Dawson College: **Algebra**: 201-007-50 02

September 29, 2009

Name: SOLUTIONS

Student ID: _____

Test 1 (B)

Question 1. *(10 marks.)* Solve for x in the following equations:

✓ **(a)** $\frac{4}{7}(x+2)=\frac{1}{2}$

$\frac{4}{7}x+\frac{8}{7}=\frac{1}{2}$

$\frac{4}{7}x=\frac{1}{2}-\frac{8}{7}$

$\frac{4}{7}x=\frac{7}{14}-\frac{16}{14}$

$\frac{4}{7}x=\frac{-9}{14}$

$\frac{7}{4}\cdot\frac{4}{7}x=\frac{7}{4}\cdot\left(-\frac{9}{14}\right)$

$x=-\frac{9}{8}$

✓ **(b)** $13(3x+4)-7(2x-5)=5x-13$

$39x+52-14x+35=5x-13$

$25x+87=5x-13$

$25x-5=-13-87$

$20x=-100$

$x=-5$

Question 2 *(5 marks.)* The first side of a triangle is 4cm lonoger than the base of the triangle. The second side is 3cm longer than the first side. If the perimeter is 26cm find the length of each side.

LET x BE THE LENGTH OF THE BASE

$\therefore$ $x+4$ IS THE " " " FIRST SIDE

$(x+4)+3$ IS THE " " " SECOND SIDE

$\therefore \quad x + (x+4) + (x+7) = 26$

$3x + 11 = 26$

$3x = 15$

$x = 5$

$\therefore$ THE FIRST SIDE IS 9cm LONG, THE SECOND IS 12cm LONG

THE BASE IS 5cm LONG

Question 3. *(4 marks.)* Solve for R_2 in the following:

$$A = \frac{B(R_1 - R_2)}{5}$$

$5A = B(R_1 - R_2)$

$\frac{5A}{B} = R_1 - R_2$

$R_2 = R_1 - \frac{5A}{B}$

Question 4. *(10 marks.)* Solve the following linear inequalities. Give the solution graph and solution set (indicate which is which).

✓ **(a)** $4(x-1)+3 \geq 6(x-\frac{13}{6})$

$4x-4+3 \geq 6x-13$

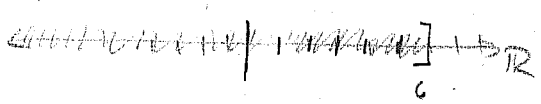
$4x-6x \geq -13+4-3$

$-2x \geq -12$

$\frac{-2x}{-2} \leq \frac{-12}{-2}$

$x \leq 6$

SOLUTION GRAPH:



SOLUTION SET:

$(-\infty, 6]$

✓ **(b)** $8 \geq 2(x-7) > -4$

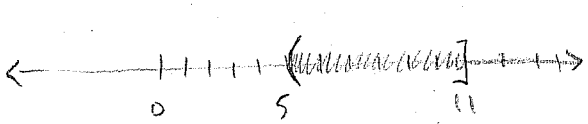
$8 \geq 2x-14 > -4$

$8+14 \geq 2x > -4+14$

$22 \geq 2x > 10$

$11 \geq x > 5$

SOLUTION GRAPH



SOLUTION SET:

$(5, 11]$

Question 5. *(7 marks.)*

(a) Find the slope-intercept form of the equation of the line that passes through the point $(6,4)$ and parallel to the line $10x = 2y - 52$.

$10x = 2y - 52$

$2y = 10x + 52$

$y = 5x + 26$

$\therefore m = 5$

THE LINES ARE PARALLEL SO OUR SLOPE IS $m = 5$

SLOPE-INTERCEPT FORM

$y = mx + b$

$4 = 5(6) + b$

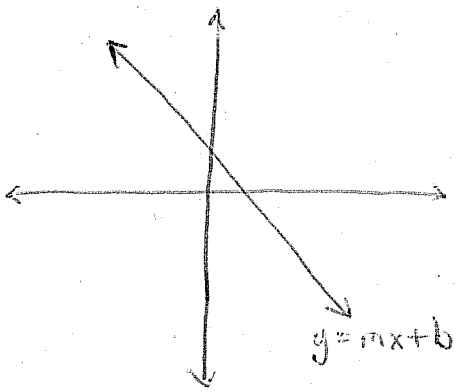
$4 = 30 + b$

$-26 = b$

$\therefore y = 5x - 26$

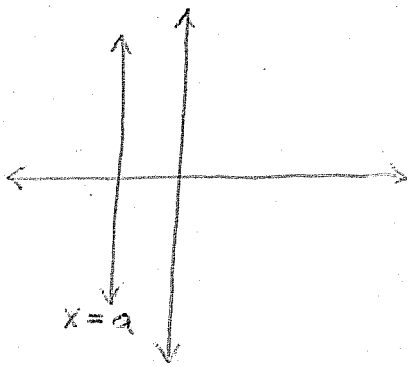
(b) State whether the slopes of the following lines are positive, negative, zero or undefined.

i)



POSITIVE

ii)



UNDEFINED

Question 6. *(4 marks.)* Use the intercepts (indicate which is which) to graph the line $7x - 2y = -14$

x-int: $y = 0$

$7x - 2(0) = -14$

$7x = -14$

$x = -2$

$\therefore (-2, 0)$

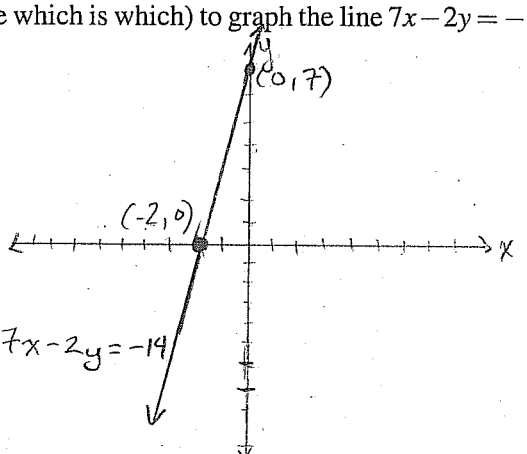
y-int: $x = 0$

$7(0) - 2y = -14$

$-2y = -14$

$y = 7$

$\therefore (0, 7)$



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Question 7. *(7 marks.)* In a certain city the taxi fare for a 6km trip is \$13 and \$20 for a 10km trip.
(a) Express the fare y in a linear equation with a distance of the trip in km, x.
(b) What is the starting charge of the taxi fare?
(c) How far can someone travel for \$46.25?

$(x_1, y_2) = (6, 13)$, $(x_2, y_2) = (10, 20)$

a) $m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{20-13}{10-6} = \frac{7}{4}$, $y = mx + b \Rightarrow 20 = \frac{7}{4}(10) + b \Rightarrow 20 - \frac{70}{4} + b$

$\Rightarrow \frac{80}{4} - \frac{70}{4} = b \Rightarrow \frac{10}{4} = b \Rightarrow \frac{5}{2} = b$

$\therefore y = \frac{7}{4}x + \frac{5}{2}$ or $y = 1.75x + 2.50$

b) $x = 0 \Rightarrow y = 2.50$ $\therefore$ THE STARTING THE FARE IS \$2.50

c) $46.25 = 1.75x + 2.50 \Rightarrow 46.25 - 2.50 = 1.75x$

$\frac{43.75}{1.75} = \frac{1.75x}{1.75}$

$\therefore x = 25$ $\therefore$ SOMEONE COULD TRAVEL FOR 25km

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Question 8. *(5 marks.)* Given that the lines $7x + 3y = 17$ and $kx - 2y = 13$ are perpendicular find k.

$3y = -7x + 17$

$y = -\frac{7}{3}x + \frac{17}{3}$

$m_1 = -\frac{7}{3}$

$kx - 2y = 13$

$-2y = -kx + 13$

$y = \frac{k}{2}x - \frac{13}{2}$

PERPENDICULAR $\therefore m_1 \cdot m_2 = -1$

$\left(-\frac{7}{3}\right)\left(\frac{k}{2}\right) = -1$

$-\frac{7k}{6} = -1$

$-7k = -6$

$k = \frac{-6}{-7}$

$\boxed{k = \frac{6}{7}}$

Question 9. *(6 marks.)* Graph $-8x+3y+16>0$

1) BOUNDARY LINE: $-8x+3y+16=0$

x-int: $y=0$

$-8x+3(0)+16=0$

$-8x=-16$

$x=2$

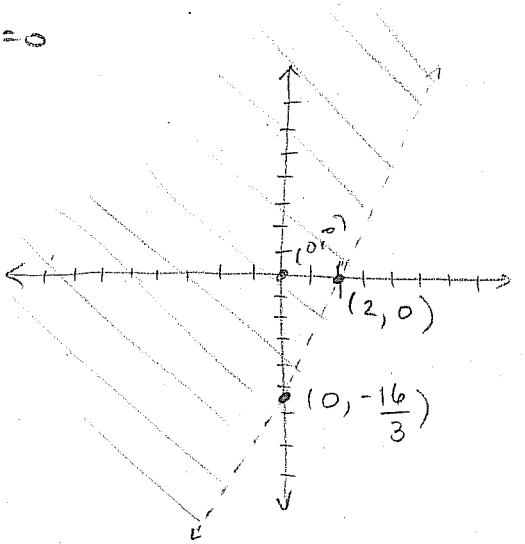
$\therefore (2,0)$

y-int: $x=0$

$-8(0)+3y+16=0$

$3y=-16$

$y=\frac{-16}{3}$ $\therefore (0,\frac{-16}{3})$



2) TEST POINT: $(0,0)$

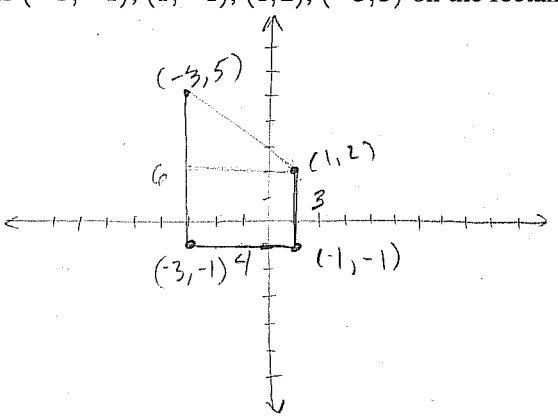
$-8(0)+3(0)+16>0$

$16>0$

TRUE

Question 10. *(5 marks.)*

(a) Plot the points $(-3,-1)$, $(1,-1)$, $(1,2)$, $(-3,5)$ on the rectangular coordinate system.



(b) Find the area of the object whose corners are the points above.

AREA OF RECTANGLE $= 4 \cdot 3 = 12 \text{ units}^2$

AREA OF TRIANGLE $= \frac{4 \cdot 3}{2} = 6 \text{ units}^2$

AREA OF OBJECT $= 12+6 = 18 \text{ units}^2$

Question 11. *(5 marks.)* Solve the following system to find the point of intersection of the lines:

$$\begin{aligned} &(1)\quad 4x - 5y = 11 \\ &(2)\quad 5x - 3y = 17 \end{aligned} \Rightarrow$$

$(1)\times 3 \quad 12x - 15y = 33$

$(2)\times 5 \quad -(25x - 15y = 85)$

$-13x = -52$

$x = 4$

FROM (1) $4(4) - 5y = 11$

$16 - 5y = 11$

$-5y = 11 - 16$

$-5y = -5$

$y = 1$

$\therefore (4, 1)$

Question 12. *(5 marks.)* A bank teller has \$1420 in ten and twenty dollar bills. Using linear equations, find the number of tens and twenty dollar bills he has if he has 109 bills in total.

LET x = NUMBER OF 10S, y = NUMBER OF 20S

$\therefore x + y = 109 \Rightarrow y = 109 - x$

$10x + 20y = 1420$

$10x + 20(109 - x) = 1420$

$10x - 20x = 1420 - 2180$

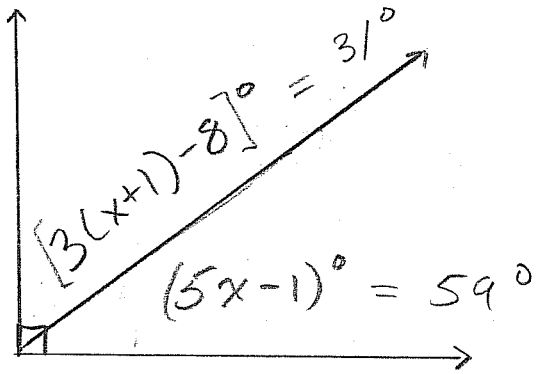
$-10x = -760$

$x = 76$

$y = 109 - 76 = 33$

$\therefore$ THE TELLER HAS 76 TENS AND 33 TWENTYS.

Question 13. *(5 marks.)* Find each angle.



$3x + 3 - 8 \quad + 5x - 1 = 90$

$8x - 6 = 90$

$\frac{8x}{8} = \frac{96}{8}$

$x = 12$