

①

$$2x - 9 = -8x + 2$$

$$10x = 11$$

$$x = \frac{11}{10}$$

10pts

$$3 \cdot 3 \cdot 5 = \text{LCD}$$

②

$$\frac{2x}{9} \cdot \frac{5}{5} + \frac{2}{1} \cdot \frac{45}{45} = \frac{1}{15} \cdot \frac{3}{3}$$

$$\frac{10x + 90}{\text{LCD}} = \frac{3}{\text{LCD}}$$

$$10x + 90 = 3$$

$$10x = -87$$

$$x = \frac{-87}{10}$$

③

$$12x^2 = 9$$

$$x^2 = \frac{9}{12} = \frac{3}{4}$$

$$x = \pm \sqrt{\frac{3}{4}} = \pm \frac{\sqrt{3}}{2} = x$$

121

T 1

$$(4) \quad 9x^2 - 24x + 23 = 0$$

$$a=9, b=-24, c=23$$

$$b^2 - 4ac = (-24)^2 - 4(9)(23)$$

$$= 576 - 828 = -252$$

$$\sqrt{-252} = 6i\sqrt{7}$$

$$x = \frac{24 \pm 6i\sqrt{7}}{2(9)} = \frac{6(4 \pm i\sqrt{7})}{6 \cdot 3}$$

$$= \frac{4 \pm i\sqrt{7}}{3} = x$$

$$\begin{array}{r} 2 \overline{) 252} \\ \underline{2} \phantom{00} \\ 0 \phantom{00} \\ 2 \overline{) 126} \\ \underline{2} \phantom{00} \\ 0 \phantom{00} \\ 3 \overline{) 63} \\ \underline{3} \phantom{00} \\ 0 \phantom{00} \\ 3 \overline{) 21} \\ \underline{3} \phantom{00} \\ 0 \phantom{00} \end{array}$$

$$(5) \quad 9x^2 - 24x + 23 = 0 \rightarrow$$

$$b^2 - 4ac = -252 \rightarrow 2 \text{ nonreal solns}$$

$$(6) \quad 12x^2 = 9 \rightarrow$$

$$12x^2 + 0x - 9 = 0 \rightarrow$$

$$b^2 - 4ac = 0^2 - 4(12)(-9)$$

$$= 432 \rightarrow 2 \text{ real solns}$$

$$(7) \quad 36x^2 - 60x + 25 = 0$$

$$b^2 - 4ac = 60^2 - 4(36)(25)$$

$$= 0! \quad \text{one real (rational)} \\ \text{(repeated) root}$$

12)

T 1

8

$$x^2 + 2x - 35$$

$$= (x+7)(x-5) \stackrel{\text{SET}}{=} 0$$

10 pts

$$\Rightarrow x \in \{-7, 5\}$$

9

$$60x^2 + 61x - 56 = 0$$

Big one?  
cheat it!

$$b^2 - 4ac = 61^2 - 4(60)(-56)$$

$$= 17161 = 131^2$$

$$\Rightarrow x = \frac{-61 \pm 131}{2(60)}$$

$$\begin{aligned} x &= \frac{7}{12} = x \\ -\frac{8}{5} &= x \end{aligned}$$

$$= \frac{-61 + 131}{2(60)} = \frac{70}{120}$$

$$= \frac{-61 - 131}{120} = \frac{-192}{120}$$

$$= \frac{96}{60} = \frac{48}{30} = \frac{16}{10} = \frac{8}{5} \checkmark$$

Factored Form:

$$60 \left(x - \frac{7}{12}\right) \left(x + \frac{8}{5}\right)$$

$$= 5 \left(x + \frac{8}{5}\right) (12) \left(x - \frac{7}{12}\right)$$

$$= \boxed{(5x + 8)(12x - 7)}$$

121

T1

(10)

$$x^2 - 7x + 7 = 0$$

$$x^2 - 6x + 3 = -7$$

$$x^2 - 6x + 3^2 = -7 + 9 = 2$$

 $\frac{21}{4}$ 

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

$$x-3 = \pm\sqrt{2}$$

$$x = 3 \pm \sqrt{2}$$

(11)

$$7x^2 - 6x - 9 = 0$$

$$\frac{\frac{6}{7}}{2} = \frac{6}{7} \cdot \frac{1}{2} = \frac{3}{7}$$

$$7 \left( x^2 - \frac{6}{7}x - \frac{9}{7} \right) = 0$$

$$x^2 - \frac{6}{7}x = \frac{9}{7}$$

$$x^2 - \frac{6}{7}x + \left(\frac{3}{7}\right)^2 = \frac{9}{7} + \frac{9}{49} = \frac{63+9}{49}$$

$$\left(x - \frac{3}{7}\right)^2 = \frac{72}{49}$$

$$x - \frac{3}{7} = \pm \sqrt{\frac{72}{49}} = \pm \frac{6\sqrt{2}}{7}$$

$$x = \frac{3 \pm 6\sqrt{2}}{7}$$

$2 \sqrt{72}$   
 $2 \sqrt{36}$   
 $2 \sqrt{18}$   
 $3 \sqrt{9}$   
 $3$

(12) (a)  $m = -5, (x_1, y_1) = (-13, 77)$   
 SILLY STUDENTS!

$$y = m(x - x_1) + y_1$$

$$y = -5(x + 13) + 77$$

$$= -5x - 65 + 77$$

$$= -5x + 12$$

(b)  $m = -5 \rightarrow m_{\perp} = \frac{1}{5} \rightarrow$

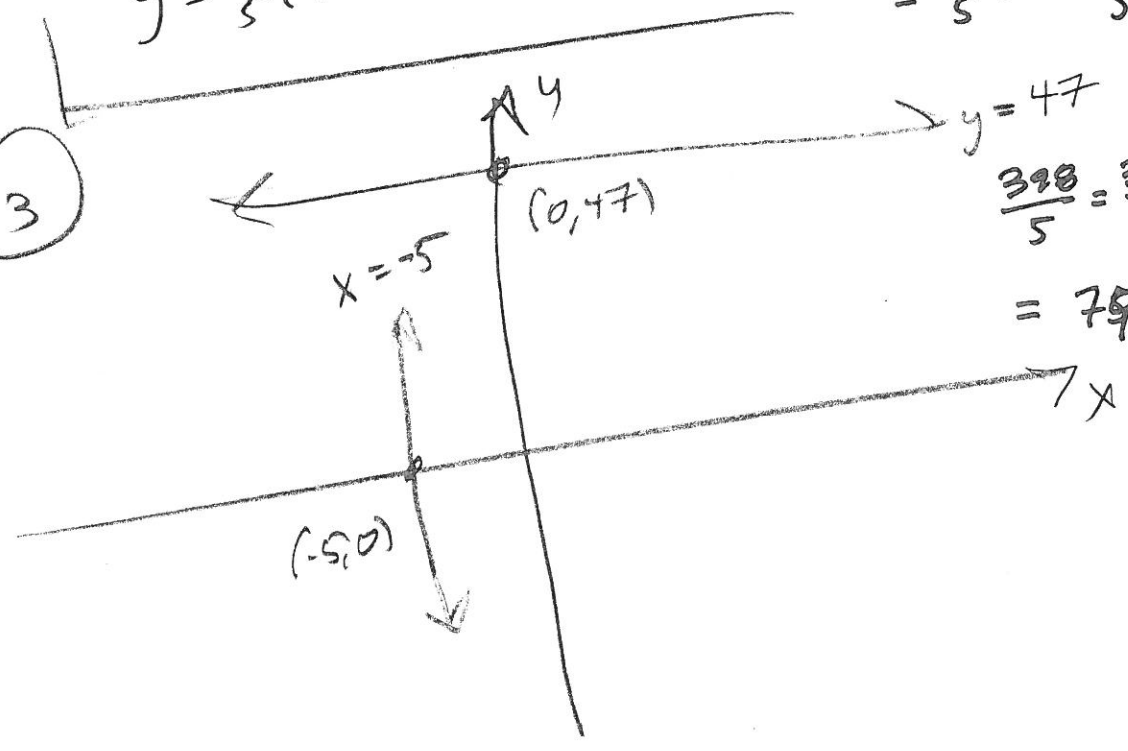
$$y = \frac{1}{5}(x + 13) + 77$$

$$= +\frac{1}{5}x + \frac{13}{5} + \frac{77 \cdot 5}{1 \cdot 5}$$

$$= \frac{1}{5}x + \frac{13 + 385}{5}$$

$$= \frac{1}{5}x + \frac{398}{5}$$

(13)



$$\frac{398}{5} = \frac{395}{5} + \frac{3}{5}$$

$$= 79 + \frac{3}{5}$$

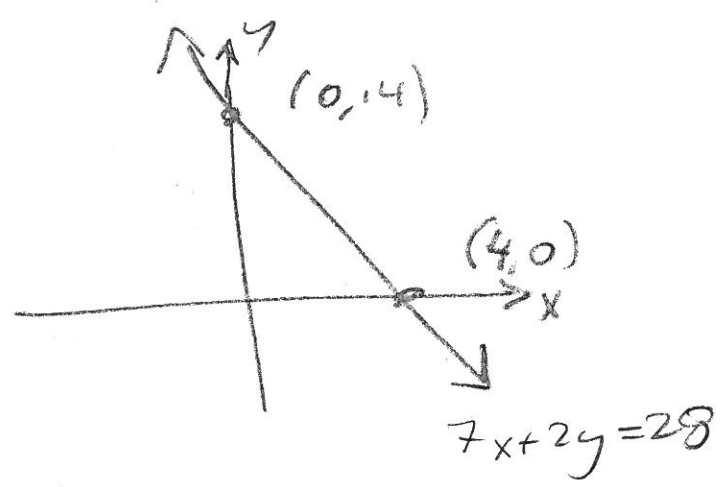
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T 1

(14)

$$7x + 2y = 28$$

x	y
0	14
4	0



(15)

(a)

$$|8x - 3| > 5$$

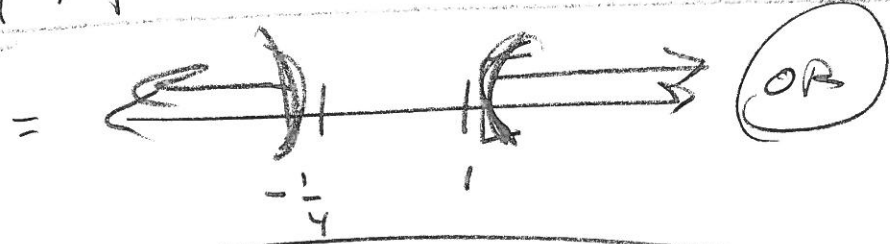
$$8x - 3 > 5 \quad \text{OR} \quad 8x - 3 < -5$$

$$8x > 8$$

$$8x < -2$$

10pts

$$\left\{ x \mid x > 1 \quad \text{OR} \quad x < -\frac{1}{4} \right\}$$



$$= (-\infty, -\frac{1}{4}) \cup (1, \infty)$$

121

T1

15b

$$|-7x+9| \leq 5$$

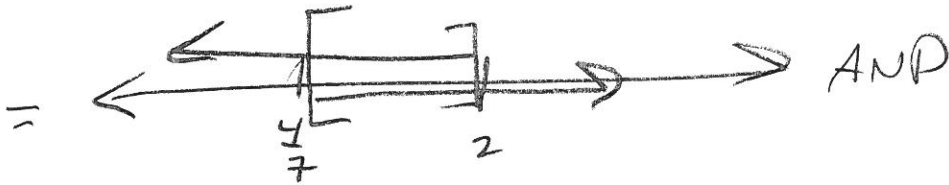
$$|7x-9| \leq 5$$

$$7x-9 \leq 5 \quad \text{AND} \quad 7x-9 \geq -5$$

$$7x \geq 4$$

$$7x \leq 14$$

$$\left\{ x \mid x \leq 2 \quad \text{AND} \quad x \geq \frac{4}{7} \right\}$$



$$= \left[ \frac{4}{7}, 2 \right]$$

M2

$$-7x+9 \leq 5 \quad \text{and} \quad -7x+9 \geq -5$$

$$-7x \leq -4$$

$$-7x \geq -14$$

$$\left\{ x \mid x \geq \frac{4}{7} \quad \text{and} \quad x \leq 2 \right\} \text{ SAME}$$

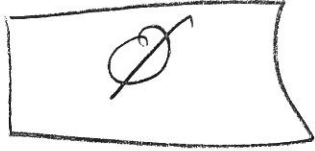
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11

(Sc)

$$|2x-7| + 9 < 5$$

$$|2x-7| < -4 \text{ Never!}$$



(d)

$$|2x-7| + 2 \leq 3$$

$$|2x-7| \leq 1$$

$$2x-7 \leq 1 \quad \text{and} \quad 2x-7 \geq -1$$

$$2x \leq 8$$

$$2x \geq 6$$

$$\{x \mid x \leq 4 \quad \text{and} \quad x \geq 3\}$$



$$= [3, 4]$$



12) TI

Let  $x =$  amt of 22% alcohol (gallons)

then

$$.22x + .83(50) = .6(x + 50)$$

Let  $x =$  the # of hours that Tracy & John spend working (hrs).

Then  $\frac{1}{11}x + \frac{1}{15}x = 1$

B1

$$\frac{15x + 11x}{LCD} = \frac{(15)(11)}{LCD}$$

$$LCD = (15)(11) \\ = 165$$

$$26x = 165$$

$$x = \frac{165}{26} \text{ hrs}$$

B2

Let  $x =$  amt of time John works  
&  $y =$  " " " Tracey works.

Then  $y = x - 3$  a)

$$\frac{1}{11}x + \frac{1}{15}(x - 3) = 1$$

0121

T1

B2 ental

$$\frac{15x + 11(x-3)}{\text{LCD}} = \frac{165}{\text{LCD}}$$

$$15x + 11x - 33 = 165$$

$$26x = 198$$

$$x = \frac{198}{26} = \frac{99}{13}$$

$$\rightarrow y = x - 3 = \frac{99}{13} - \frac{3 \cdot 13}{1 \cdot 13}$$

$$= \frac{99 - 39}{13} = \frac{60}{13} = y$$

121

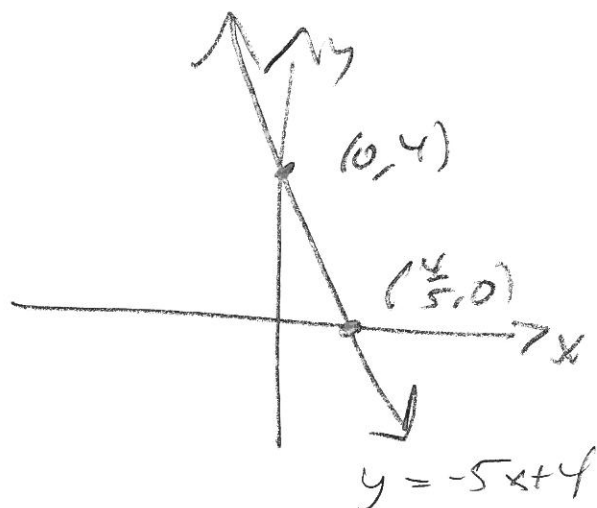
T1

(B3)

$$y = -5x + 4 \quad \underline{\underline{\text{SET } 0}}$$

$$-5x = -4$$

$$x = \frac{4}{5}$$



(B4)

$$f(x) = 7x^2 - 6x - 9$$

$$= 7 \left( x^2 - \frac{6}{7}x \right) - 9$$

$$= 7 \left( x^2 - \frac{6}{7}x + \left(\frac{3}{7}\right)^2 \right) - 9 - 7 \left(\frac{3}{7}\right)^2$$

$$= 7 \left( x - \frac{3}{7} \right)^2 - \frac{72}{7}$$

$$\rightarrow -9 - 7 \left( \frac{9}{49} \right)$$

$$= -9 - \frac{9}{7}$$

$$= \frac{-63 - 9}{7}$$

$$= \frac{-72}{7}$$

(B5)

$$x^4 - 81 = (x^2 - 9)(x^2 + 9)$$

$$= (x-3)(x+3)(x^2+9) \quad \underline{\underline{\text{SET } 0}}$$

$$\rightarrow x = \pm 3, \quad x^2 = -9$$

$$x = \pm \sqrt{-9}$$

$$x = \pm 3i$$

$$x \in \{ \pm 3, \pm 3i \}$$