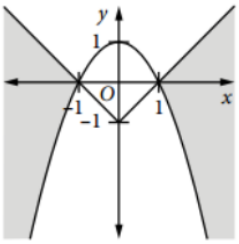
CIRCULAR AND SIMULTANEOUS INEQUALITIES

1 Sketch the region defined by each inequality.

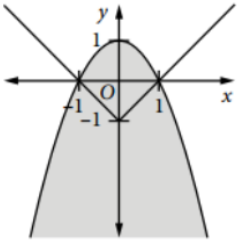
(a) $x^2 + y^2 \geq 16$ **(b)** $x^2 + y^2 < 4$ **(c)** $(x-1)^2 + y^2 > 9$

2 Which diagram shows the region satisfying $y \leq 1 - x^2$ and $y \geq |x| - 1$?

A



B



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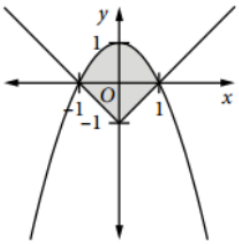
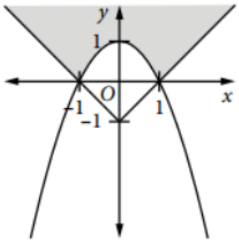


D



3 Sketch the region defined by each inequality.

(d) $y \geq |x|$ **(e)** $y < 2x + 4$ **(f)** $y < |2x + 4|$

3 Sketch the region defined by each inequality.

(a) $(x+3)^2+y^2<1$ **(b)** $y\le x^2+1$ **(c)** $y\ge 9-x^2$

(d) $y\ge|x|$ **(e)** $y<2x+4$ **(f)** $y<|2x+4|$

4 Sketch the region defined by the given inequalities.

(a) $x^2 + y^2 \leq 1, x \geq 0, y \geq 0$

(b) $(x-1)^2 + (y-1)^2 < 1, x > 0, y > 0$

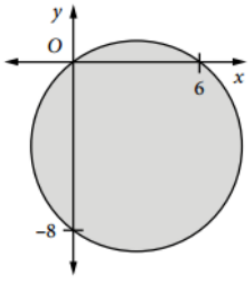
(g) $y > |x-2|, y > 3$

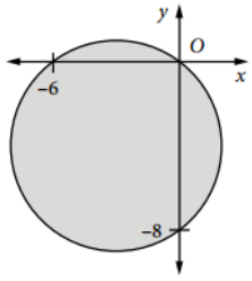
(h) $y \leq 1 - x^2, y \geq 0$

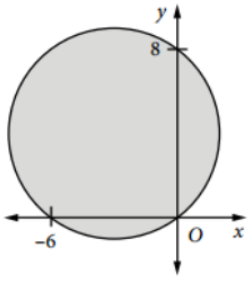
(i) $x^2 + y^2 \leq 1, y \leq 2x, x \geq 0$

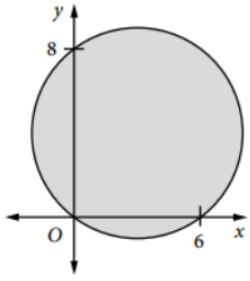
(j) $(x-1)^2 + y^2 \geq 1, x \geq 0, y \leq 1$

5 Which graph represents the region defined by $(x-3)^2 + (y+4)^2 \leq 25$?

A 

B 

C 

D 

7 For the shaded region in the diagram, state whether each statement is correct or incorrect.

(a) The shaded region is defined by $y \leq |x|$ and $x^2 + y^2 \leq 4$.

(b) The shaded region is the part of the interior of the circle of centre $(0, 0)$ and radius 2 that is below the lines given by $y = |x|$.

(c) The shaded region is defined by $y \geq |x|$ and $x^2 + y^2 \leq 4$.

(d) The shaded region is the part of the circle with centre $(0, 0)$ and radius 2, and its interior, that is on or below the lines given by $y = |x|$.