

SKETCH THE SOLUTION SET OF THE SYSTEM +

SOLID ① $x + 2y \leq 5$

LINE x -INT: $x + 2(0) = 5 \rightarrow x = 5$ FIND THE
 y -INT: $0 + 2y = 5 \rightarrow y = \frac{5}{2} = 2.5$ VERTICES

DOTTED ② $5x - y > 14$

LINE x -INT: $5x = 14 \rightarrow x = \frac{14}{5} = 2.8$
 y -INT: $-y = 14 \rightarrow y = -14$

DOTTED ③ $6x + y > 8$

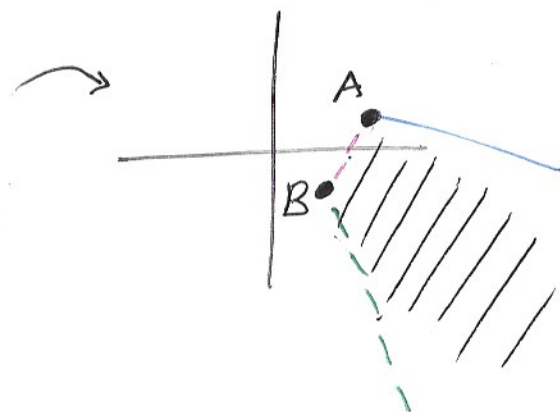
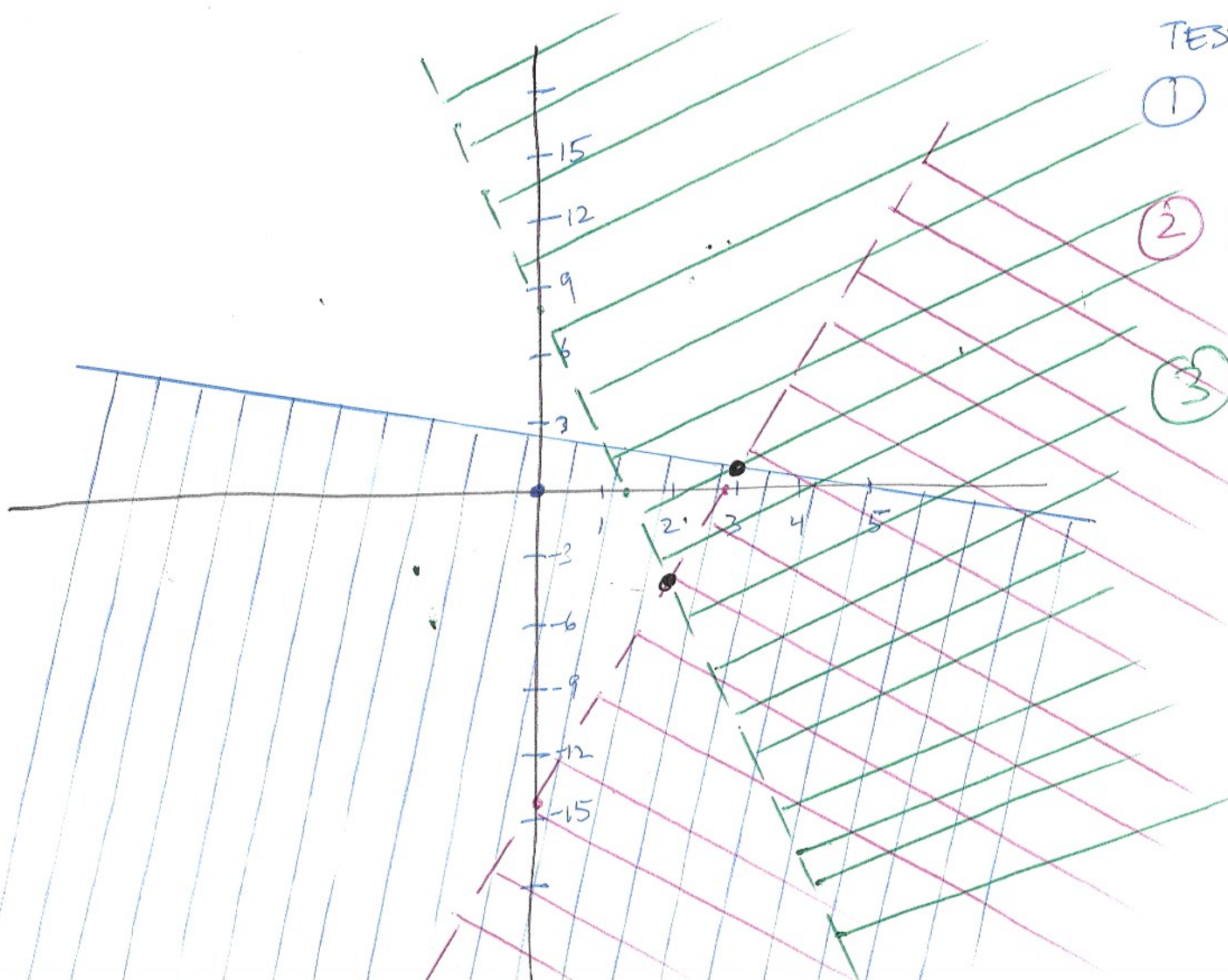
LINE x -INT: $6x = 8 \rightarrow x = \frac{4}{3} = 1.3$
 y -INT: $y = 8 \rightarrow y = 8$

TEST (0,0)

① $0 + 2(0) \leq 5$
 $0 \leq 5$ ✓

② $5(0) - 0 > 14$
 $0 > 14$ ✗

③ $6(0) + 0 > 8$
 $0 > 8$ ✗



$$x + 2y = 5 \rightarrow x = 5 - 2y$$

$$5x - y = 14 \rightarrow 5(5 - 2y) - y = 14$$

$$25 - 10y - y = 14$$

$$-11y = -11$$

$$y = 1$$

$$x = 5 - 2(1) = 3 \quad A(3, 1)$$

$$\begin{array}{r} 5x - y = 14 \\ + (6x + y) = 8 \\ \hline 11x = 22 \end{array}$$

$$x = 2$$

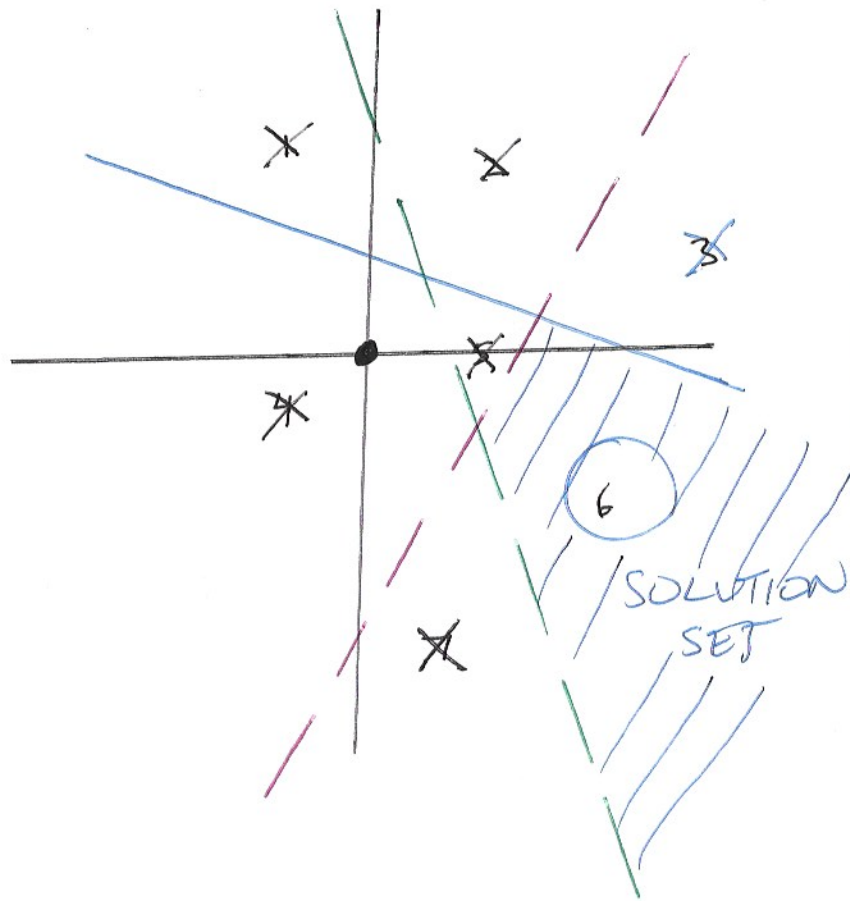
$$6(2) + y = 8$$

$$12 + y = 8$$

$$y = -4$$

$$B(2, -4)$$

NEGATIVE "SHADING" (ELIMINATION OF NON-SOLUTIONS)



TEST $(0,0)$

① ✓

② X → ELIMINATE ALL REGIONS
ON SAME SIDE OF RED
LINE AS $(0,0)$

③ X



ELIMINATE ALL REGIONS
ON SAME SIDE OF GREEN LINE
AS $(0,0)$

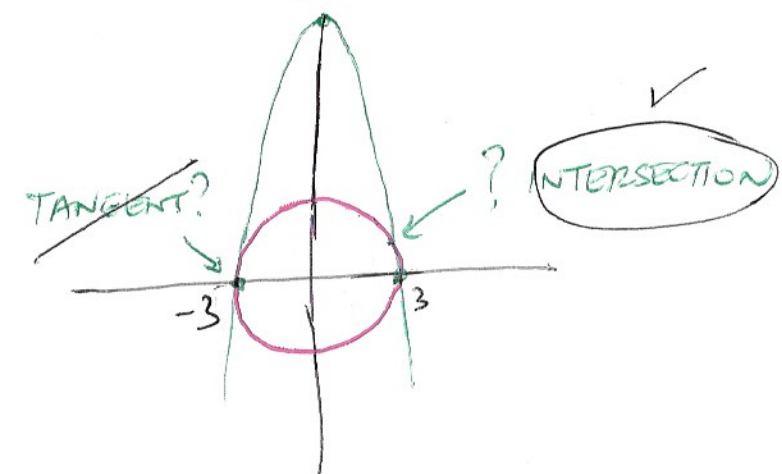
ELIMINATE ALL REGIONS
ON OTHER SIDE OF BLUE
LINE AS $(0,0)$

SKETCH $\rightsquigarrow$ VERTICES

① $x^2 + y^2 \leq 9$ CIRCLE CENTER (0,0) RADIUS 3

② $x^2 + y \geq 9$ PARABOLA
 $y = 9 - x^2$

X-INT: $0 = 9 - x^2 \rightarrow x = \pm 3$
 Y-INT: $y = 9 - 0^2 \rightarrow y = 9$



INTERSECTIONS

$x^2 + y^2 = 9$
 ~~$x^2 + y = 9$~~

$y^2 - y = 0$

$y(y-1) = 0$

$y = 0, 1$

$x^2 + 0 = 9$
 $x = \pm 3$

$(\pm 3, 0)$

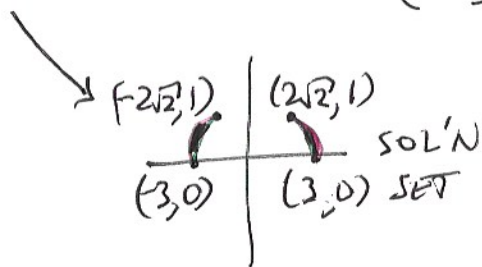
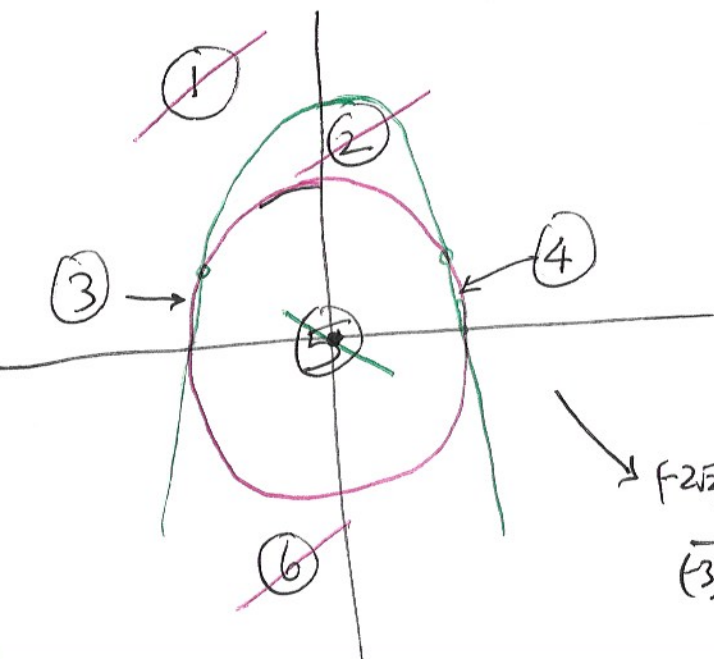
$x^2 + 1 = 9$
 $x^2 = 8$
 $x = \pm 2\sqrt{2}$

$(\pm 2\sqrt{2}, 1)$

TEST (0,0)

① $x^2 + y^2 \leq 9$
 $0^2 + 0^2 \leq 9$
 $0 \leq 9$ ✓

② $x^2 + y \geq 9$
 $0^2 + 0 \geq 9$
 $0 \geq 9$ ✗



(COVERED IN 7.5 LECTURE)

LINEAR SYSTEMS



$ax+by=c$ LINEAR EQ'N IN 2 UNKNOWN

x, y UNKNOWN

a, b, c CONSTANTS I.E. $a, b, c \in \mathbb{R}$

$ax+by+cz=d$ LINEAR EQ'N IN 3 UNKNOWN

eg. $4x+3y=1$
 $-x+2y=8$

① SUBSTITUTION

$$-x+2y=8$$

$$2y-8=x$$

$$4(2y-8)+3y=1$$

$$8y-32+3y=1$$

$$11y=33$$

$$y=3$$

$$x=2(3)-8=-2 \quad (x,y)=(-2,3)$$

CHECK SOL'NS

$$4(-2)+3(3)=-8+9=1$$

$$-(-2)+2(3)=2+6=8 \quad \checkmark$$

② ELIMINATION

$$\begin{array}{r} 4x + 3y = 1 \\ 4(-x + 2y) = (8)4 \end{array}$$

$$\begin{array}{r} 4x + 3y = 1 \\ -4x + 8y = 32 \\ \hline 11y = 33 \\ y = 3 \end{array}$$

$$\begin{array}{r} 2(4x + 3y) = 2(1) \\ -3(-x + 2y) = -3(8) \end{array}$$

$$\begin{array}{r} 8x + 6y = 2 \\ -3x - 6y = -24 \\ \hline 11x = -22 \\ x = -2 \end{array}$$