★ While checking, please understand that there are multiple correct ways to solve a problem.

Review for Test #4 - Systems of Equations

Name: Key Class: _____

1.) If you solve a system of equations, and your answer is "The identity – there are infinite solutions," what will the graphs of these equations look like?

They would be the same line.

2.) If you solve a system of equations, and your answer is "The null set – there are no solutions," what will the graphs of these equations look like?

They would be two parallel lines.

3.) If you solve a system of equations, and your answer is "There is one unique solution," what will the graphs of these equations look like?

They would be two intersecting lines.

For each question, solve each system using the method indicated.

4.) Graphing

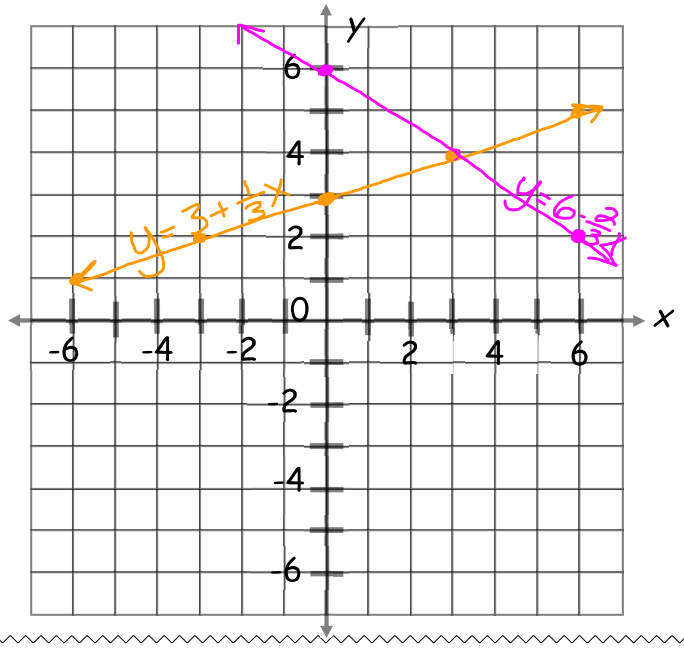
$$\begin{array}{l} 2x+3y=18 \\ \hline y=3+\frac{1}{3}x \end{array}$$

$2x+3y=18$

$3y=18-2x$

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

(3,4)



5.) Elimination

$-3(5x + y = 8) \rightarrow -15x - 3y = -24$

$x + 3y = 10 \rightarrow x + 3y = 10$

$-14x = -14$

$x = 1$

$5x + y = 8$

$5(1) + y = 8$

$5 + y = 8$

$y = 3$

$(1, 3)$

6.) Substitution

$2x + 11y = 15$

$x - y = 1$

$x - y = 1$

$x = 1 + y$

$2x + 11y = 15$

$2(1 + y) + 11y = 15$

$2 + 2y + 11y = 15$

$2 + 13y = 15$

$13y = 13 \rightarrow y = 1$

$x - 1 = 1$

$x = 2$

$(2, 1)$

7.) Substitution

$a + 2b = 1 \rightarrow a = 1 - 2b$

$2a + b = 8$

$2(1 - 2b) + b = 8$

$2 - 4b + b = 8$

$2 - 3b = 8$

$-3b = 6$

$b = -2$

$a + 2(-2) = 1$

$a - 4 = 1$

$a = 5$

$(5, -2)$

8.) Any method you'd like

$x = 4y - 1$

$2x - 6y = -1$

$2(4y - 1) - 6y = -1$

$8y - 2 - 6y = -1$

$2y - 2 = -1$

$2y = 1$

$y = \frac{1}{2}$

$x = 4y - 1$

$x = 4\left(\frac{1}{2}\right) - 1$

$x = 2 - 1$

$x = 1$

$\left(1, \frac{1}{2}\right)$

9.) Any method you'd like

$-2(3x + 2y = 8)$

$6x + 4y = 16$

$-6x - 4y = -16$

$6x + 4y = 16$

$0 = 0$

∞ Solutions

10.) Any method you'd like

$3\left(\frac{x}{3} + y = 8\right)$

$-1(x + 3y = 10)$

$x + 3y = 24$

$-x - 3y = -30$

$0 \neq -6$

No solution

11.) Check any question you want from 4 – 10. Question #: _____

12.) A bus company requires 4 buses and 8 vans to take 240 school children to the library. It requires 2 buses and 9 vans to take 170 children to the museum. Calculate the number of children a bus can carry and the number of children a van can carry.

Let # of students on bus = b
Let # of students on van = v

$4b+8v=240 \rightarrow 4b+8v=240$
$-2(2b+9v=170) \rightarrow -4b-18v=-340$
$-10v=-100$
$v=10$

$4b+8(10)=240$
$4b+80=240$
$4b=160$
$b=40$

The bus can carry 40 kids + the van can carry 10 kids

13.) At a carnival, 600 tickets were sold for a total amount of $2,500. An adult ticket cost $8 and a children's ticket cost $3. Find the number of adult tickets and the number of children's tickets sold.

Let # of adult tix = a
Let # of child tix = c

$a+c=600 \rightarrow a=600-c$
$8a+3c=2500$
$8(600-c)+3c=2500$
$4800-8c+3c=2500$
$4800-5c=2500$

$-5c=-2300$
$c=460$
$a+460=600$
$a=140$

460 child tix and 140 adult tix

14.) Is the ordered pair (2,3) a solution of the following system? Support your answer with work.

$3x+2y=12$
$-2x+2y=5$

$3x+2y=12$
$3(2)+2(3)=12$
$6+6=12$
$12=12$ ✓

$-2x+2y=5$
$-2(2)+2(3)=5$
$-4+6=5$
$2=5$

NO

For 15 – 16, isolate *y*.

15.) $4\left(2x+\frac{y}{4}=7\right)$

$8x+y=28$
$y=28-8x$

16.) $3\left(5x-\frac{y}{3}=1\right)$

$15x-y=3$
$15x=y+3$
$y=15x-3$

17.) 432 tickets were sold for *The Lion King*. Balcony tickets cost $40 each and tickets for the main floor cost $120. The total amount of sales for each type of ticket was $30,560. How many tickets were sold for the balcony? How many tickets were sold each?

Let # of balcony tix = b
Let # of floor tix = f

$-40(b+f=432) \rightarrow -40b-40f=-17280$

$40b+120f=30560$

$80f=-13280$

$f=166$

$b+f=432$
$b+166=432$
$b=266$

166 floor tix and 266 balcony tix

18.) A test has twenty questions worth 100 points. The test consists of True/False questions worth 3 points each and multiple-choice questions worth 11 points each. How many multiple choice questions are on the test?

Let # of T/F ?'s = x
Let # of MC ?'s = y

$-3(x+y=20) \rightarrow -3x-3y=-60$

$3x+11y=100$

$3x+11y=100$

$8y=40$
$y=5$

$x+5=20$
$x=15$

5 M/C questions

19.) Your teacher is giving a test worth 100 points, consisting of four-point questions and six-point questions. There are a total of 21 questions. How many of each type of question is on the test?

Let # of 4-pt ?'s = x
Let # of 6-pt ?'s = y

$-4(x+y=21) \rightarrow -4x-4y=-84$

$4x+6y=100$

$4x+6y=100$

$2y=16 \rightarrow y=8$

$x+8=21$
$x=13$

13 4-pt. questions
8 6-pt. questions

20.) Trevor is renting a limo out to a couple that is planning their wedding. He told them that it will cost $70 an hour, plus there is an initial rental fee. He calculated that after 7 hours, the couple will pay $515 to rent the limo.

a.) Write an equation to relate the cost, *y*, to the number of hours, *x*.

$m = \$70/hr.$

Now find b.

$y=70x+b$
$515=70(7)+b$
$515=490+b$
$25=b$

$y=70x+25$

b.) What is the initial rental fee?

$25

21.) Grace and Caleb decide to join a gym. At this gym, there is a membership fee, plus a monthly fee. Grace pays $250 after 6 months and Caleb pays $350 after 10 months.

a.) Write an equation to relate the cost, *C*, to the number of months, *m*.

(6,250)
(10,350)

$m = \frac{350-250}{10-6} = \frac{100}{4} = \$25/\text{month}$

$y = 25x + b$
$250 = 25(6) + b$
$250 = 150 + b$
$100 = b$

$C = 25m + 100$

b.) What is the monthly fee? $25/mo

c.) What is the initial fee? $100

d.) Find the amount they would have to pay after 12 months.

$C = 25(12) + 100$
$C = 300 + 100$
$C = \$400$

Answers:

4.) (3,4)
5.) (1,3)
6.) (2,1)
7.) (5,-2)
8.) (1,0.5)
9.) infinite solutions
10.) no solution
12.) 40 on bus, 10 on the van
13.) 140 adult tickets, 460 children tickets
14.) No
15.) $y = -4x + 28$
16.) $y = 15x - 3$
17.) 166 main floor tickets, 266 balcony tickets
18.) 5 Multiple choice questions
19.) 13 four-point questions, 8 six-point questions
20.) a.) y = 70x + 25 b.) $25
21.) a.) C = 25m + 100 b.) $25/mo c.) $100 d.) $400