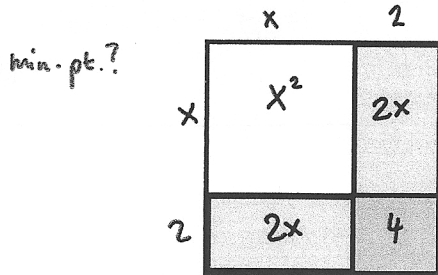


9. If $f(x) = x^2 + 4x + 7$, find
- (i) the smallest possible value of $f(x)$
 - (ii) the value of x at which this smallest value occurs
 - (iii) the greatest possible value of $\frac{1}{(x^2 + 4x + 7)}$.



$$f(x) = \underbrace{x^2 + 4x + 4}_{(x+2)^2} + \underbrace{7-4}_3$$

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

min. pt. $(-2, 3)$

- (i) 3
- (ii) -2

- (iii) the greatest possible value of $\frac{1}{(x^2 + 4x + 7)}$.

the value of this fraction is greatest when the denominator has its minimum value

this occurs at $x = -2$ so sub in

$$\frac{1}{(-2)^2 + 4(-2) + 7} = \frac{1}{4 - 8 + 7} = \frac{1}{3}$$