

Name: _____
Student ID: _____

Test 1 (A)

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

✓(a) $13(3x+4) - 7(2x-5) = 5x - 13$

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

$$25x + 87 = 5x - 13$$

$$25x - 5x = -13 - 87$$

$$20x = -100$$

$$x = -5$$

✓(b) $\frac{3}{11}(x+5) = \frac{1}{2}$

$$\frac{3}{11}x + \frac{15}{11} = \frac{1}{2}$$

$$\frac{3}{11}x = \frac{1}{2} - \frac{15}{11}$$

$$\frac{3}{11}x = \frac{11}{22} - \frac{30}{22}$$

$$\frac{3}{11}x = -\frac{19}{22}$$

$$\frac{11}{3} \cdot \frac{3}{11}x = \frac{11}{3} \left(-\frac{19}{22} \right)$$

$$\therefore x = -\frac{19}{6}$$

Question 2. (10 marks.) Solve the following linear inequalities. Give the solution graph and solution set (indicate which is which).

$$(a) 5(x-1)+3 \geq 7(x-\frac{13}{7})$$

$$5x-5+3 \geq 7x-13$$

$$5x-2 \geq 7x-13$$

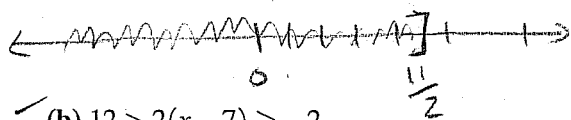
$$5x-7x \geq -13+2$$

$$-2x \geq -11$$

$$\frac{-2x}{-2} \leq \frac{-11}{-2}$$

$$x \leq \frac{11}{2}$$

SOLUTION GRAPH:



SOLUTION SET:

$$(-\infty, \frac{11}{2}]$$

$$(b) 12 > 2(x-7) \geq -2$$

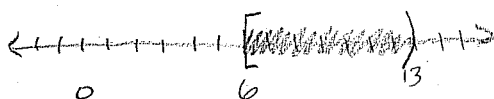
$$12 > 2x-14 \geq -2$$

$$12+14 > 2x \geq -2+14$$

$$26 > 2x \geq 12$$

$$13 > x \geq 6$$

SOLUTION GRAPH:



SOLUTION SET:

$$[6, 13)$$

✓ **Question 3** (5 marks.) The first side of a triangle is 4cm longer 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

THEN $x+4$ IS THE " " " FIRST SIDE

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

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

$$3x + 11 = 26$$

$$3x = 15$$

$$x = 5$$

∴ THE FIRST SIDE IS 9cm LONG, THE SECOND IS 12cm LONG AND THE BASE IS 5cm LONG

✓ **Question 4.** (4 marks.) Solve for T_2 in the following:

$$R = \frac{A(T_1 - T_2)}{4}$$

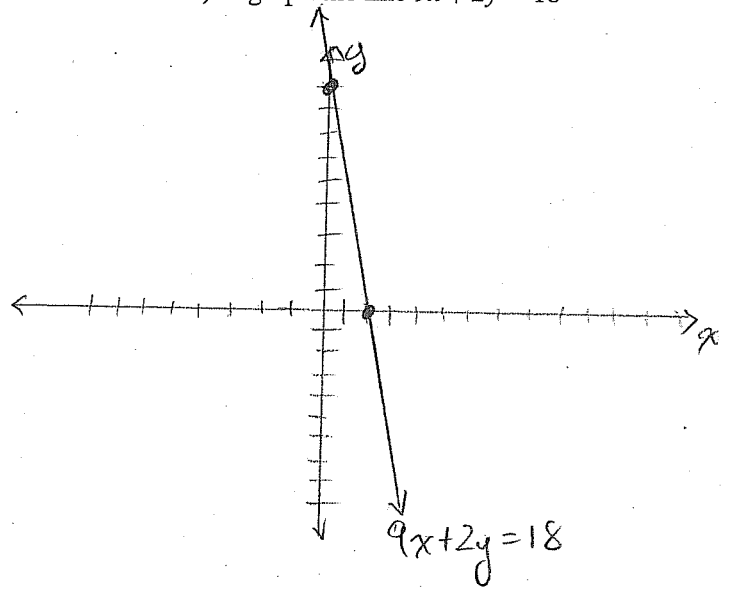
$$4R = A(T_1 - T_2)$$

$$\frac{4R}{A} = T_1 - T_2$$

$$T_2 = T_1 - \frac{4R}{A}$$

Question 5. (4 marks.) Use the intercepts (indicate which is which) to graph the line $9x + 2y = 18$

$\begin{aligned} \text{x-int: } y=0 \\ 9x + 2(0) &= 18 \\ 9x &= 18 \\ x &= 2 \\ \therefore (2, 0) \end{aligned}$	$\begin{aligned} \text{y-int: } x=0 \\ 9(0) + 2y &= 18 \\ 2y &= 18 \\ y &= 9 \\ \therefore (0, 9) \end{aligned}$
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Question 6. (7 marks.)

(a) Find the slope-intercept form of the equation of the line that passes through the point $(7, 3)$ and parallel to the line $14x = 7y - 52$.

$$\begin{aligned} 14x &= 7y - 52 \\ 14x + 52 &= 7y \\ y &= \frac{14}{7}x + \frac{52}{7} \\ y &= 2x + \frac{52}{7} \end{aligned}$$

$$\therefore m = 2$$

THE LINES ARE PARALLEL

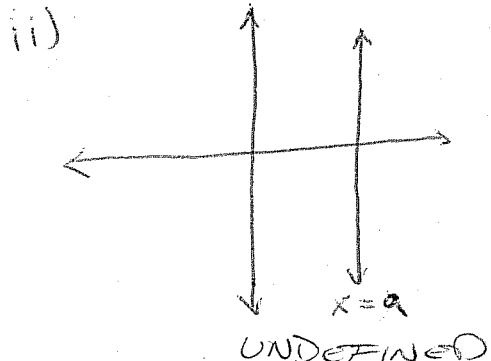
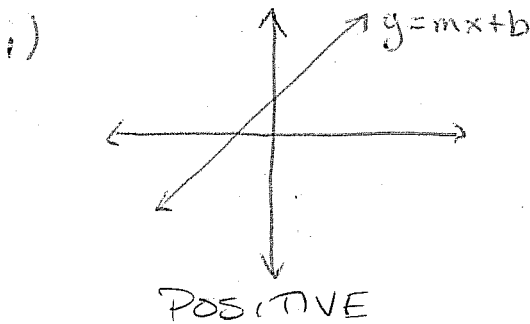
\therefore OUR SLOPE IS $m = 2$

SLOPE INTERCEPT FORM

$$\begin{aligned} y &= mx + b \\ 3 &= 2(7) + b \\ 3 &= 14 + b \\ -11 &= b \end{aligned}$$

$$\therefore y = 2x - 11$$

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



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

$$5x + 2y = 17$$

$$2y = -5x + 17$$

$$y = -\frac{5}{2}x + \frac{17}{2}$$

$$\therefore m_1 = -\frac{5}{2}$$

$$kx - 7y = 13$$

$$-7y = -kx + 13$$

$$y = \frac{k}{7}x - \frac{13}{7}$$

$$\therefore m_2 = \frac{k}{7}$$

LINES ARE PERPENDICULAR

$$\therefore m_1 m_2 = -1$$

$$-\frac{5}{2} \cdot \frac{k}{7} = -1$$

$$-\frac{5k}{14} = -1$$

$$-5k = -14$$

$$k = \frac{14}{5}$$

✓ **Question 8** (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?

a) $(x_1, y_1) = (6, 13), (x_2, y_2) = (10, 20)$

$$\therefore m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{20 - 13}{10 - 6} = \frac{7}{4}$$

$$y = mx + b$$

$$20 = \frac{7}{4}(10) + b$$

$$20 = \frac{35}{2} + b$$

$$20 - \frac{35}{2} = b$$

$$\frac{5}{2} = b$$

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

$$\text{OR } y = 1.75x + 2.50$$

b) STARTING CHARGE $\Rightarrow x = 0$

$$\therefore y = \frac{7}{4}(0) + \frac{5}{2}$$

$$= \frac{5}{2} = \$2.50$$

\(\therefore\) THE STARTING CHARGE IS \$2.50

c) $y = \$46.25$

$$\$46.25 = \frac{7}{4}x + 2.50$$

$$46.25 - 2.50 = 1.75x$$

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

$$25 = x$$

$$\therefore x = 25$$

\(\therefore\) SOMEONE CAN TRAVEL 25 km

Question 9. (6 marks.) Graph $-3x + 8y + 9 > 0$ 1) BOUNDARY LINE: $-3x + 8y + 9 = 0$

$$x\text{-int: } y=0$$

$$-3x + 8(0) + 9 = 0$$

$$-3x = -9$$

$$x = 3$$

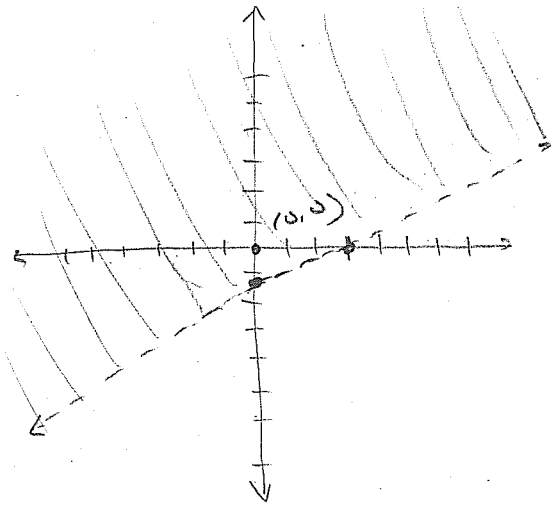
$$\therefore (3, 0)$$

$$y\text{-int: } x=0$$

$$-3(0) + 8y + 9 = 0$$

$$8y = -9$$

$$y = -\frac{9}{8} \quad \therefore (0, -\frac{9}{8})$$



2) TEST POINT

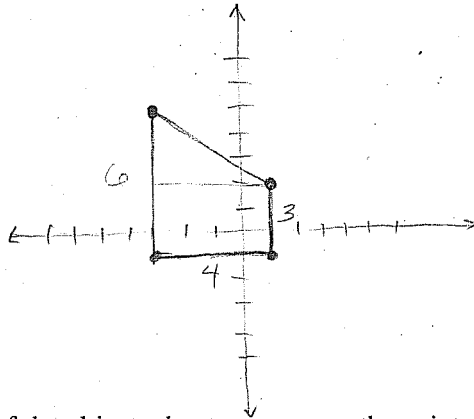
$$-3(0) + 8(0) + 9 > 0$$

$$9 > 0$$

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.

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

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

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

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

$$4x - 5y = 11$$

$$5x - 3y = 17$$

$$\begin{array}{r} \textcircled{1} \times 5 : 20x - 25y = 55 \\ \textcircled{2} \times 4 : -(20x - 12y = 68) \\ \hline -13y = -13 \\ y = 1 \end{array}$$

$$4x = 16$$

$$x = 4$$

$$\therefore \boxed{(4, 1)}$$

PLUG INTO $\textcircled{1}$

$$4x - 5(1) = 11$$

$$4x - 5 = 11$$

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 TENS
 y = NUMBER OF TWENTYS

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

$$10x + 20y = 1420$$

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

$$10x + 2180 - 20x = 1420$$

$$-10x = 1420 - 2180$$

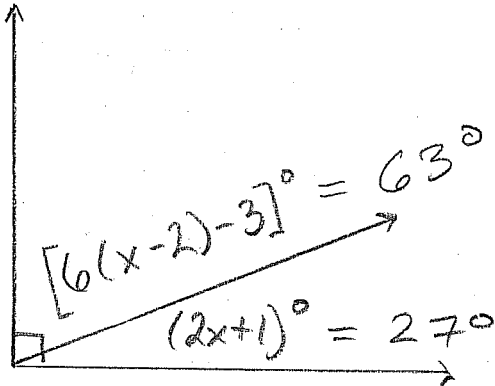
$$-10x = -760$$

$$x = 76$$

$$y = 109 - 76 = 33$$

\therefore THE TELLER HAS 76 TENS AND 33 TWENTYS.

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



$$6x - 12 - 3 + 2x + 1 = 90$$

$$8x - 14 = 90$$

$$8x = 104$$

$$x = 13$$

$$6(13-2) - 3 = 63$$

$$2(13) + 1 = 27$$