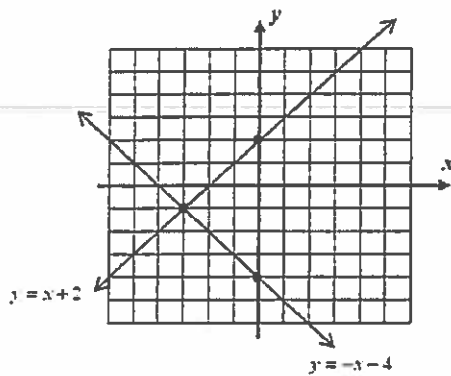
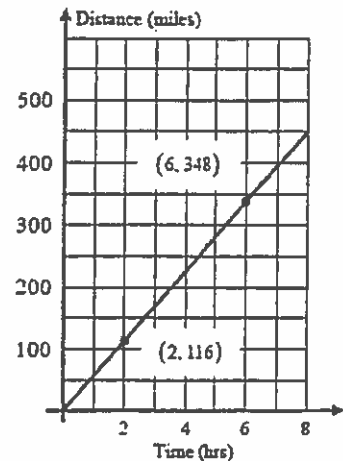


Answer Key

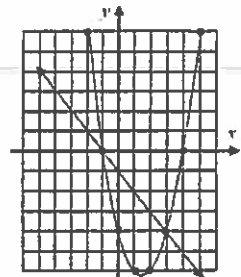
Common Core Regents Review

Linear Functions

- The standard form for a linear equation is $y = mx + b$, where m represents the slope and b represents the y-intercept.
- To determine the slope or **rate of change** of a linear function, use $m = \frac{y_2 - y_1}{x_2 - x_1}$, positive slopes, rises from left to right, negative slope, falls from left to right.
- Parallel lines have equal slopes; lines parallel to the x-axis have a zero slope; lines parallel to the y-axis have no slope or are said to be undefined.
- A system of linear (or quadratic) equations are two or more functions graphed in the same coordinate plane; to find the solution graphically of a system of equations find the point of intersection. This is the point common to both linear functions.

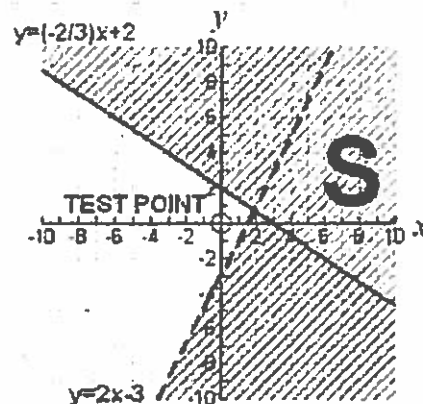


The axes of a coordinate plane are generally labeled x and y ; however, when graphing real-life situations other labels may be more appropriate for the problem, i.e. months, money, etc



- To find the solution algebraically of a system of linear equations use elimination or substitution

- To graph a linear inequality (and system of inequality) in two variables, graph the inequality using the rules for linear graphing. If the inequality is *less than* ($<$) or *greater than* ($>$), the line is "dashed"; if the inequality is *less than or equal to* (\leq) or *greater than or equal to* (\geq), the line is solid
- Since there are infinite solutions for all of the inequality symbols, shade above the line for greater than, shade below the line for less than; the solution to an inequality system is where the shading overlaps, S



Solving linear systems algebraically

<p>1.</p> $\begin{aligned} 4x+3y &= 27 \\ y &= 2x-1 \end{aligned}$ $\begin{aligned} 4x+3y &= 27 \\ 4x+3(2x-1) &= 27 \\ 4x+6x-3 &= 27 \\ 10x-3 &= 27 \\ \underline{+3 \quad +3} & \\ 10x &= 30 \\ \underline{10 \quad 10} & \\ \boxed{x=3} & \end{aligned}$ $\begin{aligned} y &= 2x-1 \\ y &= 2(3)-1 \\ y &= 6-1 \\ \boxed{y=5} & \end{aligned}$ <p style="text-align: center;">$(3, 5)$</p>	<p>2.</p> $\begin{aligned} y &= x+3 \\ 3x+2y &= 26 \end{aligned}$ $\begin{aligned} 3x+2y &= 26 \\ 3x+2(x+3) &= 26 \\ 3x+2x+6 &= 26 \\ 5x+6 &= 26 \\ \underline{-6 \quad -6} & \\ 5x &= 20 \\ \underline{5 \quad 5} & \\ \boxed{x=4} & \end{aligned}$ $\begin{aligned} y &= x+3 \\ y &= 4+3 \\ \boxed{y=7} & \end{aligned}$ <p style="text-align: center;">$(4, 7)$</p>
<p>3.</p> $\begin{aligned} 8x+5y &= 9 \\ 2x-5y &= -4 \end{aligned}$ $\begin{aligned} 10x &= 5 \\ \underline{10 \quad 10} & \\ \boxed{x = \frac{1}{2}} & \end{aligned}$ $\begin{aligned} 8x+5y &= 9 \\ 8(\frac{1}{2})+5y &= 9 \\ 4+5y &= 9 \\ \underline{-4 \quad -4} & \\ 5y &= 5 \\ \underline{5 \quad 5} & \\ \boxed{y=1} & \end{aligned}$ <p style="text-align: center;">$(\frac{1}{2}, 1)$</p>	<p>4.</p> $\begin{aligned} 5x+3y &= 14 \\ -3(2x+y) &= 6 \end{aligned}$ $\begin{aligned} 5x+3y &= 14 \\ -6x-3y &= -18 \\ \underline{-x \quad -4} & \\ \underline{-1 \quad -1} & \\ \boxed{x=4} & \end{aligned}$ $\begin{aligned} 2x+y &= 6 \\ 2(4)+y &= 6 \\ 8+y &= 6 \\ \underline{-8 \quad -8} & \\ \boxed{y=-2} & \end{aligned}$ <p style="text-align: center;">$(4, -2)$</p>
<p>5.</p> $\begin{aligned} -2(2x+3y) &= 7 \\ 4x-5y &= 25 \end{aligned}$ $\begin{aligned} -4x-6y &= -14 \\ 4x-5y &= 25 \\ \underline{-11y} &= 11 \\ \underline{-11 \quad -11} & \\ \boxed{y=-1} & \end{aligned}$ $\begin{aligned} 2x+3y &= 7 \\ 2x+3(-1) &= 7 \\ 2x-3 &= 7 \\ \underline{+3 \quad +3} & \\ 2x &= 10 \\ \underline{2 \quad 2} & \\ \boxed{x=5} & \end{aligned}$ <p style="text-align: center;">$(5, -1)$</p>	<p>6.</p> $\begin{aligned} -2(3x+5y) &= 7 \\ 3(2x+4y) &= 6 \end{aligned}$ $\begin{aligned} -6x-10y &= -14 \\ 6x+12y &= 18 \\ \underline{2y} &= 4 \\ \underline{2 \quad 2} & \\ \boxed{y=2} & \end{aligned}$ $\begin{aligned} 3x+5y &= 7 \\ 3x+5(2) &= 7 \\ 3x+10 &= 7 \\ \underline{-10 \quad -10} & \\ 3x &= -3 \\ \underline{3 \quad 3} & \\ \boxed{x=-1} & \end{aligned}$ <p style="text-align: center;">$(-1, 2)$</p>
<p>7. The sum of two numbers is 36. Their difference is 24. Find the numbers.</p> <p style="margin-left: 20px;">Let $x =$ one number 30 $y =$ another number 6</p> $\begin{aligned} x+y &= 36 \\ x-y &= 24 \\ \underline{2x} &= 60 \\ \underline{2 \quad 2} & \\ \boxed{x=30} & \end{aligned}$ $\begin{aligned} x+y &= 36 \\ 30+y &= 36 \\ \underline{-30 \quad -30} & \\ \boxed{y=6} & \end{aligned}$	

8. The owner of men's clothing store bought six belts and eight hats for \$140. A week later, at the same prices, he bought nine belts and six hats for \$132. Find the price of a belt and the price of a hat.

Let $x =$ price of one belt $\$6$
 $y =$ price of one hat $\$13$

$$\begin{array}{r} -3(6x + 8y = 140) \\ 2(9x + 6y = 132) \end{array} \quad \begin{array}{r} -18x - 24y = -420 \\ 18x + 12y = 264 \\ \hline -12y = -156 \\ \hline y = 13 \end{array} \quad \begin{array}{r} 6x + 8y = 140 \\ 6x + 8(13) = 140 \\ 6x + 104 = 140 \\ -104 \quad -104 \\ \hline 6x = 36 \\ \hline x = 6 \end{array}$$

4

9. What is the y-intercept of the line whose equation is $y = 6x - 7$?
 (1) -6 (2) 6 (3) 7 (4) -7

1

10. Which ordered pair is the solution for the system of equations below?

$$\begin{array}{l} 2x + y = 18 \\ x - y = -6 \end{array}$$

$$\begin{array}{r} 2x + y = 18 \\ x - y = -6 \\ \hline 3x = 12 \\ \hline x = 4 \end{array} \quad \begin{array}{r} 2x + y = 18 \\ 2(4) + y = 18 \\ 8 + y = 18 \\ -8 \quad -8 \\ \hline y = 10 \end{array}$$

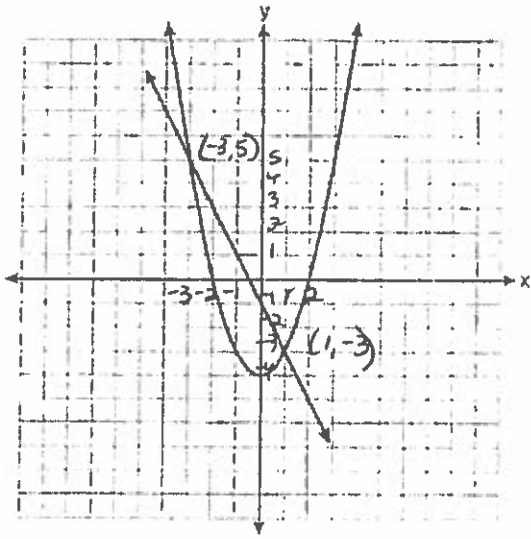
(4, 10)

- (1) (4,10) (2) (4,-10) (3) (8,3) (4) (6,12)

2

11. Which ordered pair is a solution of the system of equations shown in the graph below?

- (1) (-3,1) (2) (-3,5) (3) (0,-1) (4) (0,-4)



3

12. What is the slope of the line that passes through the points $(-6,1)$ and $(4,-4)$?

- (1) -2 (2) 2 (3) $-\frac{1}{2}$ (4) $\frac{1}{2}$

$$\text{slope} = \frac{y_2 - y_1}{x_2 - x_1}$$

$$\text{slope} = \frac{-4 - 1}{4 - (-6)}$$

$$\text{slope} = \frac{-5}{10}$$

$$\text{slope} = -\frac{1}{2}$$

3

13. What is the solution of the system of equations $c + 3d = 8$ and $c = 4d - 6$?
(1) $c = -14, d = -2$ (2) $c = -2, d = 2$ (3) $c = 2, d = 2$ (4) $c = 14, d = -2$

$$\begin{array}{r}
 c + 3d = 8 \\
 4d - 6 + 3d = 8 \\
 7d - 6 = 8 \\
 \underline{+6 \quad +6} \\
 7d = 14 \\
 \underline{7 \quad 7} \\
 d = 2
 \end{array}$$

$$\begin{array}{l}
 c = 4d - 6 \\
 c = 4(2) - 6 \\
 c = 8 - 6 \\
 \boxed{c = 2}
 \end{array}$$

14. Same as #12 sorry.

1

15. Which equation represents a line that is parallel to the line $y = -4x + 5$?

- (1) $y = -4x + 3$ (2) $y = -\frac{1}{4}x + 5$ (3) $y = \frac{1}{4}x + 3$ (4) $y = 4x + 5$

2

16. What is the solution set of the following system of equations?

$$\begin{array}{l}
 x + y = 7 \\
 x - y = 3
 \end{array}$$

$$\begin{array}{r}
 x + y = 7 \\
 x - y = 3 \\
 \underline{-y \quad -y} \\
 2x = 10 \\
 \underline{2 \quad 2} \\
 x = 5
 \end{array}
 \qquad
 \begin{array}{r}
 x + y = 7 \\
 5 + y = 7 \\
 \underline{-5 \quad -5} \\
 y = 2
 \end{array}$$

- (1) (3,4) (2) (5,2) (3) (10,-3) (4) (8,-1)

2

17. In a linear equation, the independent variable increases at a constant rate, while the dependent variable decreases at a constant rate. The slope of this line is:

- (1) zero (2) negative (3) positive (4) undefined

$$\begin{array}{l}
 \text{slope} = \frac{y_2 - y_1}{x_2 - x_1} \\
 \text{points: } (1,4), (2,3), (3,2) \\
 \text{slope} = \frac{3-4}{2-1} = -1 \\
 \text{slope} = \frac{2-3}{3-2} = -1
 \end{array}$$

2

18. Which ordered pair is in the solution set of the system of equations $y = -x + 1$ and $y = x^2 + 5x + 6$?

- (1) (-5,-1) (2) (-5,6) (3) (5,-4) (4) (5,2)

$$\begin{array}{l}
 -x + 1 = x^2 + 5x + 6 \\
 \underline{-x + 1 = x^2 + 5x + 6} \\
 0 = x^2 + 6x + 5 \\
 0 = (x + 5)(x + 1) \\
 \underline{x + 5 = 0 \quad x + 1 = 0} \\
 x = -5 \quad x = -1
 \end{array}
 \qquad
 \begin{array}{l}
 y = -x + 1 \\
 y = -(-5) + 1 \\
 y = 5 + 1 \\
 y = 6 \\
 (-5, 6)
 \end{array}$$

3

19. Samuel's Car service will charge a flat travel fee of \$4.75 for anyone making a trip. They charge an additional set rate of \$1.50 per mile that is traveled. Which is an equation that represents the charges?

- (1) $y = 1.5x + 1.5$ (2) $y = 4.75x + 4.75$ (3) $y = 1.5x + 4.75$ (4) $y = 4.75x + 1.5$

3

20. Jerome collects stamps. He saved \$100 to buy stamps to add to his collection. The stamps cost \$1.50, \$2, or \$5. Which equation models the different ways that Jerome can spend his money where x represents the number of 1.50 stamps, y represents the number of \$2 stamps, and z represents the number of \$5 stamps?

- (1) $7.50x = 100$ (2) $15xyz = 100$ (3) $1.5x + 2y + 5z = 100$ (4) $\frac{x}{1.5} + \frac{y}{2} + \frac{z}{5} = 100$

3

21. What is the solution of the system of equations $2x - 5y = 11$ and $-2x + 3y = -9$?

- (1) (-3,-1) (2) (-1,3) (3) (3,-1) (4) (3,1)

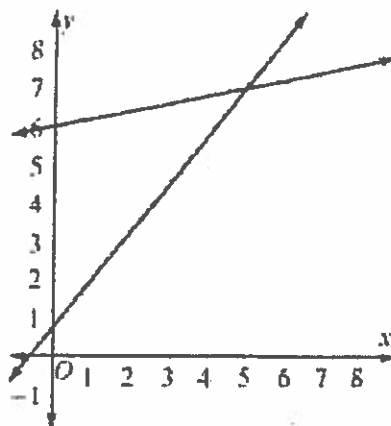
$$\begin{array}{r}
 2x - 5y = 11 \\
 -2x + 3y = -9 \\
 \underline{-2x + 3y = -9} \\
 \underline{+3 \quad +3} \\
 -2y = -6 \\
 \underline{-2 \quad -2} \\
 y = 3
 \end{array}
 \qquad
 \begin{array}{r}
 2x - 5y = 11 \\
 -2x + 3y = -9 \\
 \underline{-2x + 3y = -9} \\
 \underline{-2y = -2} \\
 y = -1
 \end{array}$$

3

22. The graph below represents a system of linear equations.

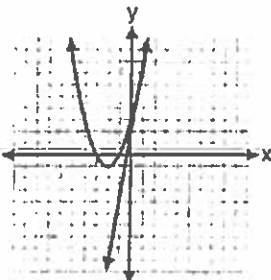
What is the solution set of this system?

- (1) $(0, \frac{3}{4})$ (2) $(0, 6)$ (3) $(5, 7)$ (4) $(7, 5)$

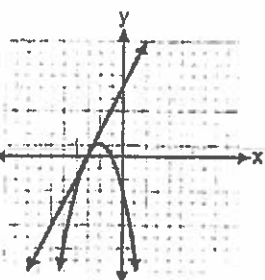


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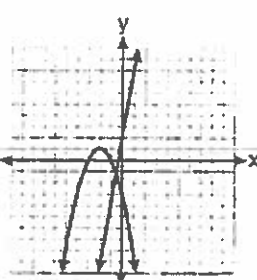
23. Which graph could be used to find the solution to the system $y = 2x + 6$ and $y = x^2 + 4x + 3$?



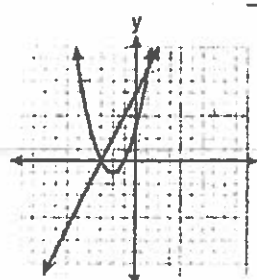
(1)



(2)



(3)



(4)

$$\begin{aligned}
 2x + 6 &= x^2 + 4x + 3 \\
 -2x - 6 & \quad -2x - 6 \\
 0 &= x^2 + 2x - 3 \\
 0 &= (x + 3)(x - 1) \\
 x + 3 = 0 & \quad x - 1 = 0 \\
 -3 = -3 & \quad +1 = +1 \\
 x = -3 & \quad x = 1 \\
 y = 2x + 6 & \quad y = 2x \\
 y = 2(-3) + 6 & \quad y = 2(-3) \\
 y = -6 + 6 & \quad y = -6 \\
 y = 0 & \quad y = -6 \\
 (-3, 0) & \quad (-3, -6) \\
 (1, 8) & \quad (1, 2)
 \end{aligned}$$

24. The cost of three notebooks and four pencils is \$8.50. The cost of five notebooks and eight pencils is \$14.50. Determine the cost of one notebook and the cost of one pencil.

Let x = cost of one notebook \$2.50
 y = cost of one pencil \$0.25

$$\begin{aligned}
 -2(3x + 4y = 8.50) & \quad -6x - 8y = -17.00 \\
 5x + 8y = 14.50 & \quad \quad \quad 5x + 8y = 14.50 \\
 \hline
 -x &= -2.50 \\
 -1 & \quad -1 \\
 \hline
 x &= 2.50
 \end{aligned}$$

$$\begin{aligned}
 3x + 4y &= 8.50 \\
 3(2.50) + 4y &= 8.50 \\
 7.50 + 4y &= 8.50 \\
 -7.50 & \quad -7.50 \\
 \hline
 4y &= 1.00 \\
 \frac{4y}{4} & \quad \frac{1.00}{4} \\
 y &= 0.25
 \end{aligned}$$

25. Costco charges \$15.00 for membership. Their prices are less than those found in a supermarket. For a gallon of milk, they charge \$1.50. The local supermarket charges \$3.00 per gallon.

a. Create an equation for the cost of buying x gallons of milk from each of the two stores.

▪ Cost, C_1 , of buying milk from ^{Costco} ~~Price Club~~ $C_1 = 15 + 1.50x$

▪ Cost, C_2 , of buying milk from supermarket $C_2 = 3x$

b. How many gallons of milk would you have to buy in order to have spent the same amount of money at each store?

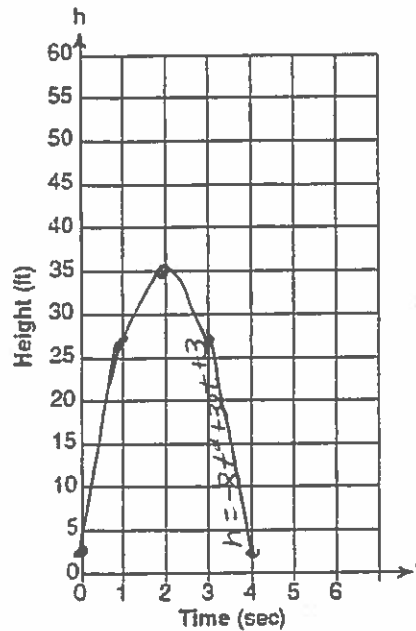
▪ Gallons: 10

$$\begin{aligned} 15 + 1.50x &= 3x \\ -1.50x & \quad -1.50x \\ \hline 15 &= 1.5x \\ 10 &= x \end{aligned}$$

26. Tom throws a ball into the air. The ball travels on a parabolic path represented by the equation, $h = -8t^2 + 32t + 3$, where h is the height, in feet, of the ball, and t is the time in seconds.

a. On the graph below, graph the function from $t = 0$ to $t = 4$ seconds.

b. What is the value of t at which h has its greatest value? 2 sec



t	$h = -8t^2 + 32t + 3$	h
0	$-8(0)^2 + 32(0) + 3$	3
1	$-8 + 32 + 3$	27
2	$-8(4) + 64 + 3$	35
3	$-8(9) + 96 + 3$	27
4	$-8(16) + 128 + 3$	3

27. On the set of axes below, solve the following system of equations graphically for all values of x and y . State the coordinates of all the solutions.

$$y = x^2 + 4x - 5$$

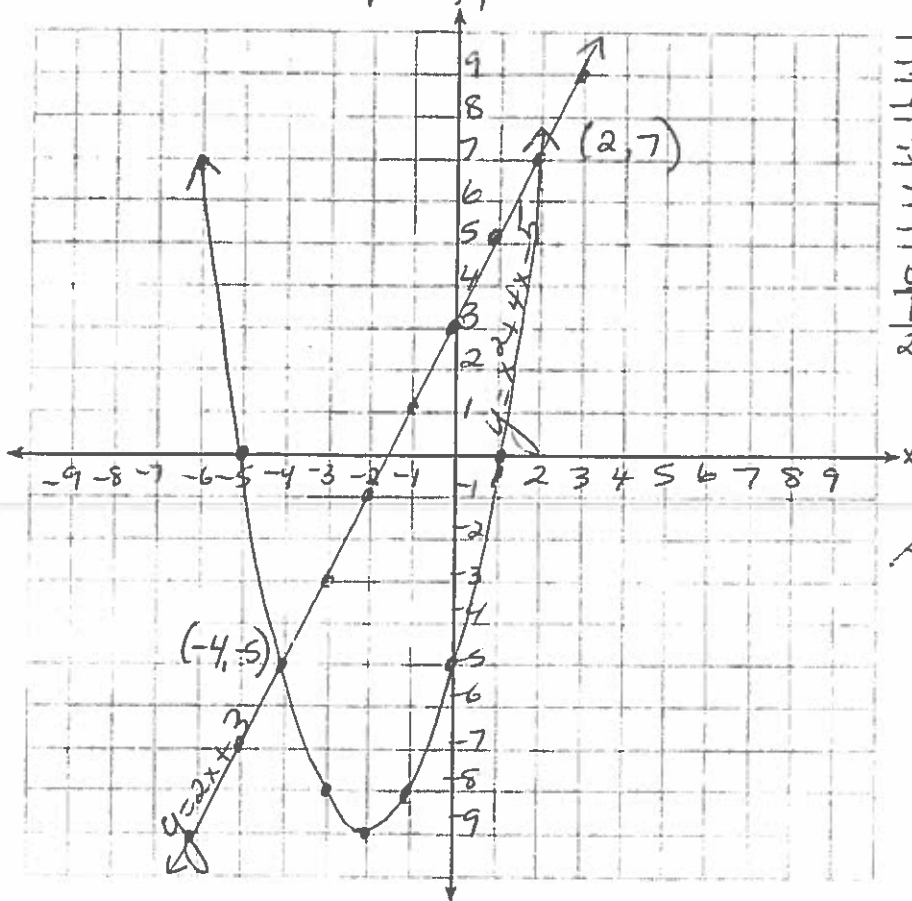
$$y = 2x + 3$$

slope = $\frac{2}{1}$
y intercept = 3

$$x = \frac{-b}{2a}$$

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

$$x = -2$$



x	y = x ² + 4x - 5	y
-5	25 - 20 - 5	0
-4	16 - 16 - 5	-5
-3	9 - 12 - 5	-8
-2	4 - 8 - 5	-9
-1	1 - 4 - 5	-8
0		-5
1	1 + 4 - 5	0
2	4 + 8 - 5	7

Solution Set
(-4, -5), (2, 7)

Coordinate Geometry

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

