Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Hour: \_\_\_\_\_\_\_\_\_\_\_

6.3 Booster Club Members: Intersecting Lines

At a school band concert, Chris and Jake sell memberships for the band’s booster club. An adult membership costs $10, and a student membership costs $5. At the end of the evening, the students had sold 50 memberships for a total of $400. The club president asked,

* *How many of the new members are adults and how many are students?*

You can answer the question by writing and solving equations that represent the question and the given information.

1. Let *a* represent the number of $10 adult memberships and *s* represent the number of $5 student memberships.
2. What equation relates *a* and *s* to the $400 income total? Explain what each term of the equation represents.

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1. Find three solutions for your equation from part (1).

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1. What equation relates *a* and *s* to the total of 50 new members? Explain what each term of the equation represents.

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1. Find three solutions for your equation from part (3).

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1. Are there any pairs of values for *a* and *s* that satisfy both equations?

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1. Graph the two equations from Question A on a grid like the one at the right. Does it matter which variable goes on which axis? Explain.

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1. Determine the coordinates of the intersection point. Explain what the coordinates tell you about the numbers of adult and student memberships sold.

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1. Could there be a common solution for the two equations that is *not* shown on your graph?

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The two equations you wrote to model the conditions of this Problem are called a **system of linear equations**. The coordinates of the intersection point satisfy both equations. These coordinates are called the **solution of the system**.

1. Use graphic or symbolic methods to solve each system of linear equations. Check your answer.
2. *x* + *y* = 4 and *x* – *y* = -2
3. 2*x* + *y* = -1 and *x* – 2*y* = 10
4. -2*x* + *y* = 3 and -4*x* + 2*y* = 6
5. -2*x* + *y* = 3 and -4*x* + 2*y* = 10