

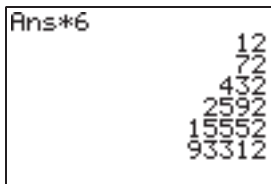
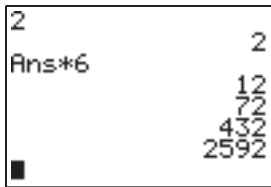
Answers for Grapher Workshop

Section 1.11 Exercises for Chapter 1

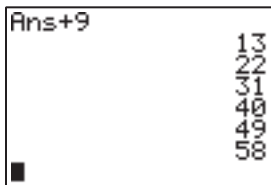
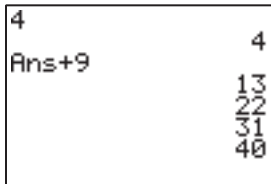
(pp. 20–24)

The graphs used in these answers are from the Texas Instruments TI-83 graphing calculator and are similar to the ones that would appear on the Sharp and most Casio graphing calculators. Use Table 1.4 to convert special viewing windows (decimal, friendly, etc.) to appropriate ones for your graphing calculator if it is not one of these.

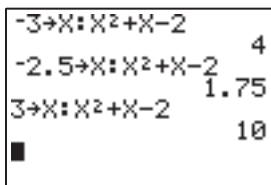
1. 693.375
2. 3.71293
3. -1
4. 7
5. 4
6. 3
7. 2, 12, 72, 432, 2592, 15552, 93312



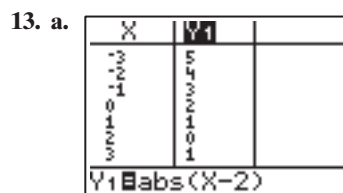
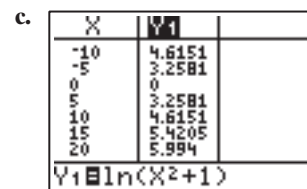
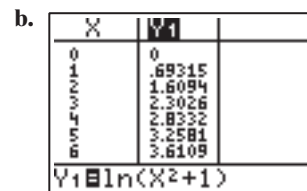
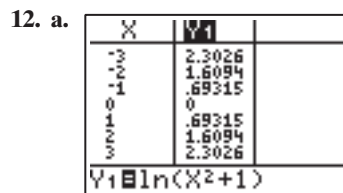
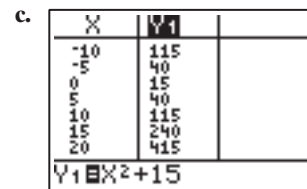
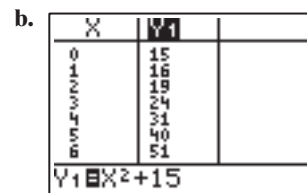
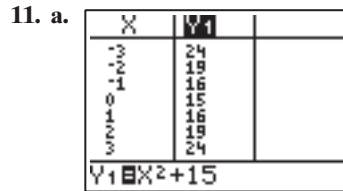
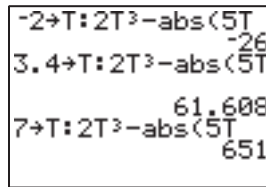
8. 4, 13, 22, 31, 40, 49, 58



9. 4, 1.75, 10



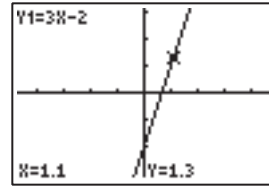
10. -26, 61.608, 651



b.

X	Y1
0	2
1	1
2	0
3	1
4	2

Y1 = abs(X-2)

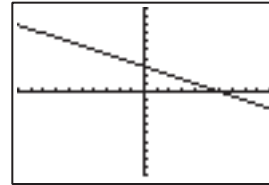


c.

X	Y1
-10	12
0	2
10	8
20	18

Y1 = abs(X-2)

16. a. $[-10, 10]$ by $[-10, 10]$

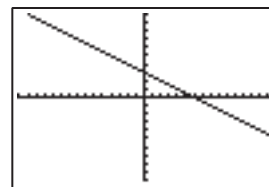


14. a.

X	Y1
-3	1.5874
0	0
1	-1.26
0	-1.26
1	0
2	1.5874
3	2.1544

Y1 = sqrt(X^2 + X - 2)

b. $[-15.161\dots, 15.161\dots]$ by $[-10, 10]$

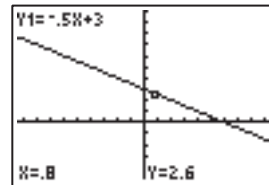


b.

X	Y1
0	-1.26
1	0
2	1.5874
3	2.1544
4	2.6207
5	3.0366
6	3.42

Y1 = sqrt(X^2 + X - 2)

c. $[-9.4, 9.4]$ by $[-5, 10]$

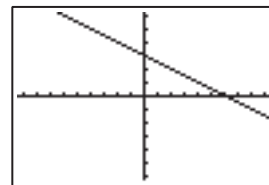


c.

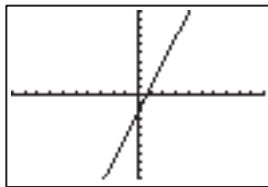
X	Y1
-10	4.448
-5	2.6207
0	-1.26
5	3.0366
10	4.7622
15	6.1972
20	7.477

Y1 = sqrt(X^2 + X - 2)

d. $[-9.4, 9.4]$ by $[-6.2, 6.2]$

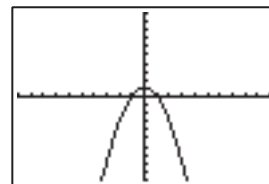
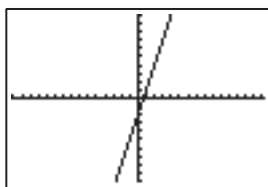


15. a. $[-10, 10]$ by $[-10, 10]$

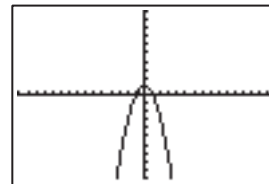


17. a. $[-10, 10]$ by $[-10, 10]$

b. $[-15.161\dots, 15.161\dots]$ by $[-10, 10]$

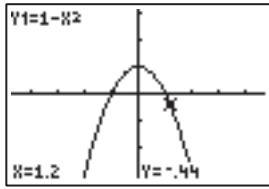


b. $[-15.161\dots, 15.161\dots]$ by $[-10, 10]$

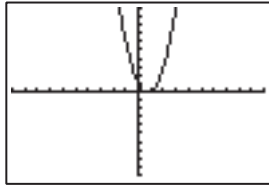


c & d. $[-4.7, 4.7]$ by $[-3.1, 3.1]$ On the TI-83, Casio, and Sharp graphing calculators, the decimal window is square and friendly. This is not true on all graphers. For example, the decimal window on the TI-85 is friendly but not square.

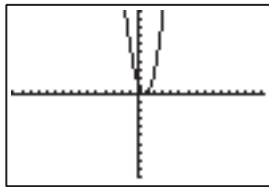
c. & d. $[-4.7, 4.7]$ by $[-3.1, 3.1]$



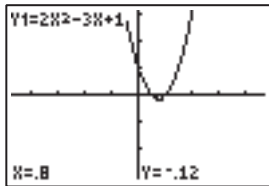
18. a. $[-10, 10]$ by $[-10, 10]$



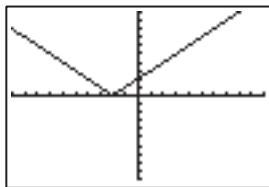
b. $[-15.161\dots, 15.161\dots]$ by $[-10, 10]$



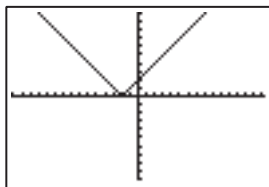
c. & d. $[-4.7, 4.7]$ by $[-3.1, 3.1]$



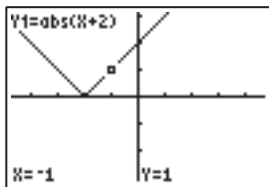
19. a. $[-10, 10]$ by $[-10, 10]$



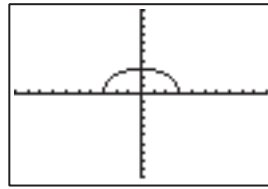
b. $[-15.161\dots, 15.161\dots]$ by $[-10, 10]$



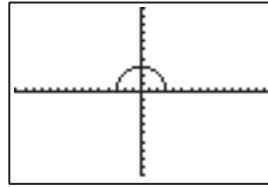
c. & d. $[-4.7, 4.7]$ by $[-3.1, 3.1]$



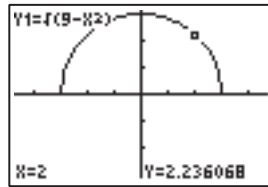
20. a. $[-10, 10]$ by $[-10, 10]$



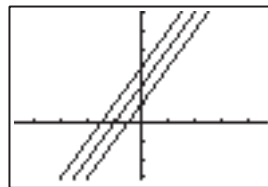
b. $[-15.161\dots, 15.161\dots]$ by $[-10, 10]$



c. & d. $[-4.7, 4.7]$ by $[-3.1, 3.1]$

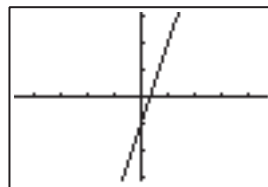


21. In sequential mode, first the graph of y_1 is drawn, then the graph of y_2 , and finally the graph of y_3 . In simultaneous mode, the three graphs are drawn at the same time.

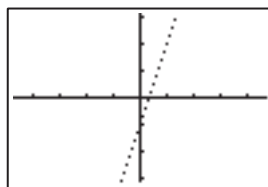


$[-4.7, 4.7]$ by $[-3.1, 6.1]$

22. In dot mode, one point is plotted in each column of pixels provided the point is in the viewing window. That is, if the corresponding y -value lies between Y_{min} and Y_{max} . In connected mode, points are plotted and joined together to produce a line that appears to have no breaks in it.



$[-4.7, 4.7]$ by $[-3.1, 3.1]$



$[-4.7, 4.7]$ by $[-3.1, 3.1]$

23. One possibility is $[-10, 15]$ by $[-300, 200]$. There are two x -intercepts.

24. One possibility is $[-15, 5]$ by $[-2200, 500]$. There are three x -intercepts.

25. a. The graphs of $y_1 = |x|$ and $y_2 = \frac{1}{2}x + 1$ intersect at $(-0.666\dots, 0.666\dots)$ and $(2, 2)$.

b. The x -intercepts of $y_3 = y_1 - y_2$ are $x = -0.666\dots$ and $x = 2$. The solutions of the equations are $x = -0.666\dots = -\frac{2}{3}$ and $x = 2$.

26. a. The graphs of $y_1 = |x - 3|$ and $y_2 = -\frac{1}{2}x + 4$ intersect at $(-2, 5)$ and $(4.666\dots, 1.666\dots)$.

b. The x -intercepts of $y_3 = y_1 - y_2$ are $x = -2$ and $x = 4.666\dots$. The solutions of the equation are $x = -2$ and $x = 4.666\dots = 4\frac{2}{3}$.

27. a. The graphs of $y_1 = x - 2$ and $y_2 = 1 - x^2$ intersect at $(-2.303\dots, -4.303\dots)$ and $(1.303\dots, -0.697\dots)$.

b. The x -intercepts of $y_3 = y_1 - y_2$ are $x = -2.303\dots$ and $x = 1.303\dots$. The solutions of the equation are $x \approx -2.303$ and $x \approx 1.303$.

28. a. The graphs of $y_1 = x - 3$ and $y_2 = x^2 - 5$ intersect at $(-1, -4)$ and $(2, -1)$.

b. The x -intercepts of $y_3 = y_1 - y_2$ are $x = -1$ and $x = 2$. The solutions of the equation are $x = -1$ and $x = 2$.

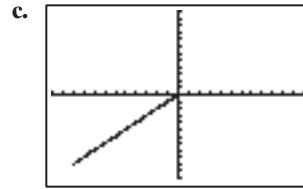
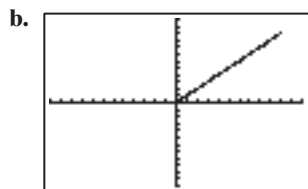
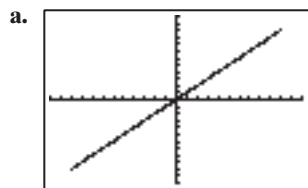
29. a. One possibility is $[-10, 15]$ by $[-300, 200]$.

b. There is a local maximum of 0 at $x = 0$, and a local minimum of -256 at $x = 8$.

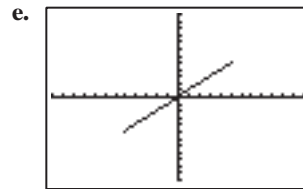
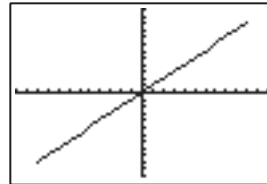
30. a. One possibility is $[-15, 5]$ by $[-2200, 500]$.

b. Accurate to two decimal places there is a local minimum of -2112.40 at $x = -11.05$, a local maximum of 0 at $x = -3$, and a local minimum of -52.10 at $x = -0.95$. (You may need to zoom-in to find these values.)

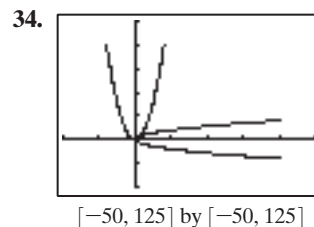
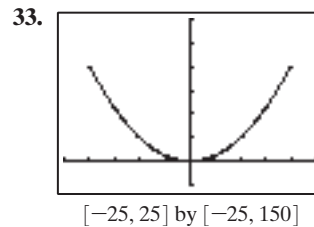
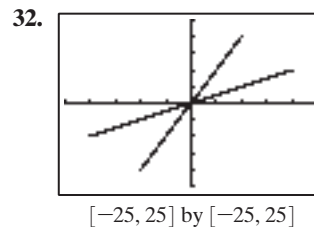
31. All graphs are drawn in the $[-12, 12]$ by $[-12, 12]$ viewing window.



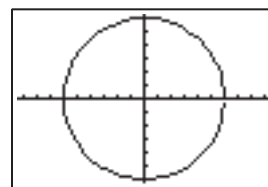
d. This graph may appear to be the same as in (a), but there are fewer points plotted. Also this graph is drawn faster than the one in (a).



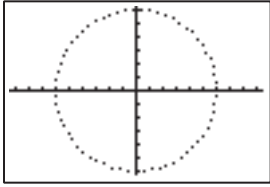
f. Same as (a), except this graph is drawn from upper right to lower left, and the graph in (a) is drawn from lower left to upper right.



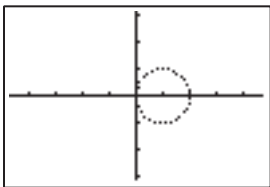
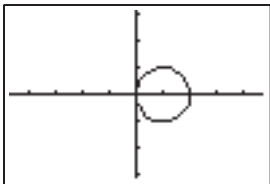
35. Viewing window: $[-9.4, 9.4]$ by $[-6.2, 6.2]$, $\theta_{\min} = 0$, $\theta_{\max} = 2\pi$, $\theta_{\text{step}} = 0.1$.



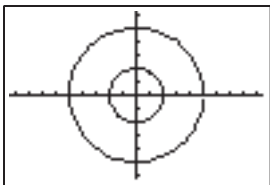
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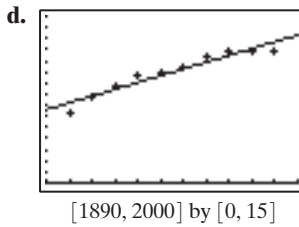
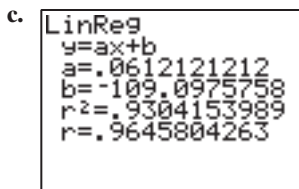
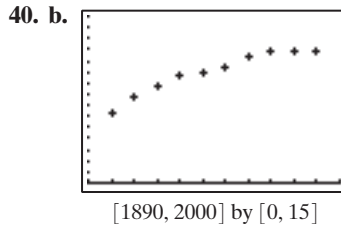
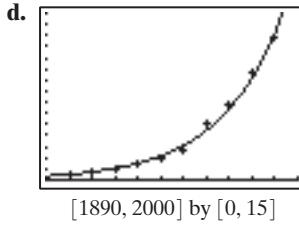
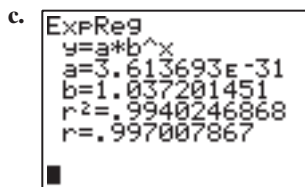
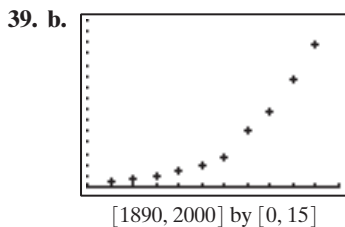
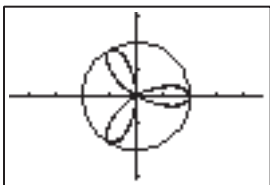
36. Viewing window: $[-4.7, 4.7]$ by $[-3.1, 3.1]$, $\theta_{\min} = 0$, $\theta_{\max} = \pi$, $\theta_{\text{step}} = 0.1$.



37. Viewing window: $[-9.4, 9.4]$ by $[-6.2, 6.2]$, $\theta_{\min} = 0$, $\theta_{\max} = 2\pi$, $\theta_{\text{step}} = 0.1$.

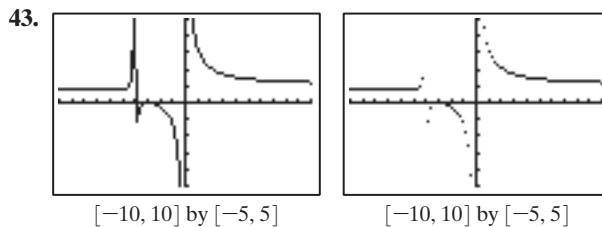


38. Viewing window: $[-4.7, 4.7]$ by $[-3.1, 3.1]$, $\theta_{\min} = 0$, $\theta_{\max} = 2\pi$, $\theta_{\text{step}} = 0.1$.

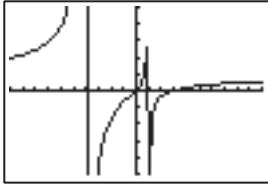


41. a. $\det A = 17$
 b. $A^{-1} = \begin{pmatrix} 2/17 & 3/17 \\ -5/17 & 1/17 \end{pmatrix}$
 c. $A^{-1}B = \begin{pmatrix} 2 \\ 1 \end{pmatrix}$

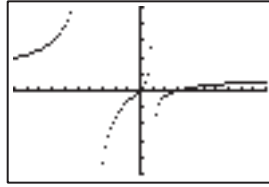
42. a. $\det A = -33$
 b. $A^{-1} = \begin{pmatrix} 5/33 & 13/33 & 1/33 \\ 5/33 & -20/33 & 1/33 \\ -1/11 & 4/11 & 2/11 \end{pmatrix}$
 c. $A^{-1}B = \begin{pmatrix} 3 \\ 1 \\ -1 \end{pmatrix}$



44.



$[-10, 10]$ by $[-5, 5]$



$[-10, 10]$ by $[-5, 5]$

