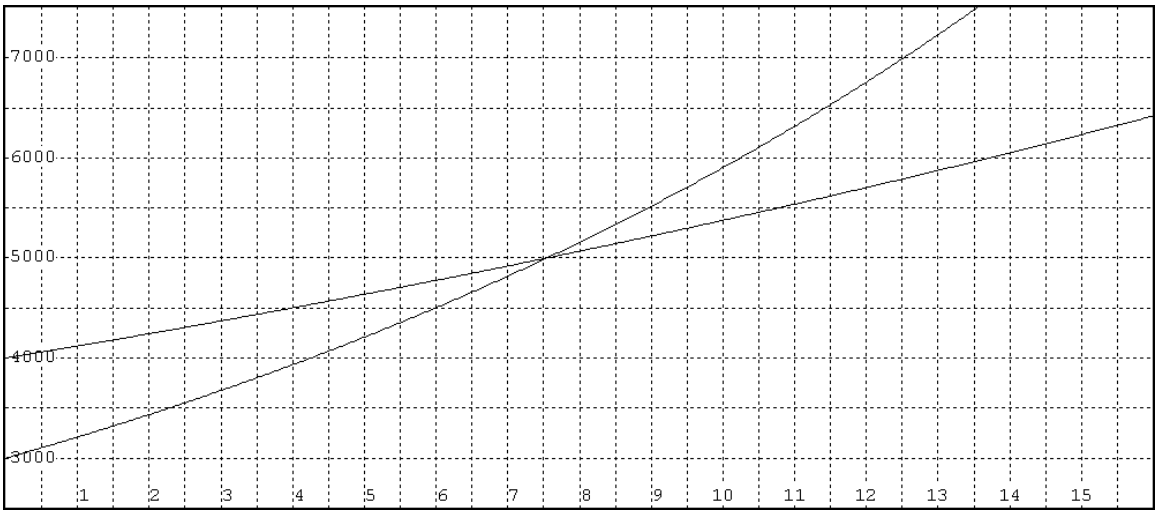


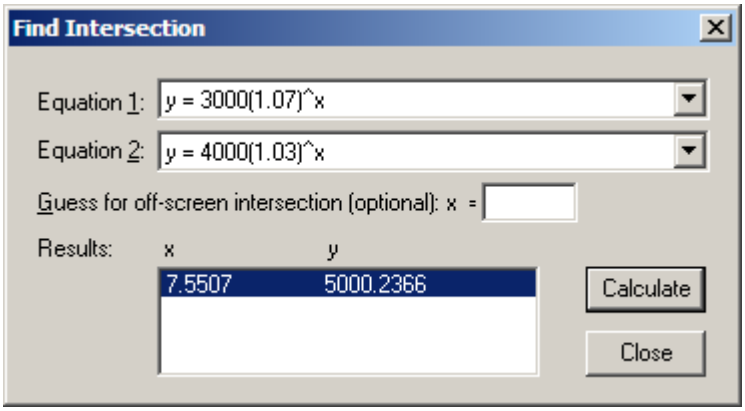
(Note: you have to play with the window settings / zoom a bit to get a "nice" picture.)

(next page!)

Example 3: An investment of $4000 earns 3% interest compounded annually. Another investment of $3000, starting at the same time, earns 7% interest. At what point will the second investment be worth more than the first?

For this one, we'll go with Graphmatica:





After about 7.5 years, the 2nd investment is worth more.

Practice: pg. 72 #5 – 8, 13