Name:

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

a) $y = x^2 + x$

$\left(-\frac{1}{2}, -\frac{1}{4}\right)$

b) $y = x^2 - x$

$\left(\frac{1}{2}, -\frac{1}{4}\right)$

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

$(6, -36)$

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

$(-2, -1)$

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

$(3, -2)$

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

$(-5, -1)$

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

$\left(-\frac{5}{2}, -\frac{21}{4}\right)$

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

$\left(\frac{7}{2}, -\frac{17}{4}\right)$

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

$\left(-\frac{9}{2}, -\frac{25}{4}\right)$

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

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

$(-2, 2)$

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

$\left(\frac{5}{4}, -\frac{9}{8}\right)$

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

$\left(-\frac{3}{2}, 2\right)$

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

$\left(\frac{3}{4}, -\frac{5}{4}\right)$

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

$(-7, -25)$