

p. 215
11.6

IF

$$f(x) = Ax^2 + Bx + C$$

$$x = \frac{-B}{2A}$$

$$f(x) = a(x-h)^2 + k$$

$$x = h \quad V(h, k)$$

$V(x, y)$ ← From the equation

ex 10 $f(x) = (x+5)^2 - 8$

axis: $x = -5$ Vertex $(-5, -8)$

$$f(x) = x^2 + 10x + 17$$

axis: $x = \frac{-B}{2A} = \frac{-10}{2 \cdot 1} = -5$

Vertex $(-5, -8)$

$$\begin{aligned} & (-5)^2 + 10(-5) + 17 \\ & 25 - 50 + 17 \end{aligned}$$

ex12 $f(x) = -(x-2)^2 + 1$

axis $x = 2$ Vertex $(2, 1)$

ex14 $f(x) = -2x^2$

opens downward

A is neg.

$|A| > 1$ so
the graph is
narrower than
 $y = x^2$

ex 16 $f(x) = \frac{2}{3}x^2 - 4$

opens upward since $A > 0$

wider than $y = x^2$
because $\frac{2}{3} < 1$

ex 18 $f(x) = -\frac{1}{3}(x+6)^2 + 3$

opens downward since $A < 0$

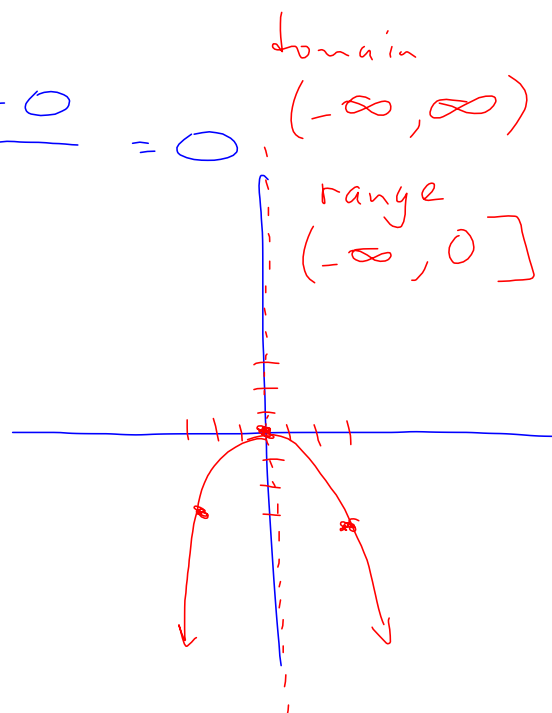
& wider than $y = x^2$ since $\frac{1}{3} < 1$

ex 22 $f(x) = -\frac{1}{3}x^2$

axis: $x = \frac{-B}{2A} = \frac{-0}{2A} = 0$

Vertex: $(0, 0)$

x	y
1	$-\frac{1}{3}$
2	$-\frac{4}{3}$
3	-3



ex 24

$$f(x) = x^2 + 3$$

axis
 $x = \frac{-B}{2A} = \frac{-0}{2 \cdot 1} = 0$

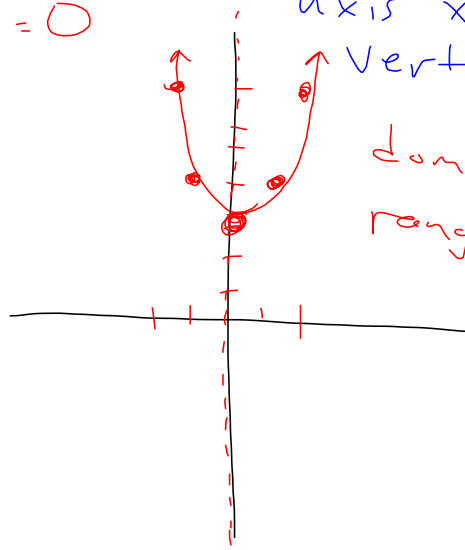
Vertex
 $(0, 3)$

x	y
1	4
2	7

or $f(x) = (x - 0)^2 + 3$

axis $x = 0$
 Vertex $(0, 3)$

domain $(-\infty, \infty)$
 range $[3, \infty)$



ex 28

$$f(x) = (x + 1)^2 + 0$$

axis: $x = -1$

Vertex $(-1, 0)$

x	y
0	1
-1	0

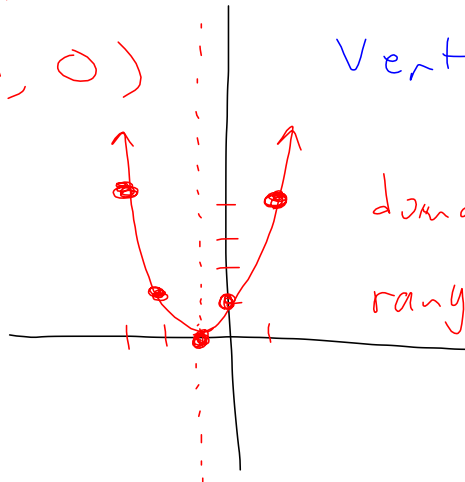
$$f(x) = x^2 + 2x + 1$$

axis $x = \frac{-B}{2A} = \frac{-2}{2 \cdot 1} = -1$

Vertex $(-1, 0)$

domain $(-\infty, \infty)$

range $[0, \infty)$



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ex 34 $f(x) = -\frac{2}{3}(x+2)^2 + 1$

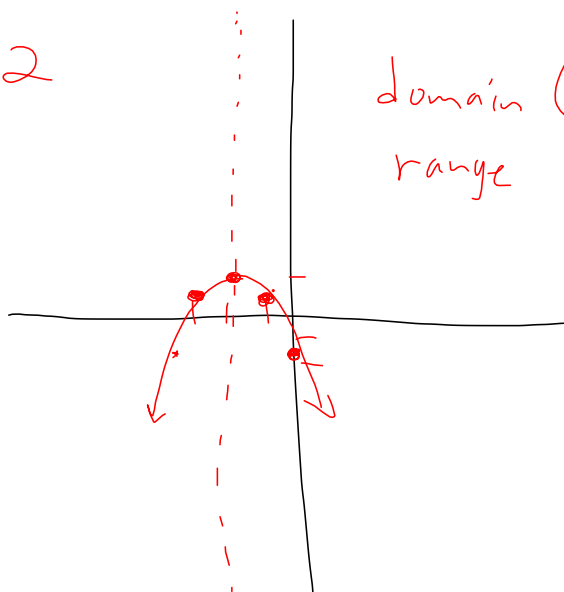
axis: $x = -2$

$V(-2, 1)$

domain $(-\infty, \infty)$

range $(-\infty, 1]$

x	y
-1	$\frac{1}{3}$
0	$-\frac{5}{3}$
1	-5



11.7
p. 726
#6

$f(x) = x^2 + 10x + 23$

$x = \frac{-B}{2A} = \frac{-10}{2 \cdot 1} = -5$

Vertex $(-5, -2)$

$(-5)^2 + 10(-5) + 23$
 $25 - 50 + 23$

ex 12 $f(x) = 3x^2 - 6x + 4$

$$x = \frac{-B}{2A} = \frac{6}{2 \cdot 3} = \frac{6}{6} = 1$$

$$V(1, 1)$$

$$B^2 - 4AC = (-6)^2 - 4(3)(4) = 36 - 48 = -12$$

Since this is neg. we have imaginary x intercepts

$A > 0$ so open up
 $|A| > 1$ so the graph
 is narrower than
 $y = x^2$

ex 14 $f(x) = -x^2 + 7x + 2$

$$x = \frac{-B}{2A} = \frac{-7}{2(-1)} = \frac{7}{2} \text{ or } 3\frac{1}{2}$$

$$\left(\frac{7}{2}, \frac{57}{4}\right)$$

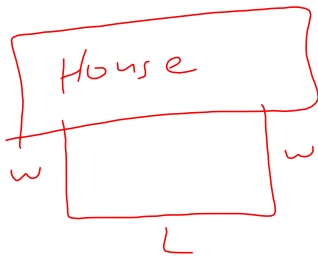
$$B^2 - 4AC$$

$$49 - 4(-1)(2) = 57$$

2 irrational x intercepts

open down $A = -1$
 same width as
 $y = x^2$; $|A| = 1$

$$\begin{array}{r} -\frac{49}{4} + \frac{49}{2} + \frac{2}{1} \\ -\frac{49}{4} + \frac{98}{4} + \frac{8}{4} \\ \hline \frac{57}{4} \end{array}$$

ex 36

$$w + L + w = 100$$

$$2w + L = 100 \rightarrow L = \underline{100 - 2w}$$

$$A = \underline{L} w$$

$$A(w) = (100 - 2w)w$$

$$A = 100w - 2w^2$$

$$A = -2w^2 + 100w + 0$$

$$\text{axis: } w = \frac{-b}{2a} = \frac{-100}{2(-2)} = 25$$

$$L = 100 - 2(25) = 50$$

$$25 \text{ ft} \times 50 \text{ ft}$$

$$1250 \text{ ft}^2$$