

12 / MIDTERM Re-do

① a) $\frac{x+2}{x-1} = \frac{3x-8}{x+2}$ LCD = $(x-1)(x+2)$

$\left(\frac{x+2}{x-1}\right)\left(\frac{x+2}{x+2}\right) = \left(\frac{3x-8}{x+2}\right)\left(\frac{x-1}{x-1}\right)$

$a=2, b=-15, c=4$
 $b^2-4ac = (-15)^2 - 4(2)(4)$

$\frac{x^2+4x+4}{LCD} = \frac{3x^2-11x+8}{LCD}$

$= 225 - 32 = 193$
 $x = \frac{15 \pm \sqrt{193}}{2(2)} \approx 7.223110997$
 $.2768890026$
 $.2768890026$

$-2x^2 + 15x - 4 = 0$

$2x^2 - 15x + 4 = 0$

10pts

$x \approx 7.223110997$

OR

$x \approx .2768890026$

b) $|2x-3| = 8$

$2x-3 = \pm 8$

$2x = 3 \pm 8$

$x = \frac{3 \pm 8}{2}$

$x \in \left[-\frac{5}{2}, \frac{11}{2}\right]$

10pts

c) $|2x-3| > 8$

$2x-3 > 8$ OR $2x-3 < -8$

$2x > 11$

$2x < -5$

$x > \frac{11}{2}$ OR $x < -\frac{5}{2}$

$= (-\infty, -\frac{5}{2}) \cup (\frac{11}{2}, \infty)$

10pts

② $x =$ Price b4 tax (8/1)

$x + .06x = 33000$

$1.06x = 33000$

$x = \frac{33000}{1.06}$

$31,132.08$

10pts

③

$x =$ time it takes working together (hrs)
 $\frac{1}{7}x + \frac{1}{10}x = 1 \Rightarrow \frac{10+7}{70}x = \frac{70}{70} \Rightarrow \frac{17}{70}x = 1$

$(.117647059)(60)$
 7.058823529

$x = \frac{70}{17}$ hrs ≈ 4.117
 4.117647059 hrs

5pts

5pts

④ Let $x =$ the # of hrs Jenny spends on the job.

Jim starts ⑨ 10 am $x-2$ hrs
 Jen " " 8 am x hrs

$$\frac{1}{7}(x-2) + \frac{1}{10}x = 1$$

$$\frac{10(x-2) + 7x}{70} = \frac{70}{70}$$

$$10x - 20 + 7x = 70$$

$$17x = 90$$

$$x = \frac{90}{17} \approx 5.294117647 \text{ is how long}$$

Jenny works. Then

8 am + 5.294117647 hrs is

1 pm + (.294117647 hrs) $\left(\frac{60 \text{ min}}{1 \text{ hr}}\right)$

\approx 1 pm + 17.64705882 min

\approx 1:18 pm

SPB

⑤ $f(x) = x^2 - 10x + 21 = (x-3)(x-7)$ SET $= 0 \Rightarrow (3,0), (7,0)$ x-ints

$$= x^2 - 10x + 5^2 - 25 + 21$$

$$= (x-5)^2 - 4$$

$$(h,k) = (5, -4)$$

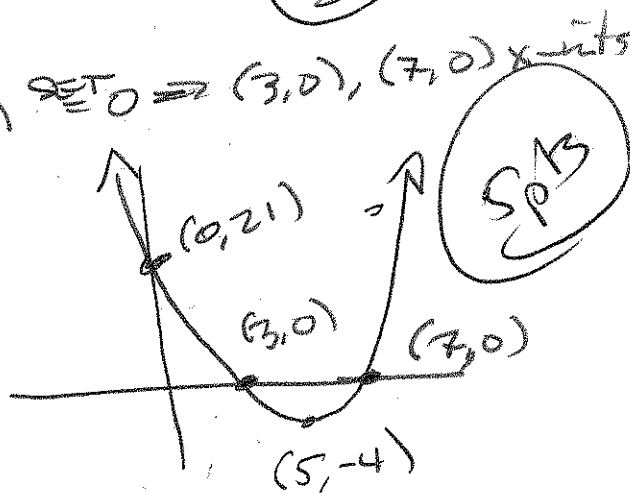
y-int: (0, 21)

OR THIS WAY:

$$(x-5)^2 = 4$$

$$x-5 = \pm 2 \quad \begin{matrix} \nearrow 7=x \\ \searrow 3=x \end{matrix}$$

$$x = 5 \pm 2 \rightarrow 3=x$$



SPB

(6) $(x_1, y_1) = (5, 3)$
 $(x_2, y_2) = (-3, 9)$

$$m = \frac{3-9}{5-(-3)} = \frac{9-3}{-3-5} = \frac{6}{-8} = -\frac{3}{4}$$

OR $y = -\frac{3}{4}(x+3) + 9$

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

(a) $y = -\frac{3}{4}(x-5) + 3$

SptB

(b) $= -\frac{3}{4}x + \frac{15}{4} + \frac{12}{4}$

$$y = -\frac{3}{4}x + \frac{27}{4}$$

SptB

(c) $4y = -3x + 27$

$$-3x + 4y = 27$$

SptB

(7) thru $(3, -7)$ & parallel to $y = \frac{2}{7}x + \frac{11}{97}$

$$y = \frac{2}{7}(x-3) - 7$$

SptB

OR $y = \frac{2}{7}x - \frac{6}{7} - \frac{49}{7}$

$$y = \frac{2}{7}x - \frac{55}{7}$$

$$y = .2857142857x - 7.857142857$$

(8) (a) $2x^2 - 3x - 9 = 0$
 $(2x+3)(x-3) = 0$
 $x \in \{-\frac{3}{2}, 3\}$

SptB



$$x \in (-\infty, -\frac{3}{2}) \cup (3, \infty)$$

SptB

(9) $f(x) = \frac{x+7}{x-5}$ & $g(x) = \sqrt{x+3}$
 $D(f) = \{x \mid x \neq 5\} = (-\infty, 5) \cup (5, \infty)$
 $D(g) = \{x \mid x \geq -3\} = [-3, \infty)$

SptB

(a) SptB

(b) SptB

(c) SptB

$$(f \circ g)(x) = \frac{\sqrt{x+3} + 7}{\sqrt{x+3} - 5}$$

$$D(f \circ g) = \{x \mid x \in D(g) \text{ and } g(x) \in D(f)\}$$

$$= \{x \mid x \geq -3 \text{ and } \sqrt{x+3} \neq 5\}$$

$$= \{x \mid x \geq -3 \text{ and } x+3 \neq 25\}$$

$$= \{x \mid x \geq -3 \text{ and } x \neq 22\}$$

$$= (-3, 22) \cup (22, \infty)$$