



# MATHS

## BOOKS - KAPLAN INC MATHS (ENGLISH)

### INEQUALITIES

#### How Much Do You Know

1. If  $\frac{3}{5}p - 2 \geq 5$ , what is the least possible value of  $\frac{6}{5}p + 2$ ?

A. 7

B. 10

C. 16

D. 18

**Answer: C**



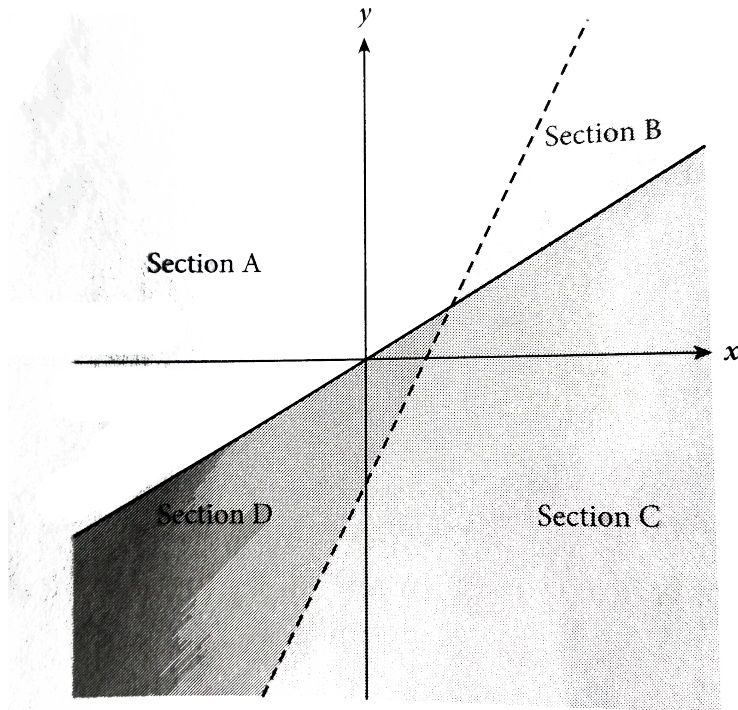
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2. If  $-3 < \frac{4}{3}h + \frac{1}{6} < 1$ , then what is one possible value of  $12h - 4$ ?





3. 
$$\begin{cases} y > 2x - 3 \\ 5y \leq 3x \end{cases}$$



The graph above depicts the system of inequalities shown. Which of the labeled

section or sections of the graph could represent all of the solutions of the system ?

A. Section A and B

B. Section B

C. Section C and D

D. Section D

**Answer: D**



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4. A bowling alley charges a flat \$6.50 fee for shoe and ball rental plus \$3.75 per game and 6.325 percent sales tax . If each person in a group of seven people has \$20 to spend on a bowling outing, and at least some members of the group must rent shoes and a ball, which inequality best describes this situation, given that the number of shoe and ball rentals is represented by  $r$  and the number of games is represented by  $g$  ?

A.  $1.06325(6.5r + 3.75g) \leq 140$

$$\text{B. } 1.06325(6.5r + 3.7g) \leq 20$$

$$\text{C. } 21.06325 \left( \frac{6.5}{\text{R}} + \frac{3.75}{g} \right) \leq 140$$

$$\text{D. } 0.06325(6.5r + 3.75g) \leq 20$$

**Answer: A**



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5. Micro is paid \$80 per day plus \$15 per hour for overtime. If he works five days per week and wants to make a minimum of \$520 this

week, what is the fewest number of hours of overtime he must work ?



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6. An architect in an arid region determines that a building's current landscaping uses \$1.640 worth of water monthly. The architect plans to replace the current landscaping with arid-zone landscaping at a cost of \$15.900, which will reduce the monthly watering cost to \$770. What of the following inequalities

can be used to find  $m$ , the number of months after replacement that the savings in water costs will be at least as much as the cost of replacing the landscaping ?

A.  $15,900 \geq (1,640 - 770)m$

B.  $15,900 > 770m$

C.  $15,900 \leq (1,640 - 770)m$

D.  $15,900 \leq 770m$

**Answer: C**



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## Try On Your Own

1.  $-\frac{a}{6} - a > -\frac{4}{3}$

Which of the following is equivalent to the inequality above?

A.  $a < \frac{7}{8}$

B.  $a > \frac{7}{8}$

C.  $a < \frac{8}{7}$

D.  $a > \frac{8}{7}$

**Answer: C**



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2. If  $-5c - 7 \leq 8$ , what is the least possible value of  $15c + 7$ ?

A.  $-38$

B.  $-4$

C.  $15$

D.  $22$



**Answer: A**



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$$3. -\frac{1}{8}(8 - 10x) > 3x - 2$$

Which of the following describes all possible values of  $x$  ?

A.  $x < -\frac{12}{7}$

B.  $x > -\frac{4}{7}$

C.  $x < \frac{4}{7}$

D.  $x > \frac{4}{7}$

**Answer: C**



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4.  $\frac{1}{4}a - \frac{1}{16}b + 3 < 5$

Which of the following is equivalent to the inequality above ?

A.  $4a - b < 8$

B.  $4a - b < 32$

C.  $a - 4b < 32$

D.  $4b - a < 4$

**Answer: B**



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5. If  $4c + 20 \geq 31$ , what is the least possible value of  $12c + 7$ ?

A. 18

B. 40

C. 51

D. 58

**Answer: B**



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**6.**  $a < 6b + 4$

$$3b < 8$$

Which of the following consists of all the  $a$ -values that satisfy the system of inequities above ?

A.  $a < 20$

B.  $a < 16$

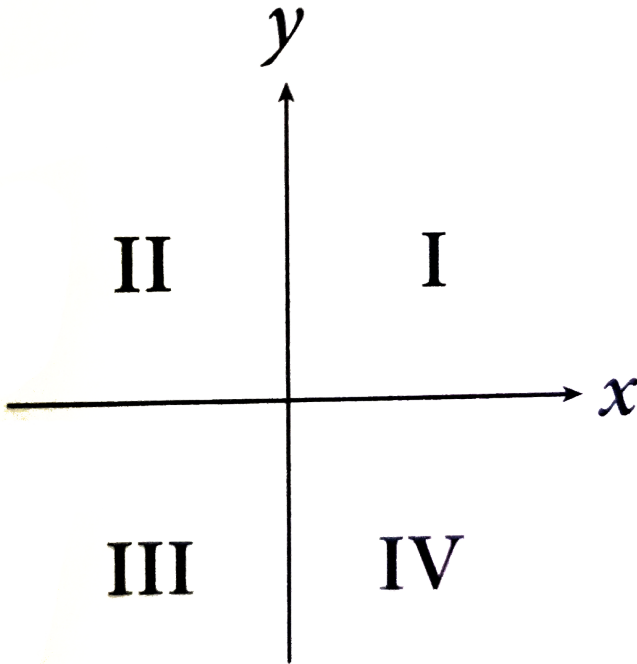
C.  $a < 12$

D.  $a < \frac{8}{3}$

**Answer: A**



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7.

If the system of inequalities

$y \leq -x + 1$  and  $y < \frac{1}{2}x$  is graphed on the

above plane which of the quadrants contain

(s) no solutions to the system?

A. Quadrant I

B. Quadrant II

C. Quadrant III

D. Quadrants I and II

**Answer: B**



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$$8. -y \leq 6x - 2200$$

$$3y \geq 9x - 1500$$

Given the system of inequalities above, if point

(a,b) lies within the solution set, what is the minimum possible value of b ?



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**9.**  $x < 4 - 2y$

$$y \leq -2x + 1$$

Which of the following ordered pairs satisfies both of the inequalities above ?

A.  $(-1, 3)$

B.  $(1, 1)$



C.  $(2, -3)$

D.  $(4, 4)$

**Answer: C**



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**10.**  $y > x + r$

$$y < s - x$$

If  $x = y = 1$  is a solution to the system of inequalities above, which of the following ordered pairs could correspond to  $(r, s)$  ?

A.  $(-1, 1)$

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

C.  $\left(-\frac{1}{10}, 3\right)$

D.  $(3, -1)$

**Answer: C**



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**11.** Ariel enters a contest to sell advertisements in the school's yearbook. To qualify for a prize. She has to sell at least \$1,500 worth of

advertisements consisting of no fewer than 15 individual ads. Each full-page ad costs \$110, each half-page ad costs \$70, and each quarter-page ad costs \$50. Which of the following systems of inequalities represents this situation, where  $x$  is the number of full-page ads she sells,  $y$  is the number of half-page ads she sells, and  $z$  is the number of quarter-page ads she sells?

A.  $110x + 70y + 50z \geq 1,500$

$$x + y + z \leq 15$$

$$\text{B. } 110x + 70y + 50z \leq 1,500$$

$$x + y + z \leq 15$$

$$\text{C. } 110x + 70y + 50z \geq 1,500$$

$$x + y + z \geq 15$$

$$\text{D. } 110x + 70y + 50z \leq 1,500$$

$$x + y + z \geq 15$$

**Answer: C**



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12. A farmer sells watermelons, cantaloups, and tomatoes from a small cart at a country fair. He needs to sell at least \$200 of produce each day. His watermelons are priced at \$0.50 per pound, his cantaloupes at \$1 per pound, and his tomatoes at \$2.50 per pound. His cart can hold no more than 250 pounds. Which of the following inequalities represents this scenario, if  $w$  is the number of pounds of watermelons,  $c$  is the number of pounds of cantaloupe, and  $t$  is the number of pounds of tomatoes ?

A.  $0.5w + 1c + 2.5t \geq 200$

$$w + c + t \leq 250$$

B.  $0.5w + 1c + 2.5t \leq 200$

$$w + c + t \leq 250$$

C.  $0.5w + 1c + 2.5t \geq 200$

$$w + c + \geq 250$$

D.  $0.5w + 1c + 2.5t \leq 200$

$$w + c + t \geq 250$$

**Answer: A**



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**13.** Allision is planting a garden with at least 15 trees. There will be a combination of apple trees, which cost \$120 each, and pear trees, which cost \$145 each. Allision's budget for purchasing the trees is on more than \$2,050. She must plant at least 5 apple trees and at least 3 pear trees. Which of the following systems of inequalities represents the situation described if  $x$  is the number of apple trees and  $y$  is the number of pear trees ?

$$\text{A. } 120x + 145y \geq 2,050$$

$$x + y \leq 15$$

$$x \geq 5$$

$$y \geq 3$$

$$\text{B. } 120x + 145y \geq 2,050$$

$$x + y \geq 15$$

$$x \leq 5$$

$$y \leq 3$$

$$\text{C. } 120x + 145 \leq 2,050$$

$$x + y \geq 15$$



$$x \leq 5$$

$$y \leq 3$$

$$D. 120x + 145y \leq 2,050$$

$$x + y \geq 15$$

$$x \geq 5$$

$$y \geq 3$$

**Answer: D**



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**14.** A utility shelf in a warehouse is used to store containers of paint and containers of varnish. Containers of paint weight 50 pounds each and containers of varnish weight 35 pounds each. The self can hold up to 32 containers, the combined weith of which must not exceed 1,450 pounds. Let  $x$  be the number of containers of paint and  $y$  be the number of container of varinish. Which of the following systems of inequalities represents this relationship ?

A.  $50x + 35y \leq 32$

$$x + y \leq 1,450$$

B.  $50x + 35y \leq 1,450$

$$x + y \leq 32$$

C.  $85(x + y) \leq 1,450$

$$x + y \leq 32$$

D.  $50x + 35yy \leq 1,450$

$$x + y \leq 85$$

**Answer: B**



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**15.** A bakery is buying flour and sugar from its supplier. The supplier will deliver no more than 750 pounds in a shipment. Each boag of flour weight 50 pounds and each bag of sugar weight 20 pounds. The bakery wants to buy at least three times as many bags of sugar as bags of flour. If  $f$  represents the number of bags of flour and  $s$  represents the number of bags of flour and  $s$  represents the number of bags of sugar, where  $f$  and  $s$  are nonnegative

integers, which of the following system of inequalities represents this situation ?

A.  $50f + 60s \leq 750$

B.  $50f + 20s \leq 750$

$$f \leq 3s$$

C.  $50f + 20s \leq 750$

$$3f \leq s$$

D.  $150f + 20s \leq 750$

$$3f \leq s$$

**Answer: C**



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**16.** A florist is organizing a sale that offers carnations at a price of \$4 for 10 and daisies at a price of \$7 for 5. The florist plans to order a maximum of 500 flowers for the sale and wants the revenue from the sale to be at least \$400. If  $x$  is the number of carnations and  $y$  is the number of daisies, and the florist sells all the flowers ordered, which system of inequalities best describes this situation ?

A.  $0.4x + 1.4y \geq 400$

$$x + y \leq 500$$

B.  $0.4x + 1.4y \leq 400$

$$x + y \leq 500$$

C.  $0.4x + 1.4y \geq 400$

$$x + y \geq 500$$

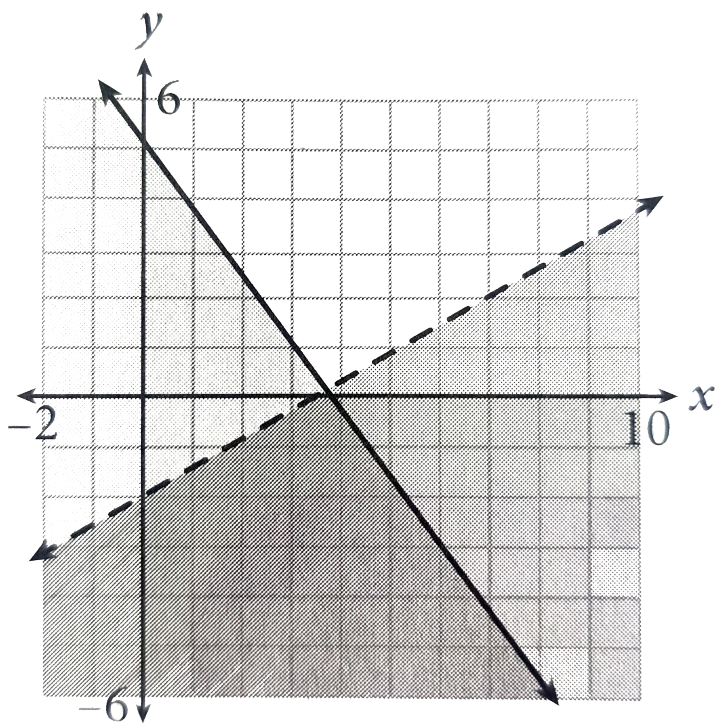
D.  $0.4x + 1.4y \leq 400$

$$x + y \geq 500$$

**Answer: A**



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17.

The figure above shows the solution set for this system of inequalities:

$$\begin{cases} x < \frac{3}{5}x - 2 \\ y \leq -\frac{4}{3}x + 5 \end{cases}$$



Which of the following is NOT is solution to this system ?

A.  $(-1, -4)$

B.  $(1, -1)$

C.  $(4, -1)$

D.  $(6, -3)$

**Answer: B**



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**18.** Ezekiel has \$5.00 to spend on snacks. Candy bars cost \$0.60 each, gum costs \$0.50 per pack and nuts are priced at \$1.29 per small bag. If  $c$  represents the number of candy bars,  $g$  represents the number of packs of gum, and  $n$  represents the number of bags of nuts, which of the following inequalities correctly describes Ezekiel's choices ?

A. 
$$\frac{c}{0.60} + \frac{g}{0.50} + \frac{n}{1.29} \leq \frac{1}{5}$$

B. 
$$c + g + n \leq 5$$

C. 
$$0.60c + 0.50g + 1.29n \leq 5.00$$

$$D. 0.60 + 0.50g + 1.29n \geq 5.00$$

**Answer: C**



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**19.** A shipping company employee is in charge of packing cargo containers for shipment. He knows a certain cargo container can hold a maximum of 50 microwaves or a maximum of 15 refrigerators. Each microwave takes up 6 cubic feet of space, and each refrigerator takes

up 20 cubic feet. The cargo container can hold a maximum of 300 cubic feet. The employee is trying to figure out how to pack a container containing both microwaves and refrigerators. Which of the following system of inequalities can the employee use to determine how many of each item (microwaves,  $m$ , and refrigerators,  $r$ ) he can pack into one cargo container ?

A.  $m \leq 6$

$$r \leq 20$$

$$50m + 15r \leq 300$$

$$\text{B. } m \leq 50$$

$$r \leq 15$$

$$m + r \leq 300$$

$$\text{C. } m \leq 50$$

$$r \leq 15$$

$$6m + 20r \leq 300$$

$$\text{D. } m \leq 50$$

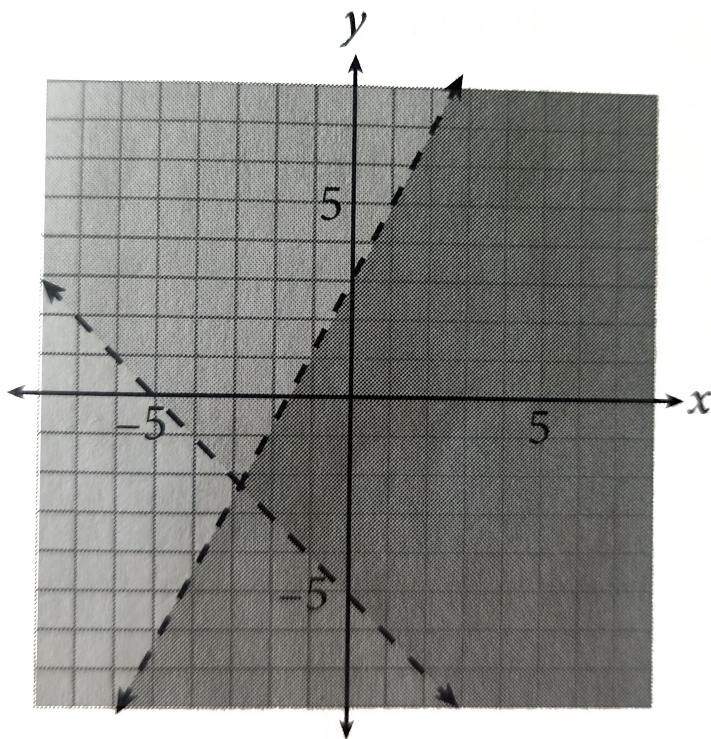
$$r \leq 15$$

$$50m + 15r \leq 300$$

**Answer: C**



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20.

$$\begin{cases} y > -x - 5 \\ y < 2x + 3 \end{cases}$$

The figure above shows the solution for the system of inequalities shown. Suppose  $(a,b)$  is

a solution to the system. If  $a = 0$ , what is the greatest possible integer value of  $b$ ?



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**21.**  $3x + 2 > 5$

$-2x + 8 > -10$

Which of the following describes the range of  $x$ ?

A.  $x > 1$

B.  $x > 9$

C.  $-1 < x < 9$

D.  $9 > x > 1$

**Answer: D**



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22.  $y \geq -3x + 18$

$y \geq 9x$

In the  $xy$  plane, the point  $(a,b)$  lies in the solution set of the system of inequalities



above. What is the minimum possible value of

b ?

A.  $1\frac{1}{2}$

B. 3

C.  $7\frac{1}{2}$

D.  $13\frac{1}{2}$

**Answer: D**



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**23.** Francine sells advertising time packages for a local television station. She is able to make up to 15 sales calls per week offering potential advertisers either a prime time package for \$12,000 or a non prime time package for \$8,000. Her weekly sales goal is to sell more than \$20,000 worth of advertising. Which of the following systems of inequalities represents this situation in terms of  $p$ , the number of prime time packages Francine sells in a week,  $n$ , the number of non prime time packages, and  $u$ , the number of

unsuccessful sales calls for which she sells  
neither offering ?

A.  $p + n + u \leq 15$

$$12,000p + 8,000n > 20,000$$

B.  $p + n + u \geq 15$

$$12,000p + 8,000n > 20,000$$

C.  $p + n + u \leq 15$

$$12,000p + 8,000(n + u) > 20,000$$

D.  $p + n + u \leq 15$

$$12,000p + 8,000n < 20,000$$

**Answer: A**



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**24.** Luis has \$25 to spend on school supplies. Pencils ( $p$ ) cost \$1.25 per package, notebooks ( $n$ ) are priced at \$2.50 each, and markers ( $m$ ) sell for \$4 per pack. He must buy exactly one calendar/planner for \$5.75. Which of the following describes how many markers Luis can buy?

$$\text{A. } m \leq \frac{19.25 + 2.5m + 5.75}{25}$$

$$\text{B. } m \leq \frac{19.25 - 1.25p - 2.5n}{4}$$

$$\text{C. } m \leq \frac{25 - 1.25p - 2.5n}{4} - 5.75$$

$$\text{D. } m \leq 19.25 - 1.25 - 2.5n$$

**Answer: B**



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**25.** Let  $a$  and  $b$  be numbers such that  $-a < b + 1 < a$ . Which of the following must be true?

I.  $a > 0$

II.  $|b| < a$

III.  $b > a + 1$

A. I only

B. I and II

C. II only

D. I, II, and III

**Answer: B**



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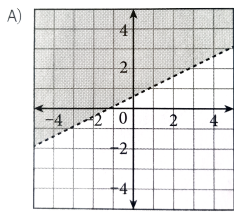
26. The variable  $x$  is a positive integer. If  $3(x - 1) + 5 > 11$  and  $-5x + 18 \geq -12$ , how many possible values are there for  $x$ ?



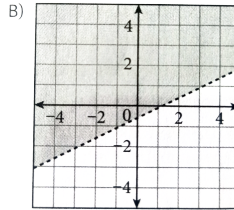
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## Linear Inequalities

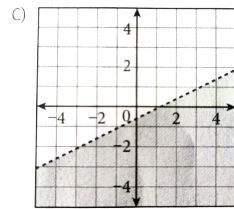
1. Which of the following graphs represents the solution set for  $5x - 10y > 6$ ?



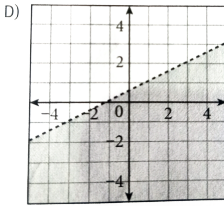
A.



B.



C.



D.

**Answer: C**

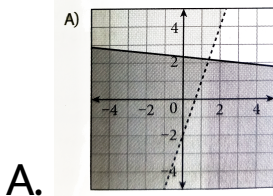


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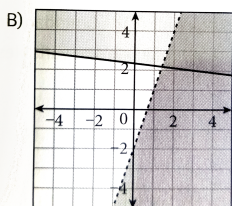


# System Of Inequalities

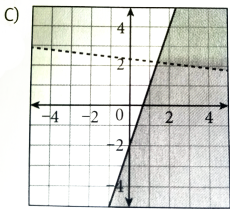
1. If  $12x - 4y > 8$  and  $\frac{2}{3}x + 6y \geq 14$  form a system of inequalities, which of the following graphs shows the solution set for the system ?



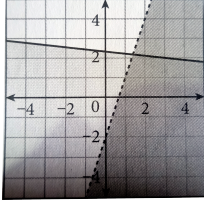
A.



B.



C.



D.

**Answer: B**



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**Modeling Real Life Situations With Inequalities**

1. To make its sales goals for the month, a toy manufacture must sell at least \$10,400 for of toy hoops and basketballs. Toy hoops sell for \$8 and basketballs sell for \$25. The company hopes to sell more than three times as many basketballs as toy hoops. If  $h$  represents the number of toy hoops and  $b$  represents the number of basketballs, where  $h$  and  $b$  are positive integer, which of the following systems of inequalities best describes this situation ?

$$\text{A. } 8h + 25b \geq 10$$

$$400b > 3h$$

$$\text{B. } 8h + 25b \geq 10$$

$$400 > 3b$$

$$\text{C. } 25h + 8b \geq 10$$

$$400b > 3h$$

$$\text{D. } 25h + 8b \geq 10$$

$$400h > 3b$$

**Answer: A**



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