



Name: \_\_\_\_\_



Find the co-ordinate of the turning points of the following graphs

a)  $y = x^2 + x$

d)  $y = x^2 + 4x + 3$

g)  $y = x^2 + 5x + 1$

b)  $y = x^2 - x$

e)  $y = x^2 - 6x + 7$

h)  $y = x^2 - 7x + 8$

c)  $y = x^2 - 12x$

f)  $y = x^2 + 10x + 24$

i)  $y = x^2 + 9x + 14$


Find the co-ordinate of the turning points of the following graphs

j)  $y = 2x^2 + 8x + 10$

l)  $y = 2x^2 - 5x + 2$

k)  $y = 4x^2 + 12x + 11$

m)  $y = 4x^2 - 6x + 1$

 **Exam question:**Find the minimum value of  $y$  for the curve with equation  $y = x^2 + 14x + 24$ .

Hence determine the co-ordinate of this minimum point on the curve

