

## Exam 2

### Math 40 - Elementary Algebra

- ✓ You have 50 minutes to complete the exam. Read ALL instructions carefully;
- ✓ You may NOT use a calculator;
- ✓ Use proper mathematical notation on ALL problems
- ✓ You may NOT use any notes, book, or neighbors during the exam;
- ✓ Use only pencil and indicate answers by BOXING, CIRCLING, or HIGHLIGHTING;
- ✓ You must show work to receive full credit and simplify all answers completely;
- ✓ Leave fractions as improper fractions if necessary (no mixed numbers);

I have read the above guidelines and agree to follow them. Also, the work contained on this exam is my own and I promise to adhere to academic honesty.

Name: key

Signature: \_\_\_\_\_



Ans: 82.5% B-

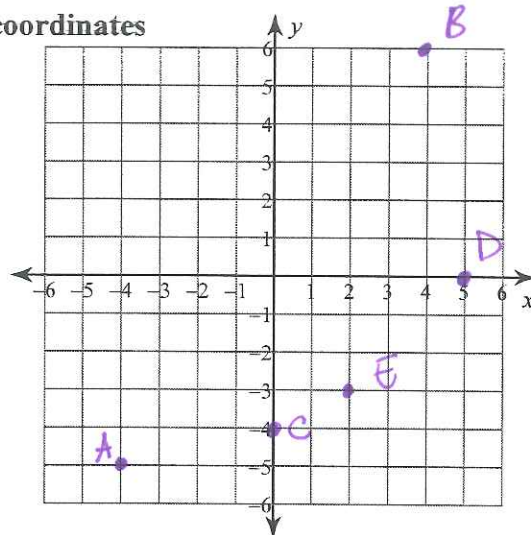
A	9
B	9
C	9
D↓	2

- 15 1. Plot the following points on the axis and label with coordinates

$(-4, -5), (4, 6), (0, -4), (5, 0), (2, -3)$

A B C D E

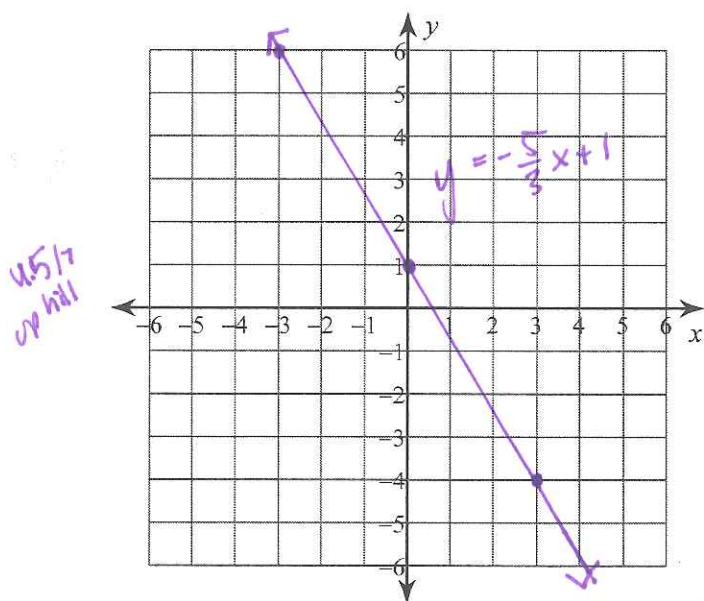
+1 each



- 15 2. Graph the following linear equation using one of the three methods learned in class.

7 a.  $y = -\frac{5}{3}x + 1$

Slope  $m = -\frac{5}{3}$  (0, 1) yint

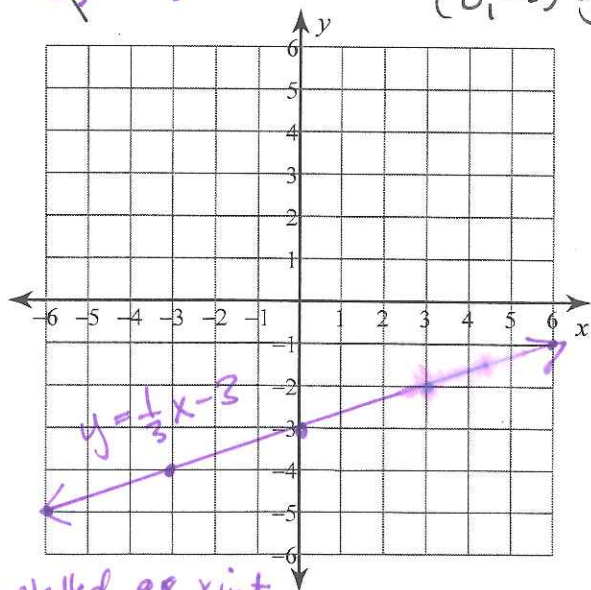


8 b.  $x - 3y = 9$

$-3y = -x + 9$   
 $\frac{-3y}{-3} = \frac{-x}{-3} + \frac{9}{-3}$

$y = \frac{1}{3}x - 3$

$m = \frac{1}{3}$  slope  
 (0, -3) yint



3. Find the equation of the line, in slope intercept form, through (0, -6) with slope  $m = -\frac{2}{3}$ .

$y = mx + b$

$y = -\frac{2}{3}x - 6$



4. Given the two points  $(-1, 6)$  and  $(1, 2)$

a. **Using algebra**, Determine the whole equation of the line in **slope-intercept** form that passes through the points

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

$$m = \frac{(2) - (6)}{(1) - (-1)}$$

$$m = \frac{-4}{2} = -2 = m$$

$$m = -2 \quad (x_1, y_1) = (-1, 6)$$

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

$$y - 6 = -2(x - (-1))$$

$$y - 6 = -2(x + 1)$$

$$y - 6 = -2x - 2$$

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

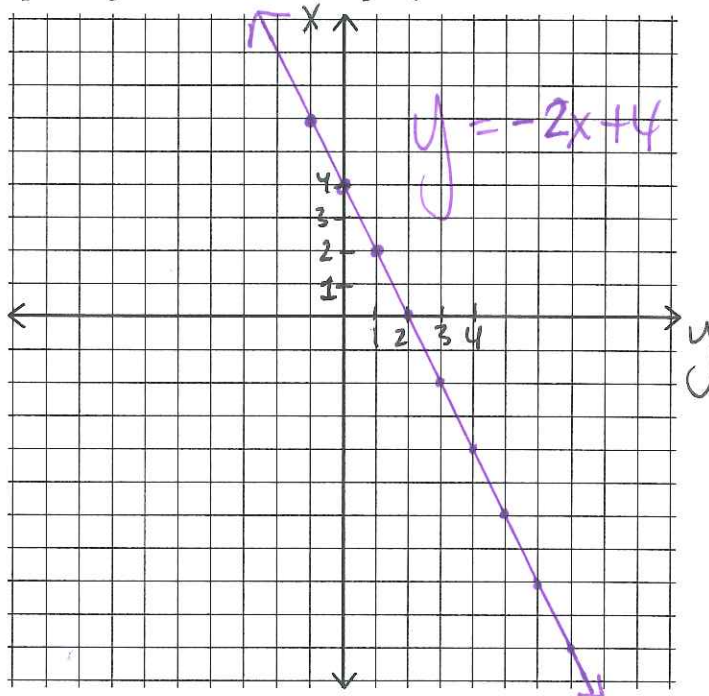
$$y = -2x + 4$$

b. Accurately graph the equation found in part a. above by using the slope and y intercept or plotting points or plotting both of the intercepts (Be sure to label and scale the axes).

Two ways:

① Plot points given in part a & connect dots

② Use Slope & y intercept



5. Graph the following two-variable inequality.

10 **Shade the graph in the appropriate area** to represent the solution. Pick a test point to check!

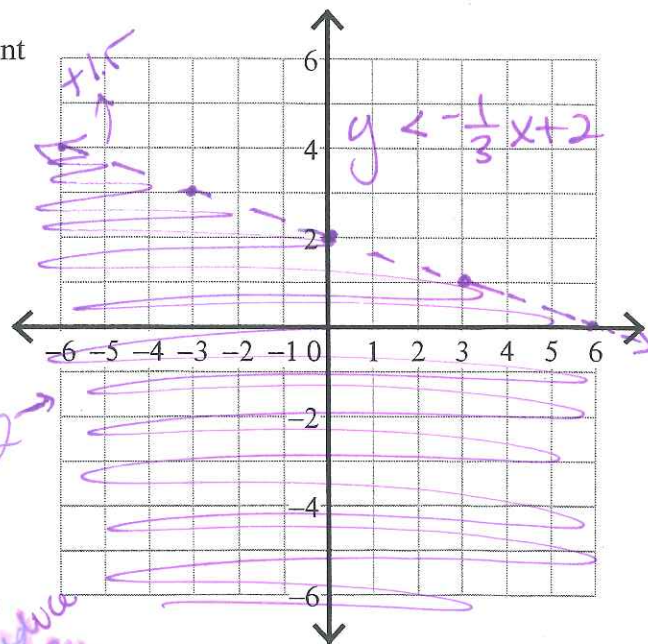
$$2x + 6y < 12$$

$$by < -2x + 12$$

$$\frac{by}{6} < \frac{-2x}{6} + \frac{12}{6}$$

$$y < -\frac{1}{3}x + 2$$

↑  
shade below  
dashed line



10

6. Solve the following system using ONE of the methods learned in class.

Answer appropriately!

$$-3x + 2y = 6$$

Subst  $y = 3x$

$$\begin{aligned} \textcircled{A} \quad y &= 3x & \textcircled{B} \quad -3x + 2y &= 6 \\ y &= 3(2) & -3x + 2(3x) &= 6 \\ y &= 6 & -3x + 6x &= 6 \\ & & 3x &= 6 \\ & & x &= 2 \end{aligned}$$

$(2, 6)$   
one soln

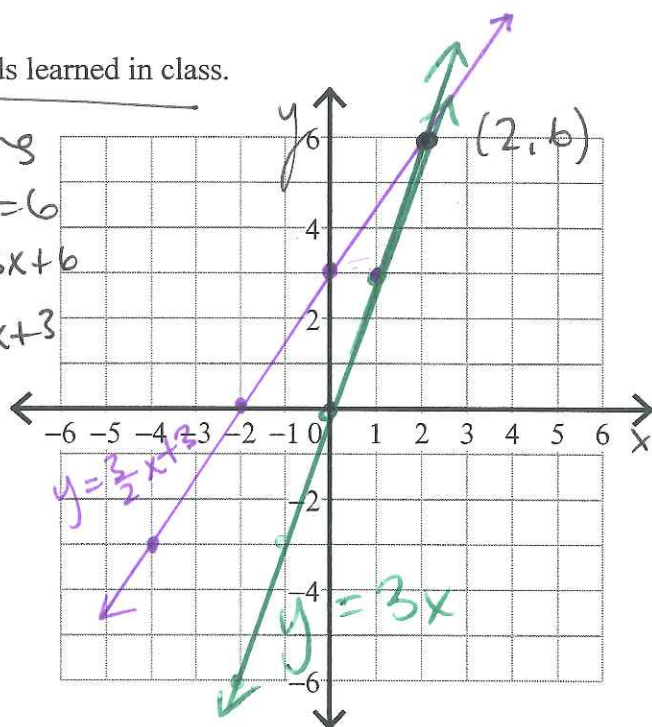
Graphing

$$-3x + 2y = 6$$

$$2y = 3x + 6$$

$$y = \frac{3}{2}x + 3$$

$$y = 3x$$



7. Solve the following system

$$x + 3y = 3$$

$$y = x + 5$$

and answer appropriately.

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a. graphically

$$x + 3y = 3$$

$$3y = -x + 3$$

$$y = -\frac{1}{3}x + 1$$

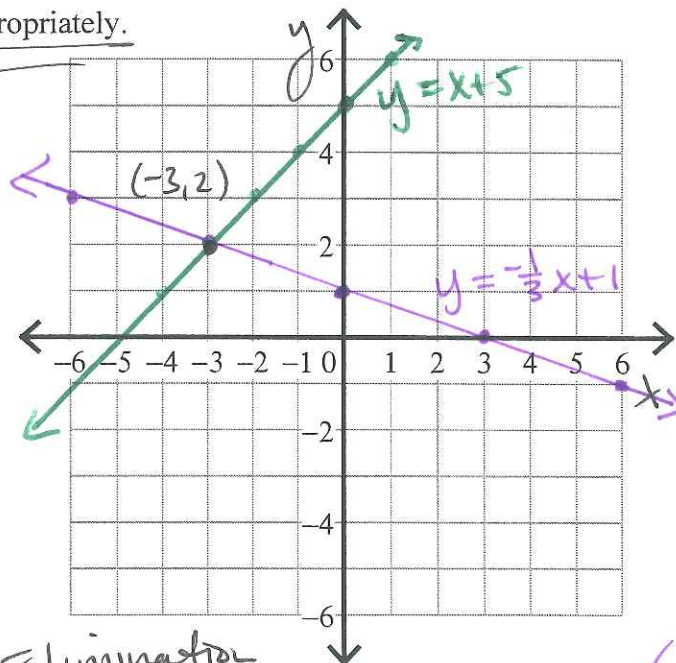
$$m = -\frac{1}{3} \quad (0, 1)$$

$$y = x + 5$$

$$m = 1$$

$$(0, 5)$$

$(-3, 2)$   
one soln



10

b. substitution OR elimination

Subst.

$$\begin{aligned} \textcircled{A} \quad y &= x + 5 & \textcircled{B} \quad x + 3y &= 3 \\ y &= -3 + 5 & x + 3(x + 5) &= 3 \\ y &= 2 & x + 3x + 15 &= 3 \\ & & 4x &= 3 - 15 \\ & & 4x &= -12 \\ & & x &= -3 \end{aligned}$$

$(-3, 2)$   
one soln

Elimination

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

$$4y = 8$$

$$y = 2$$

$$x + 3y = 3$$

$$x + 3(2) = 3$$

$$x + 6 = 3$$

$$x = -3$$

$(-3, 2)$   
one soln

30



8. Solve **TWO of the three** following word problems. Use the **5-Step Process** in order to solve. Note this requires more than just guessing an answer and checking it.

- a. Tickets to a community theater cost \$10 for adults and \$6 for children. A total of \$680 was collected for one evening performance. If 20 more adults attended than children, how many adults and children attended the show? (2.5/2.6 material)
- b. Mr. Wilson invested money in two accounts. His total investment was \$20,000. If one account pays 6% interest and the other pays 8% interest, how much does he have in each account if he earned \$1,380 in interest in 1 year? (4.4 material)
- c. How much 50% antifreeze solution and 40% antifreeze solution should be combined to give 50 gallons of 46% antifreeze solution? (4.4 material)

8a)

Type of ticket	# of tickets	Cost per ticket	Total Cost
Adults	$x+20$	10	$10(x+20)$
Child	$x$	6	$6x$
			680

① let  $x = \text{child tickets}$   
 $x+20 = \# \text{ adult tics}$

②  $10(x+20) + 6x = 680$

③  $10x + 200 + 6x = 680$

$16x + 200 = 680$

$16x = 680 - 200$

$16x = 480$

$x = \frac{480}{16}$

child  $\rightarrow x = 30$

Adult  $\rightarrow x + 20 = 30 + 20$   
 $= 50$

④ Check:  $x = 30$

$10(30+20) + 6(30) \stackrel{?}{=} 680$

$10(50) + 180 \stackrel{?}{=} 680$

$500 + 180 = 680$

$680 = 680$  ✓

⑤ 50 Adults and 30 Children attended show

8b)

Type of Acct	Amt in Acct	Interest rate	Total Interest
6%	$x$	0.06	$0.06x$
8%	$y$	0.08	$0.08y$
Total	20,000		1,380

① let  $x = \text{Amt in 6\% acct.}$   
 $y = \text{" " 8\% acct.}$

②  $x + y = 20,000$

$100(0.06x + 0.08y) = (1,380)100$

③  $-6(x+y) = (20,000)(-6)$   
 $6x + 8y = 138,000$

$-6x - 6y = -120,000$   
 $6x + 8y = 138,000$

$2y = 18,000$

$y = 9,000$

$x + y = 20,000$

$x + 9,000 = 20,000$

$x = 20,000 - 9,000$

$x = 11,000$

\$11,000 was invested in the 6% acct  
 & \$9,000 in the 8% acct.

④ Check:  $x = 11,000$   
 $y = 9,000$

$x + y = 20,000$

$11,000 + 9,000 \stackrel{?}{=} 20,000$

$20,000 \stackrel{?}{=} 20,000$  ✓

$6x + 8y = 138,000$

$6(11,000) + 8(9,000) \stackrel{?}{=} 138,000$

$66,000 + 72,000 = 138,000$

$138,000 = 138,000$  ✓

8c)

Type of Solution	Gallons of Soln	Percentage Antifreeze	Amt of Antifreeze
50%	x	0.5	0.5x
40%	y	0.4	0.4y
Mixture 46%	50	0.46	50(0.46) = 23

- ①  $x = \text{gal of 50\% antifreeze}$   
 $y = \text{gal of 40\% antifreeze}$

②  $x + y = 50$

③  $10(0.5x + 0.4y) = (23)10$  *clear decimals*

$$\begin{array}{r} -4(x+y) = (50)(-4) \\ 5x+4y = 230 \end{array}$$

$$\begin{array}{r} -4x-4y = -200 \\ 5x+4y = 230 \end{array}$$

$$x = 30$$

$$x + y = 50$$

$$30 + y = 50$$

$$y = 50 - 30$$

$$y = 20$$

$$\begin{array}{r} 50 \\ \times 46 \\ \hline 300 \\ 200x \\ \hline 2300 \end{array}$$

④ Check:  $x = 30$   
 $y = 20$

$$\begin{array}{r} x + y = 50 \\ 20 + 30 \stackrel{?}{=} 50 \\ 50 \stackrel{?}{=} 50 \checkmark \end{array}$$

$$\begin{array}{r} 5x + 4y = 230 \\ 5(30) + 4(20) \stackrel{?}{=} 230 \\ 150 + 80 \stackrel{?}{=} 230 \\ 230 = 230 \checkmark \end{array}$$

⑤ 30 gallons of 50% antifreeze and 20 gallons of 40% antifreeze would need to be mixed.