32 以下の二次関数のグラフを描き，軸と頂点を答えよ．

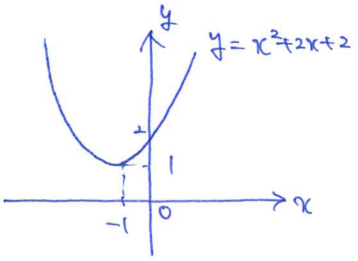
(1) $y = x^2 + 2x + 2$

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

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

軸 $x = -1$.

頂点 $(-1, 1)$



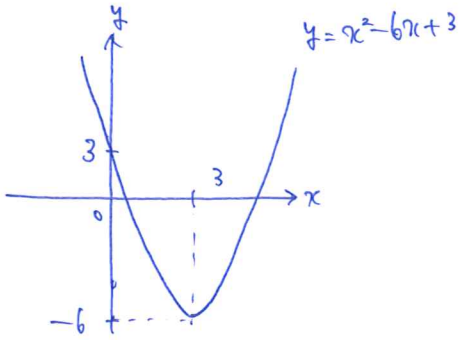
(2) $y = x^2 - 6x + 3$

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

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

軸 $x = 3$.

頂点 $(3, -6)$



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

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

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

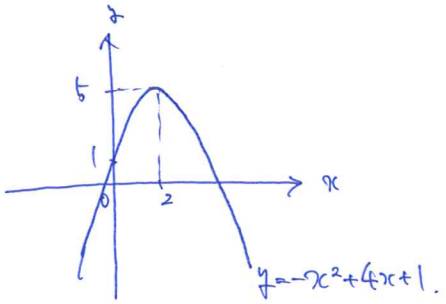
$= -\{(x-2)^2 - 4\} + 1$

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

$= -(x-2)^2 + 5$

軸 $x = 2$

頂点 $(2, 5)$



(4) $y = 3x^2 + 6x - 2$

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

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

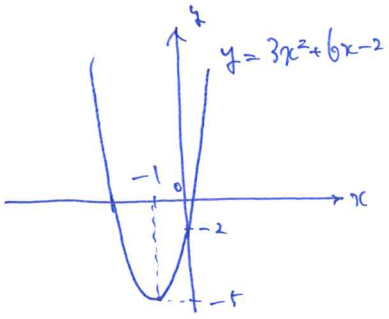
$= 3\{(x+1)^2 - 1\} - 2$

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

$= 3(x+1)^2 - 5$

軸 $x = -1$

頂点 $(-1, -5)$



(5) $y = -2x^2 - 4x + 3$

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

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

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

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

$= -2(x+1)^2 + 5$

軸 $x = -1$.

頂点 $(-1, 5)$