Unit 2 Assessment • Reasoning with Equations and Inequalities

1. Solve: $x - 7 = 11$
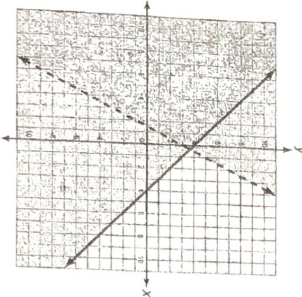
   A. $x = 3$

   B. $x = 4$

   C. $x = 16$
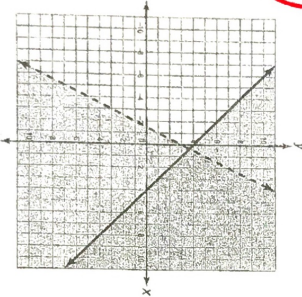
   D. $x = 18$ *(circled)*

2. A system of inequalities is shown below.

$$\begin{cases} y \geq -x + 4 \\ y < 2x + 3 \end{cases}$$

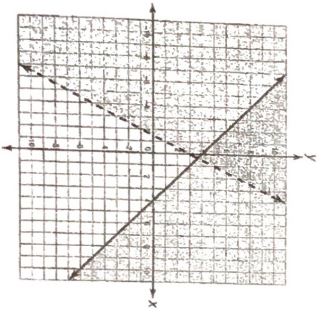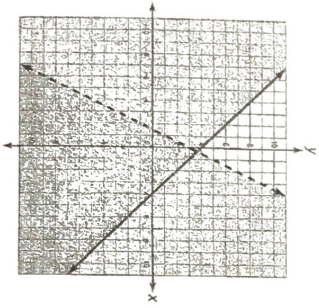Which graph shows the solution to the system of inequalities?

(circled C.)

A.

B.

C.

D.

(handwritten notes:)
shade
$>$ $\geq$ above
$<$ $\leq$ below

line
dot $>$ $<$
solid $\geq$ $\leq$

3. Jenny wrote the steps shown below while solving the equation $5x + 3 = 18$.

$$5x + 3 = 18$$

Step 1: $5x = 15$

Step 2: $1x = 3$

Step 3: $x = 3$

Which step is justified by the multiplicative identity property?

   A. Step 1: Subtract 3 from both sides.

   B. Step 2: Divide both sides by 5.

   C. Step 2: Divide both sides by 3.
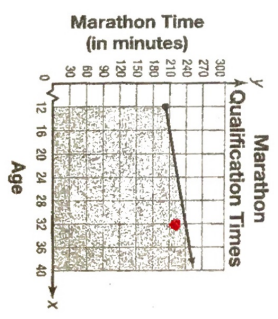
   D. Step 3: Rewrite $1x = 3$ as $x = 3$. *(circled)*

(handwritten note underline under "multiplicative identity property")

4. Solve for x where $a > 0$: $ax < -4$

   A. $a < -\frac{x}{4}$

   B. $x < -\frac{4}{a}$ *(circled)*

   C. $x > -\frac{4}{a}$

   D. $a < -\frac{4}{x}$

(handwritten notes:)
$a > 0$ → means you can multiply 1 by any # and it's still that #

a could be 1, 2, 3 & so on so you don't need to flip the inequality sign

5. To qualify for an elite marathon, each runner must run a marathon in a time at or below a maximum time designated by the marathon directors. The qualifying times are graphed below.

Marathon Qualification Times

y-axis: Marathon Time (in minutes) — 30, 60, 90, 120, 150, 180, 210, 240, 270, 300

x-axis: Age — 0, 12, 16, 20, 24, 28, 32, 36, 40

If Tyrone, who is 32 years old, runs a marathon in 218 minutes, does his time qualify for the elite marathon?

   A. Tyrone's time is in the shaded region, so he qualifies for the elite marathon. *(circled)*

   B. Tyrone's time is in the shaded region, so he does not qualify for the elite marathon.

   C. Tyrone's time is not in the shaded region, so he qualifies for the elite marathon.

   D. Tyrone's time is not in the shaded region, so he does not qualify for the elite marathon.

Unit 2

6. A system of linear equations is shown below.

$$\begin{cases} 2x + 3y = 9 \\ -2x - 2y = -10 \end{cases}$$

Y = -1

What is the solution to the system of equations?

A. $(-1, -6)$

B. $(6, -1)$ ⟲

C. $(3, 1)$

D. $(-3, 5)$

7. Solve for x: $-mx + 6 > -2$

A. $x < \dfrac{8}{m}$ ⟲

B. $x > -\dfrac{8}{m}$

C. $x < -8$

D. $x > 8$

$-mx + 6 > -2$
$\quad -6 \quad -6$
$\dfrac{-mx}{-m} > \dfrac{-8}{-m}$
$x < \dfrac{8}{m}$

8. A linear equation and its solution are shown below.
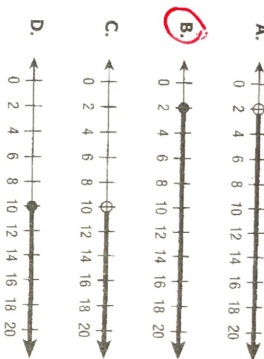
$-x - 5 = 2$

Step 1. $-x = 7$

Step 2. $x = -7$

Which property allows the addition of 5 to both sides in Step 1?

A. subtraction property of equality

B. reflexive property of equality

C. addition property of equality ⟲

D. transitive property of equality

9. A linear inequality is shown below.

$5x + 2 \geq 12$

Which graph shows the solution to the inequality?

A.
```
0  2  4  6  8  10 12 14 16 18 20
```

B. ⟲
```
0  2  4  6  8  10 12 14 16 18 20
```

C.
```
0  2  4  6  8  10 12 14 16 18 20
```

D.
```
0  2  4  6  8  10 12 14 16 18 20
```

$5x + 2 \geq 12$
$5x \geq 10$
$x \geq 2$
closed, shaded to right

10. At the store, the total cost of 2 apples and 5 oranges is $9.50. The cost of 2 apples and 3 oranges is $6.50. What are the prices of apples and oranges?

A. One apple costs $0.75, and one orange costs $1.20.

B. One apple costs $1.50, and one orange costs $1.

C. One apple costs $2, and one orange costs $0.70.

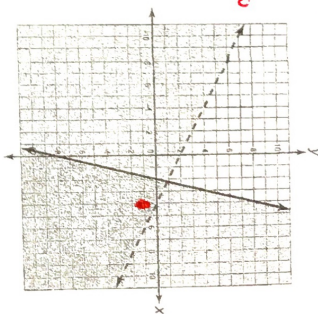D. One apple costs $1, and one orange costs $1.50. ⟲

$-1(2a + 5o = 9.50)$
$2a + 3o = 6.50$
$-2a - 5o = -9.50$
$\overline{}$
$-2o = -3$
$o = 1.50$

11. Which point is in the solution region of the system of linear inequalities?

A. $(0, 0)$

B. $(1, 6)$

C. $(4, -1)$ ⟲

D. $(5, 0)$

12. Nikhil is participating in a walkathon to raise money for a local hospital. One of his neighbors pledged to donate $5 initially and add $2 for every lap around the track that Nikhil completes. What is the minimum number of laps that he must walk so that his neighbor will donate at least $25?

A. 5 laps

B. 10 laps ⟲

C. 15 laps

D. 20 laps

$5 + 2x = 25$
$2x = 20$
$x = 10$

Unit 2

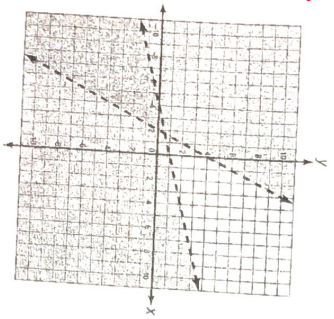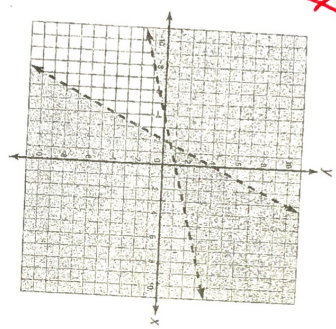**13.** A system of linear inequalities is shown below.

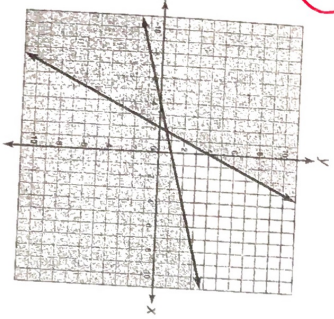$$\begin{cases} y \le \left(\frac{1}{4}\right)x + 1 \\ y \ge 2x + 4 \end{cases}$$

Which graph shows the solution to the system of inequalities?
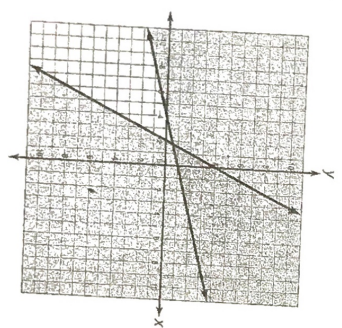
(handwritten: both solid)

B. *(circled)*

D.

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14. Solve $-3x - 4 \ge 2x - 6$ for x.

- **A.** $x \le -2$
- **B.** $x \ge -2$
- **C.** $x \le 2$
- **D.** $x > 2$

(handwritten: think that supposed to be +6)

$$-3x - 4 \ge 2x - 6$$
$$-2x + 4 \quad -2x + 4$$
$$\overline{}$$
$$\frac{-5x}{-5} \ge \frac{-2}{-5}$$
$$x \le \frac{2}{5}$$

15. The solution to a system of linear inequalities is graphed below.

Does the point (1, 3) represent a solution to the system of inequalities?
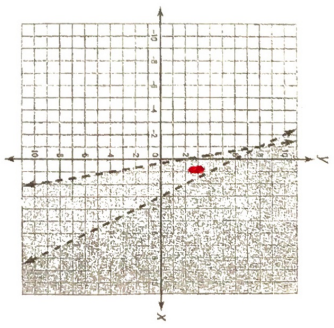
- **A.** The point is in the darker shaded region, so it is a solution to the system of inequalities.
- **B.** The point is in the darker shaded region, so it is not a solution to the system of inequalities.
- **C.** The point is not in the darker shaded region, so it is a solution to the system of inequalities.
- **D.** The point is not in the darker shaded region, so it is not a solution to the system of inequalities. *(circled)*
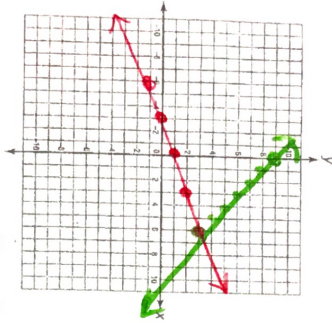
Unit 2

16. An artist is planning a mural for a square wall. She used a coordinate plane to plan two long, straight lines for the mural. The lines are represented by the system of equations below.

$$\begin{cases} y = \left(\frac{1}{3}\right)x + 1 \\ y = -x + 9 \end{cases}$$

Graph the linear equations on the coordinate plane below and determine where the lines will intersect.

They intersect @ (6,3)

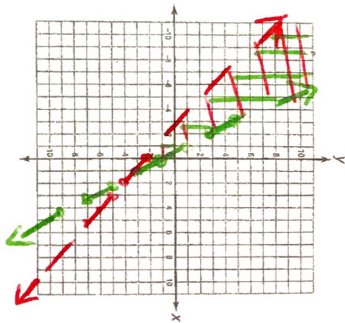---

17. A system of linear inequalities is shown below.

$$\begin{cases} y > -x - 2 \\ 3y < -6x - 3 \end{cases} \rightarrow y < -2x - 1$$

Graph the system of inequalities on the coordinate plane below and describe the solution set.

Unit 2

18. A soccer league uses a point system to evaluate the offensive statistics of players throughout the season. The league assigns a certain number of points to a player for each goal scored and a different number of points to a player for each assist. Marcelo finished the season with 8 goals and 5 assists for a total of 21 points. Emmanuel finished the season with 4 goals and 12 assists for a total of 20 points.

A. Let g represent the number of goals a player scored and let a represent the number of assists a player has during the season. Write a system of equations to represent the situation above.

$$\left(\begin{array}{l} 8g + 5a = 21 \\ {}^{-4}\; 4g + 12a = 20 \end{array} \right)$$

B. Use the elimination method to solve the system of equations from part A. Show all your work.

$$8g + 5a = 21 \qquad 8g + 5(1) = 21$$
$$^{-}8g - 24a = {}^{-}40 \qquad 8g + 5 = 21$$
$$^{-}19a = {}^{-}19 \qquad 8g = 16$$
$$a = 1 \qquad g = 2$$

Goals = 2pt
Assists = 1pt

19. Solving a linear equation, such as the equation below, involves the use of a property of equality or a property of operations at each step.

$$\tfrac{3}{2}(6 + s) - 8 = 2s - 23$$

A. Solve the equation for s. Show each step that you take to find the solution.

$$9 + \tfrac{3}{2}s - 8 = 2s - 23 \qquad \text{Distributive}$$
$$1 + \tfrac{3}{2}s = 2s - 23 \qquad \text{Simplify}$$
$$\tfrac{3}{2}s = 2s - 24 \qquad \text{Subtraction}$$
$$^{-}\tfrac{1}{2}s = {}^{-}24 \qquad \text{Subtraction}$$
$$s = 48 \qquad \text{Division}$$

B. Label each step from your answer to part A with the property that justifies it.

Go On ▶

20. Owen works as a translator of literature. He gets paid different amounts for translating articles and for translating book chapters, but he is unsure exactly how much he gets paid for each task. In January, he was paid $340 for translating 3 book chapters and 2 articles. In February, he was paid $380 for translating 1 book chapter and 6 articles.

A. Let c represent the number of book chapters that he translated and let a represent the number of articles that he translated. Write a system of equations to represent the situation above.

$$3c + 2a = 340$$
$$1c + 6a = 380$$

B. Use the substitution method to solve the system of equations from part A. Show all your work.

$$c = {}^{-}6a + 380$$
$$3({}^{-}6a + 380) + 2a = 340$$
$${}^{-}18a + 1140 + 2a = 340$$
$${}^{-}16a = {}^{-}800$$
$$\boxed{a = 50}$$

$$c = {}^{-}6(50) + 380$$
$$\boxed{c = 80}$$

STOP