

# *Regions In The Plane*

To draw a region, first you have to sketch the curve.

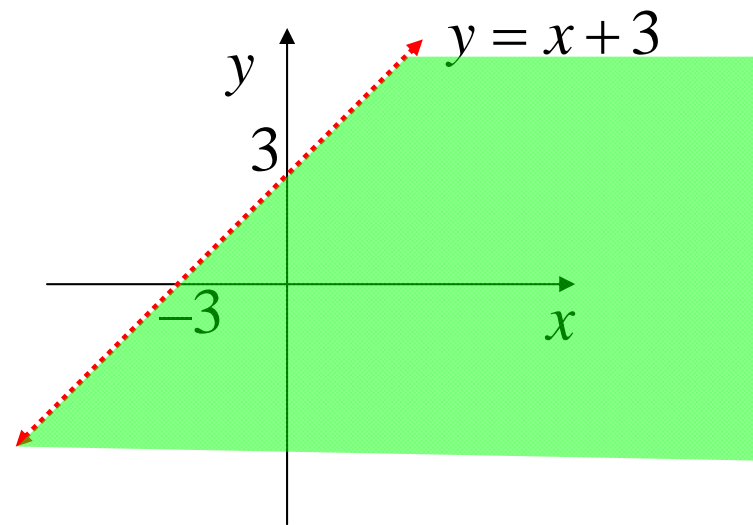
- 1) If  $<$  or  $>$  use a dotted line
- 2) If  $\leq$  or  $\geq$  use a solid line
- 3) Circle the point of intersection if it is NOT included (i.e. one is  $<$  or  $>$ )

To calculate the region, test a point NOT on the curve.

e.g. (i)  $y < x + 3$

test  $(0, 0)$

$$0 < 3 \quad \checkmark$$

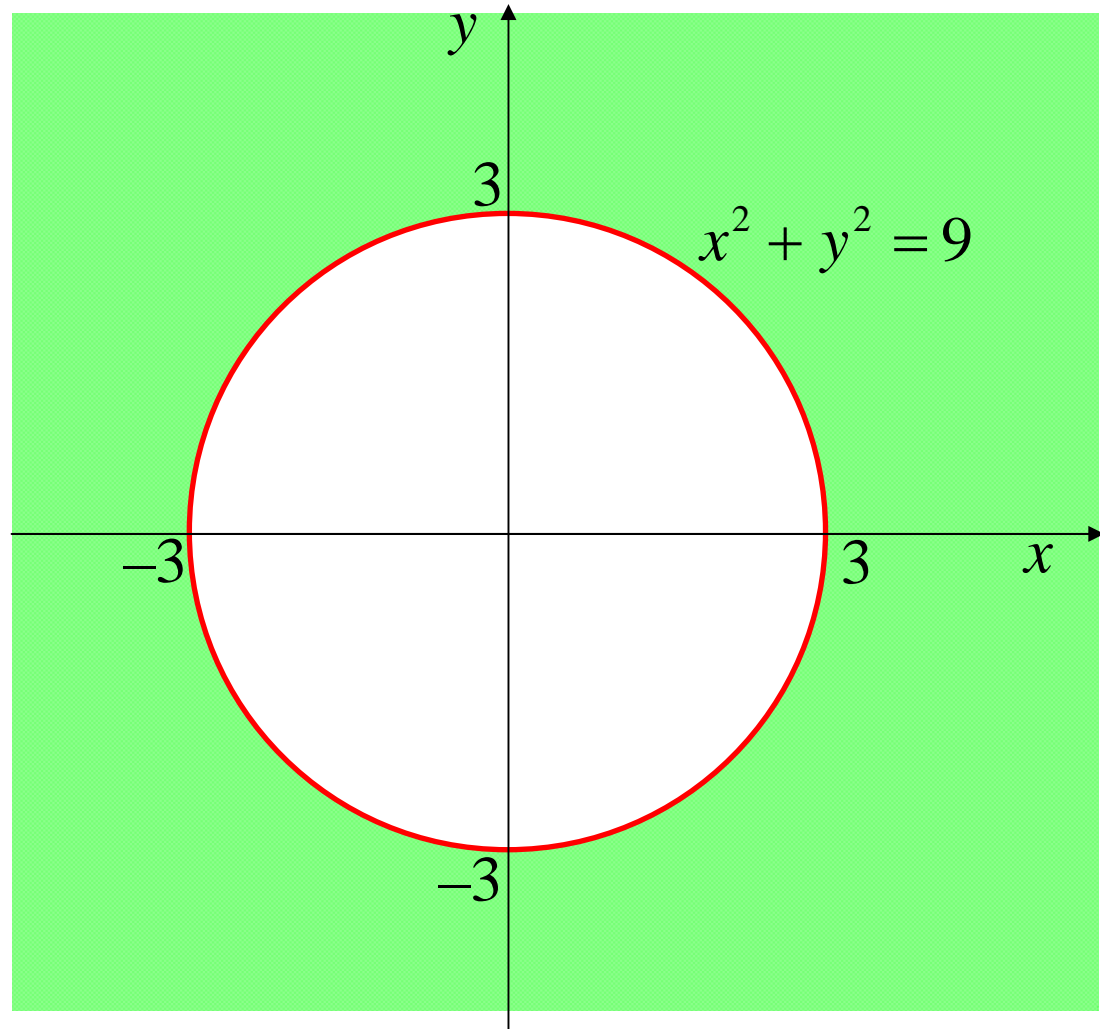


(ii)  $x^2 + y^2 \geq 9$

test (0,0)

$$0^2 + 0^2 \geq 9$$

$$0 \geq 9 \quad \times$$

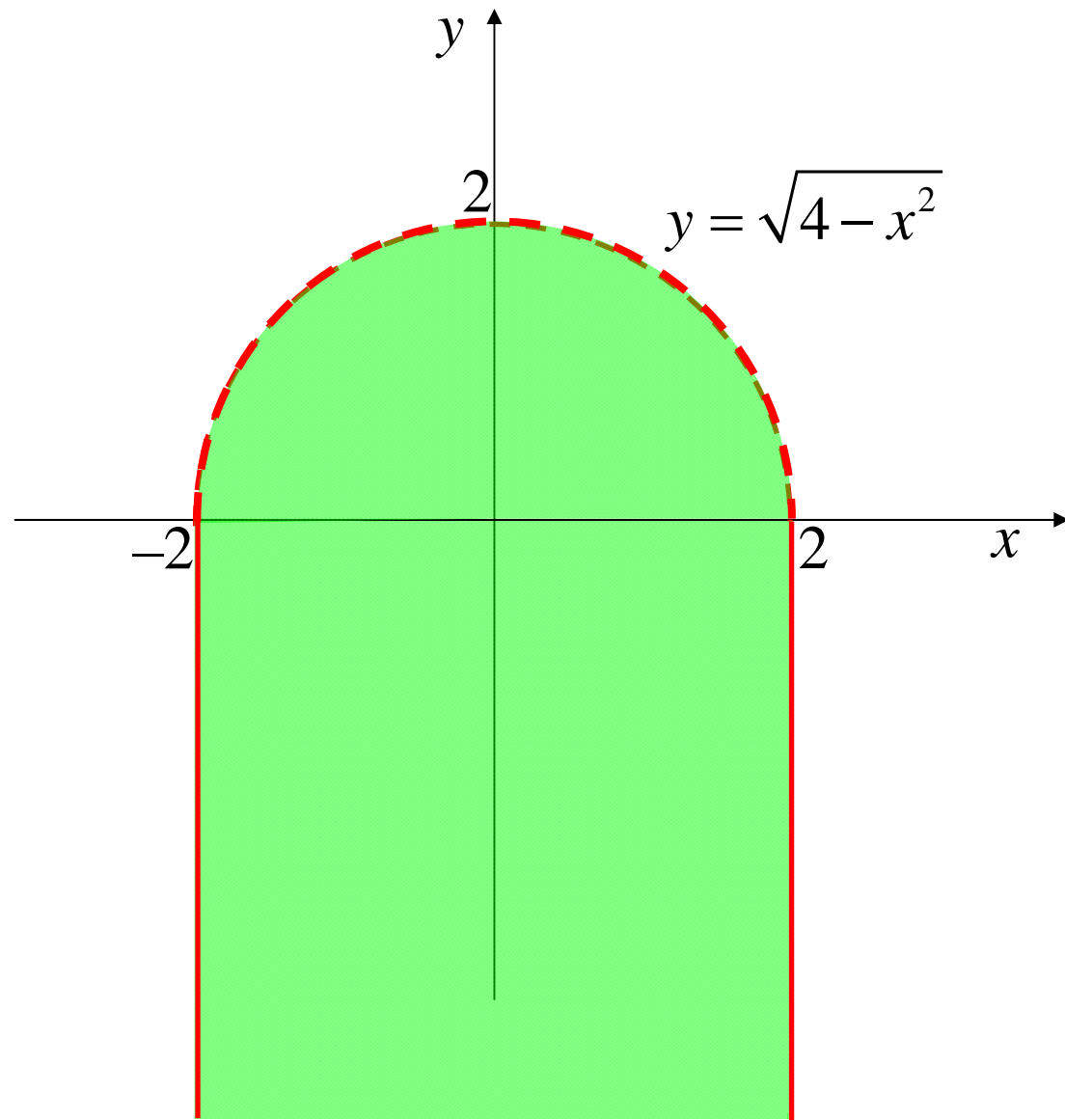


(ii)  $y < \sqrt{4 - x^2}$

test  $(0, 0)$

$$0 < \sqrt{4 - 0^2}$$

$$0 < 2 \quad \checkmark$$



$$(iv) y \geq x^2 \quad \text{and} \quad y \leq 3x + 4$$

$$y \geq x^2 \qquad y \leq 3x + 4$$

$$\text{test } (0,1) \qquad \text{test } (0,0)$$

$$0 \leq 1^2 \qquad 0 \leq 0 + 4$$

$$0 \leq 1 \quad \checkmark \qquad 0 \leq 4 \quad \checkmark$$

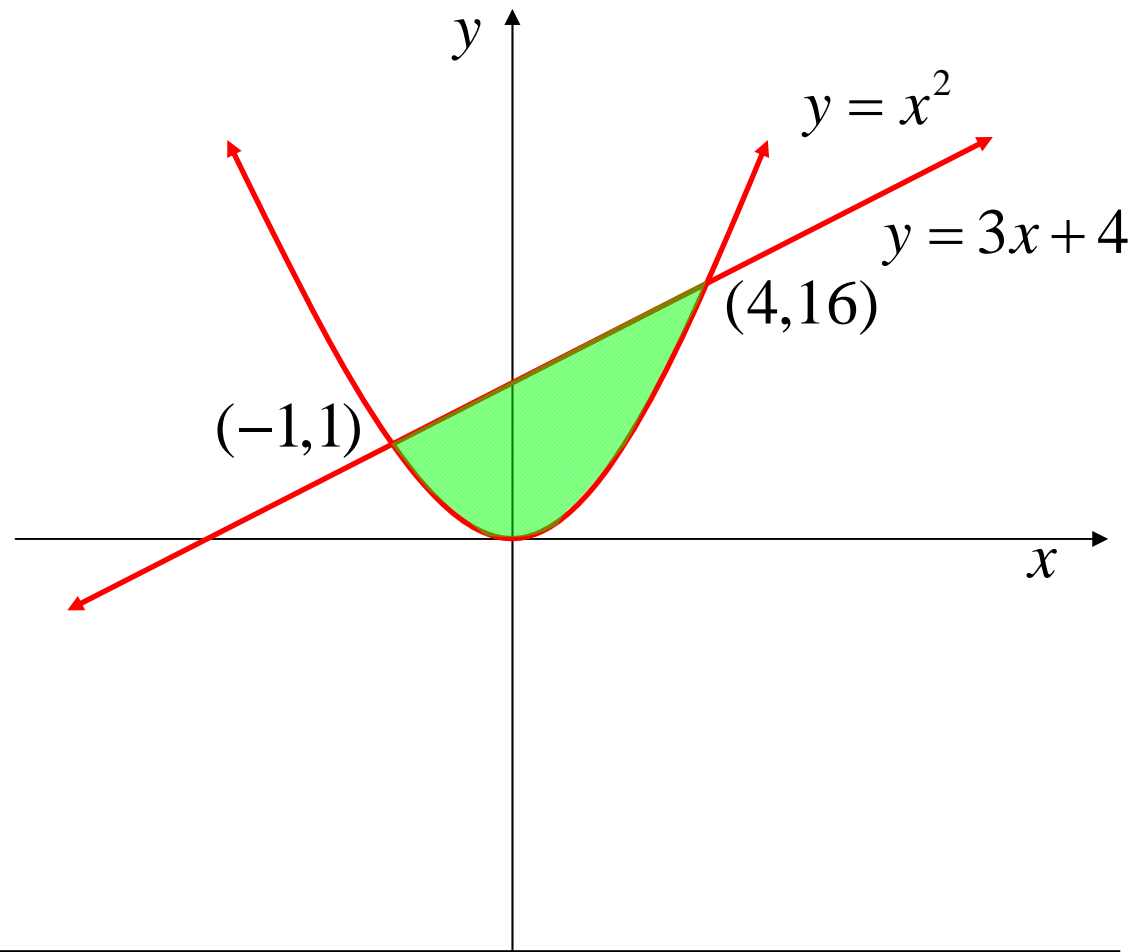
point of intersection

$$x^2 = 3x + 4$$

$$x^2 - 3x - 4 = 0$$

$$(x+1)(x-4) = 0$$

$$x = -1 \quad \text{or} \quad x = 4$$



**Exercise 3F; 3ac, 4d, 5cg, 6cd, 7, 10, 12a, 15a, 19, 20, 21a, 23\***