1. $\sqrt{x^2} = \sqrt{9}$ $\sqrt{3 \cdot 3}$ $\sqrt{-3 \cdot -3}$

$x = \pm 3$

2. $\sqrt{x^2} = \sqrt{40}$

$x = \sqrt{2 \cdot 20}$

$2 \cdot 10$

$2 \cdot 5$

$x = \sqrt{2 \cdot 2 \cdot 2 \cdot 5}$

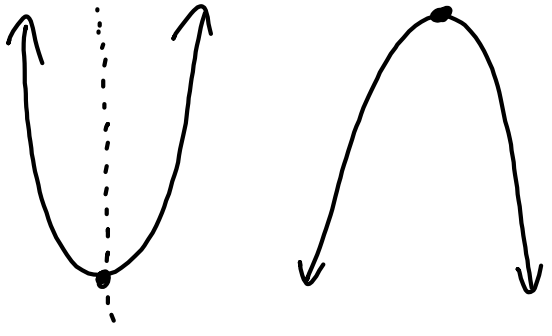
$x = \pm 2\sqrt{10}$

7. $f(x) = 2(x + 1)^2 - 3$

x-coord y-coord

$V: (-1, -3)$

E



9. $f(x) = 4 - 3(x-1)^2$

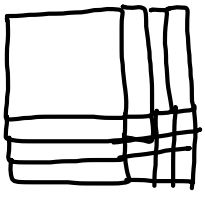
$a = -3$

$= -3(x-1)^2 + 4$

$V: (1, 4)$

A

$x^2 + 6x + 9 = (x+3)^2$



$\frac{6}{2} = 3^2 = 9$

15. $x^2+13x+\frac{169}{4} = \left(x+\frac{13}{2}\right)^2$

$\left(\frac{13}{2}\right)^2 = \frac{13^2}{2^2} = \frac{169}{4}$ $\sqrt{\frac{169}{4}} = \frac{\sqrt{169}}{\sqrt{4}}$

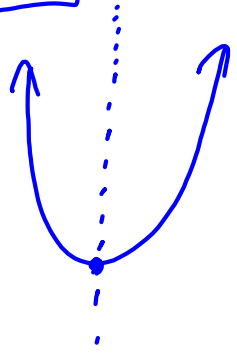
18. $g(x) = x^2+4x+2$

$g(x) = \left(x^2+4x+\underline{4}\right)-\underline{4}+2$

$\frac{4}{2} = 2^2 = 4$ $g(x) = (x+2)^2-2$

V: $(-2,-2)$

AofS: $x=-2$



20. $g(x) = -3x^2 + 6x - 9$

$g(x) = (-3x^2 + 6x + \_\_) - \_\_ - 9$

$\frac{-3}{-3}$ $\frac{6x}{-3}$

$-3(x^2 - 2x + 1) + 3 - 9$

$\frac{-2}{2} = (-1)^2$

$g(x) = -3(x-1)^2 - 6$

V: $(1, -6)$

AofS: $x = 1$

21. $g(x) = -2x^2 + 12x + 1$

$g(x) = (-2x^2 + 12x + \_\_) - \_\_ + 1$

$\frac{-2x}{-2}$ $\frac{12x}{-2}$

$g(x) = -2(x^2 - 6x + 9) + 18 + 1$

$-18 + 18$

$\frac{-6}{2} = (-3)^2$

$g(x) = -2(x-3)^2 + 19$

V: $(3, 19)$

AofS: $x = 3$

transformations

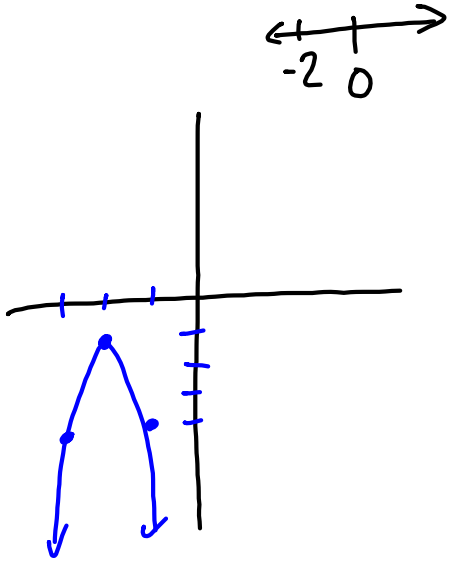
$$-a(x-h)^2+k$$

- $-a$: VS by a, flip
- $(x-h)$: shift R/L h
- $+k$: shift U/D k

"vertical stretch by a factor of a"

#24. $f(x) = -3(x+2)^2 - 1$

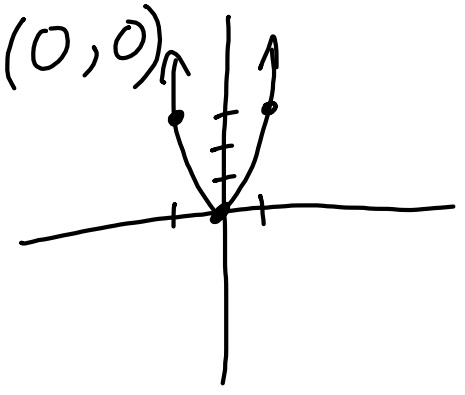
- flip
- VS by 3
- Shift left 2
- Shift down 1



#22. $g(x) = 3x^2$

$g(x) = 3(x+0)^2 + 0$

- VS by 3



1-15, 17, 20, 22-24, 27

↓

hint: look at #20