

## P517 Chapter 6 Test

$$\begin{aligned} \#1 \quad 3x - y &= 9 \\ x + 2y &= 10 \end{aligned}$$

Elimination

$$\times 2 \quad 6x - 2y = 18$$

$$\text{Same} \quad \text{add} \quad x + 2y = 10$$

$$\hline 7x = 28$$

$$x = 4$$

$$(4) + 2y = 10$$

$$2y = 6 \rightarrow y = 3$$

Dec 3-9:00 AM

#2

$$6x + 9y = -21$$

$$4x + 6y = -14$$

$$\times 2 \quad 12x + 18y = -42$$

$$\times -3 \quad -12x - 18y = +42$$

$$\hline 0 + 0 = 0$$

true

dependent

Dec 3-9:06 AM

$$\#3 \quad \frac{1}{7}x - \frac{1}{3}y = -\frac{5}{12}$$

$$\frac{1}{10}x + \frac{1}{5}y = \frac{1}{2}$$

$$\times 12 \quad 3x - 4y = -5$$

$$\times 20 \quad 2x + 4y = 10$$

$$\hline 5x = 5$$

$$x = 1$$

$$3(1) - 4y = -5$$

$$-4y = -8$$

$$y = 2$$

Dec 3-9:10 AM

$$\#4 \quad x - 2y = 4$$

$$-2x + 4y = 6$$

$$\text{same} \quad x - 2y = 4$$

$$\div 2 \quad -x + 2y = 3$$

$$\begin{array}{r} \text{add} \\ \hline 0 + 0 = 7 \end{array}$$

no solution  
since result is 'false'

Dec 3-9:15 AM

#5

$$\begin{aligned} 2x + y + z &= 3 \\ x + 2y - z &= 3 \\ 3x - y + z &= 5 \end{aligned}$$

$2(2) + (0) + z = 3$   
 $4 + z = 3$   
 $z = -1$

$$\begin{aligned} 2x + y + z &= 3 \\ \text{add } x + 2y - z &= 3 \\ \hline 3x + 3y &= 6 \\ \downarrow & \\ x + y &= 2 \end{aligned}$$

$x-1$

$$\begin{aligned} (2) + y &= 2 \\ \hline y &= 0 \end{aligned}$$

$$\begin{aligned} x + 2y - z &= 3 \\ \text{add } 3x - y + z &= 5 \\ \hline 4x + y &= 8 \end{aligned}$$

$x-1$

$$\begin{aligned} 4x + y &= 8 \\ -x - y &= -2 \\ \hline 3x &= 6 \\ x &= 2 \end{aligned}$$

Dec 3-9:18 AM

#6

$$\begin{aligned} 2x^2 + y^2 &= 6 \\ x^2 - 4y^2 &= -15 \end{aligned} \rightarrow x^2 = 4y^2 - 15$$

$$\begin{aligned} 2(4y^2 - 15) + y^2 &= 6 \\ 8y^2 - 30 + y^2 &= 6 \\ 9y^2 &= 36 \\ y^2 &= 4 \\ y &= \pm 2 \end{aligned}$$

$$\begin{aligned} 2x^2 + (2)^2 &= 6 \\ 2x^2 + 4 &= 6 \\ 2x^2 &= 2 \\ x^2 &= 1 \quad x = \pm 1 \end{aligned}$$


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$$\begin{aligned} 2x^2 + (-2)^2 &= 6 \\ 2x^2 + 4 &= 6 \\ 2x^2 &= 2 \quad x^2 = 1 \quad x = \pm 1 \end{aligned}$$

$(1, 2)$        $(-1, 2)$

$(1, -2)$      $(-1, -2)$

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$$\#7 \quad x^2 + y^2 = 25$$

$$x + y = 7$$

↓

$$x = (7 - y)$$

$$(7 - y)^2 + y^2 = 25$$

$$49 - 14y + y^2 + y^2 = 25$$

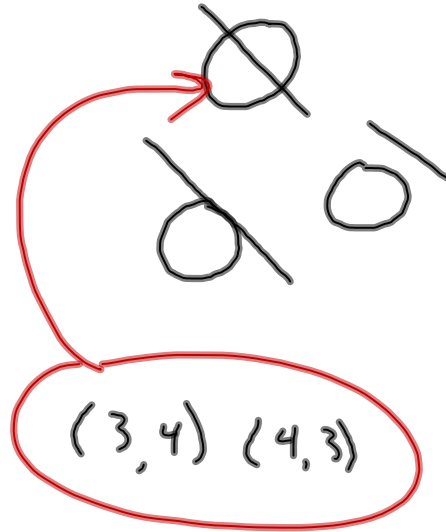
$$2y^2 - 14y + 24 = 0$$

$$y^2 - 7y + 12 = 0$$

$$(y - 3)(y - 4) = 0$$

$$y = 3 \text{ or } y = 4$$

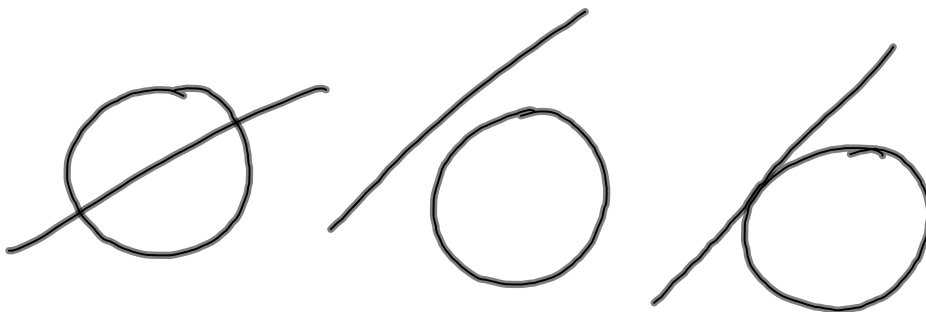
$$x = 4 \text{ or } x = 3$$



Dec 3-9:30 AM

#8

3 possibilities



Dec 5-9:01 AM

#9

$$\begin{aligned} X + y &= -1 \\ X^2 + y^2 &= 61 \end{aligned}$$

$$\begin{aligned} (-6, 5) \\ (5, -6) \end{aligned}$$

Substitution  $X = -y - 1$ 

$$(-y - 1)^2 + y^2 = 61$$

$$y^2 + 2y + 1 + y^2 = 61$$

$$2y^2 + 2y + 1 = 61$$

$$2y^2 + 2y - 60 = 0$$

$$y^2 + y - 30 = 0$$

$$(y - 5)(y + 6) = 0$$

$$y = 5 \text{ or } y = -6$$

Dec 5-9:06 AM

#10  $3a - 2b = 13$

$4a - b = 19$

$$\begin{bmatrix} 3 & -2 & 13 \\ 4 & -1 & 19 \end{bmatrix}$$

$$\begin{bmatrix} 12 & -8 & 52 \\ -12 & 3 & -57 \end{bmatrix} \begin{array}{l} \times 4 \\ \times -3 \end{array}$$

$$\begin{bmatrix} 12 & -8 & 52 \\ 0 & -5 & -5 \end{bmatrix}$$

$$\begin{bmatrix} 12 & -8 & 52 \\ 0 & 1 & 1 \end{bmatrix}$$

$y = 1$

$12x - 8(1) = 52$

$12x = 60$

$x = 5$

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#10 cont.

$$\begin{bmatrix} 12 & -8 & 52 \\ 0 & -5 & -5 \end{bmatrix} \begin{array}{l} \div 4 \\ \div -5 \end{array}$$

$$\begin{bmatrix} 3 & -2 & 13 \\ 0 & 1 & 1 \end{bmatrix} \times 2$$

$$\begin{bmatrix} 3 & -2 & 13 \\ 0 & 2 & 2 \end{bmatrix}$$

$$\begin{bmatrix} 3 & 0 & 15 \\ 0 & 2 & 2 \end{bmatrix}$$

$$\begin{bmatrix} 1 & 0 & 5 \\ 0 & 1 & 1 \end{bmatrix}$$

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$$\begin{array}{rcl} \#11 & 3a - 4b + 2c & = 15 \\ & 2a - b + c & = 13 \\ & a + 2b - c & = 5 \end{array}$$

$$\begin{bmatrix} 3 & -4 & 2 & 15 \\ 2 & -1 & 1 & 13 \\ 1 & 2 & -1 & 5 \end{bmatrix}$$

$$\begin{bmatrix} 6 & -8 & 4 & 30 \\ -6 & 3 & -3 & -39 \end{bmatrix}$$

$$\begin{bmatrix} 3 & -4 & 2 & 15 \\ 0 & -5 & 1 & -9 \\ -3 & -6 & 3 & -15 \end{bmatrix}$$

$$\begin{bmatrix} 3 & -4 & 2 & 15 \\ 0 & -5 & 1 & -9 \\ 0 & -10 & 5 & 0 \end{bmatrix}$$

$$\begin{bmatrix} 3 & -4 & 2 & 15 \\ 0 & 10 & -2 & 18 \\ 0 & -10 & 5 & 0 \end{bmatrix}$$

$$\begin{bmatrix} 3 & -4 & 2 & 15 \\ 0 & 10 & -2 & 18 \\ 0 & 0 & 3 & 18 \end{bmatrix}$$

$$C = 6 \quad \text{Sub for } a \text{ \& } b$$

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$$\begin{array}{l} \#13 \quad x+y+z=2 \\ \quad \quad x=y+z \rightarrow x-y-z=0 \\ \quad \quad z=y-x \rightarrow x-y+z=0 \end{array}$$

$$\begin{bmatrix} 1 & 1 & 1 & 2 \\ 1 & -1 & -1 & 0 \\ 1 & -1 & 1 & 0 \end{bmatrix}$$

$$2x = 2$$

$$x = 1$$

$$y+z=1$$

$$y-z=1$$

$$2y=2$$

$$y=1$$

$$z=0$$

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#14

$$\begin{bmatrix} 5 & x+6 \\ 0 & 4 \end{bmatrix} = \begin{bmatrix} y-2 & 4-x \\ 0 & w+7 \end{bmatrix}$$

$$x = -1$$

$$y = 7$$

$$w = -3$$

$$x+6 = 4-x$$

$$2x = -2$$

$$x = -1$$

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#15

$$3 \begin{bmatrix} 2 & 3 \\ 1 & -4 \\ 5 & 9 \end{bmatrix} - \begin{bmatrix} -2 & 6 \\ 3 & -1 \\ 0 & 8 \end{bmatrix}$$

$$\begin{bmatrix} 6 & 9 \\ 3 & -12 \\ 15 & 27 \end{bmatrix} - \begin{bmatrix} -2 & 6 \\ 3 & -1 \\ 0 & 8 \end{bmatrix}$$

$$\begin{bmatrix} 8 & 3 \\ 0 & -11 \\ 15 & 19 \end{bmatrix}$$

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20)  $\begin{vmatrix} 6 & 8 \\ 2 & -7 \end{vmatrix}$  Determinant

$$(6)(-7) - (2)(8)$$

$$-42 - 16$$

$$-58$$

Dec 10-9:00 AM



$$21) \begin{array}{c|cc} 2 & 0 & 8 \\ -1 & 7 & 9 \\ 12 & 5 & 3 \end{array} \begin{array}{c|cc} 2 & 0 \\ -1 & 7 \\ 12 & 5 \end{array}$$

$$\left[ \begin{array}{l} (2)(7)(-3) + (0)(9)(12) \\ + (8)(-1)(5) \end{array} \right] - \left[ \begin{array}{l} (12)(7)(8) + (5)(9)(2) \\ + (3)(-1)(0) \end{array} \right]$$

Dec 10-9:03 AM

$$\#24) \begin{array}{l} 2x - 3y = -33 \\ 4x + 5y = 11 \end{array} \left\{ \begin{array}{l} x = \frac{D_x}{D} = \frac{-132}{22} = -6 \\ y = \frac{D_y}{D} = \frac{154}{22} = 7 \end{array} \right.$$

$$D = \begin{vmatrix} 2 & -3 \\ 4 & 5 \end{vmatrix} \quad (2)(5) - (4)(-3) = 22$$

$$D_x = \begin{vmatrix} -33 & -3 \\ 11 & 5 \end{vmatrix} \quad (-33)(5) - (11)(-3) = -165 + 33 = -132$$

$$D_y = \begin{vmatrix} 2 & -33 \\ 4 & 11 \end{vmatrix} \quad (2)(11) - (4)(-33) = 154$$

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