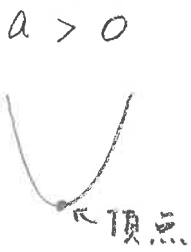
2次関数

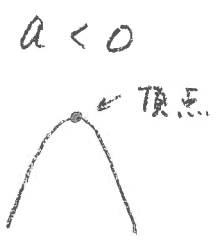
$y = ax^2 + bx + c$

↓ 平方完成

$y = a(x-p)^2 + q$

頂点 $(p, q)$




$y = 3x^2 - 12x - 2$ 定数項

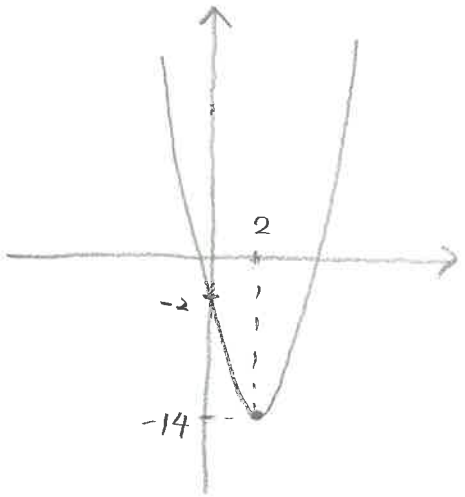
$= 3(x^2 - 4x) - 2$

$= 3\{(x^2 - 4x + 4) - 4\} - 2$ $(x\frac{1}{2})^2$

$= 3(x-2)^2 - 12 - 2$

$= 3(x-2)^2 - 14$

頂点 $(2, -14)$




$y = 2x^2 + 4x - 1$

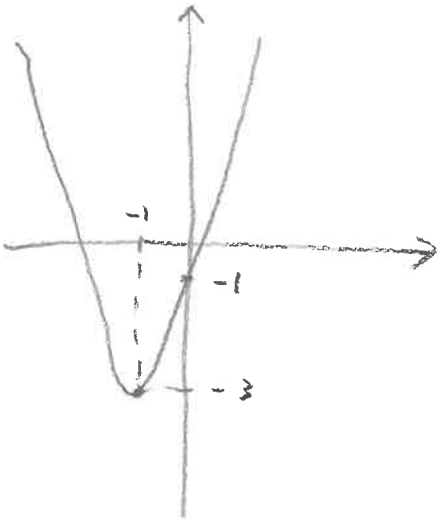
$= 2(x^2 + 2x) - 1$

$= 2\{(x^2 + 2x + 1) - 1\} - 1$

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

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

頂点 $(-1, -3)$



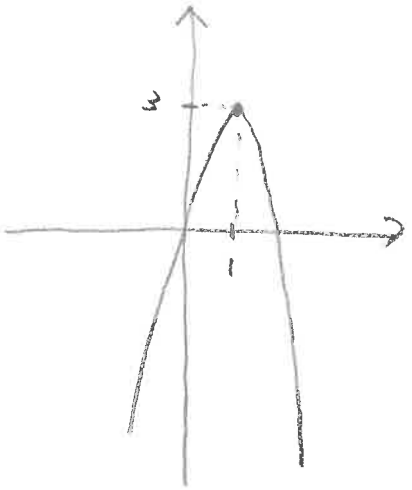
$y = -3x^2 + 6x$

$= -3(x^2 - 2x)$

$= -3\{(x^2 - 2x + 1) - 1\}$

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

頂点 $(1, 3)$




$y = \frac{1}{2}x^2 + x - \frac{3}{2}$ （$x$ の係数 $\frac{2}{1}$）

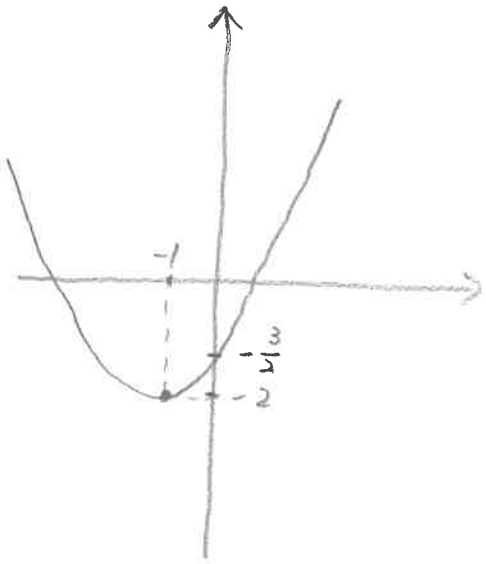
$= \frac{1}{2}(x^2 + 2x) - \frac{3}{2}$

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

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

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

頂点 $(-1, -2)$

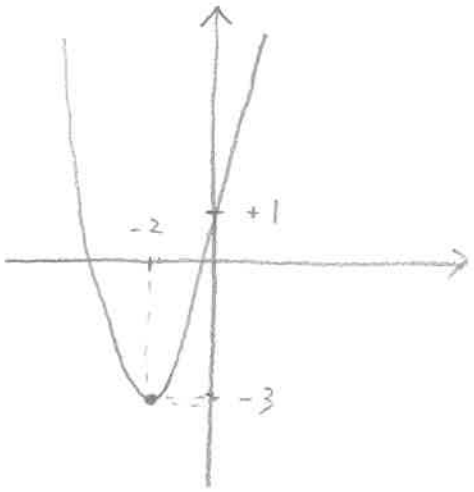


$y = (x^2 + 4x) + 1$

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

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

頂点 $(-2, -3)$




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

$= (x^2 + x + \frac{1}{4}) - \frac{1}{4} + 1$

$= (x + \frac{1}{2})^2 + \frac{3}{4}$

頂点 $(-\frac{1}{2}, \frac{3}{4})$