

Name: \_\_\_\_\_

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### 8.2/9.1 Modeling and Solving Linear Systems Graphically and Algebraically

**Bell Work** Do the following systems of two linear equations have one solution, no solution, or an infinite number of solutions? Explain your choice.

a)  $6x - 3y = 12$   
 $2x - y = 4$

b)  $y = x + 7$   
 $x + y = 7$

c)  $y = 2x - 1$   
 $y = 2x + 1$

Example 1: People can rent ski and snowboard equipment from two places at Whistler Resort. Option A charges a one-time \$30 fee and then \$5 per hour. Option B charges \$20 per hour.

- a) Create a system of linear equations to model the rental charges.

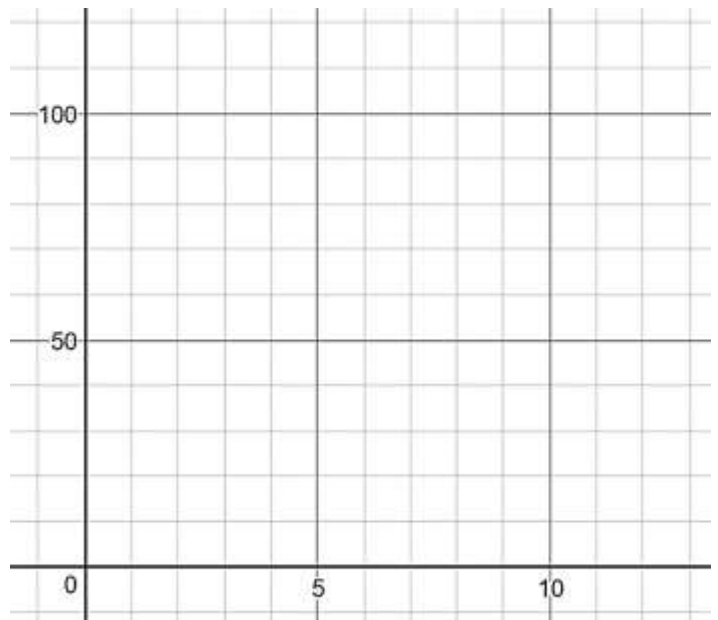
Let y represent \_\_\_\_\_

Let x represent \_\_\_\_\_

Option A:

Option B:

- b) Solve the linear system algebraically. Then graph the system. What does the solution represent?



Example 2: A movie theater charges \$11 for an adult ticket and \$8 for children's or senior's tickets. Suppose 240 people went to see the movie and ticket sales totaled \$2370.

- a) The manager wants to know how many adults went to see the movie. What system of linear equations could help the manager determine the answer?

Let  $a$  represent \_\_\_\_\_

Let  $s$  represent \_\_\_\_\_

- b) Solve the system algebraically.

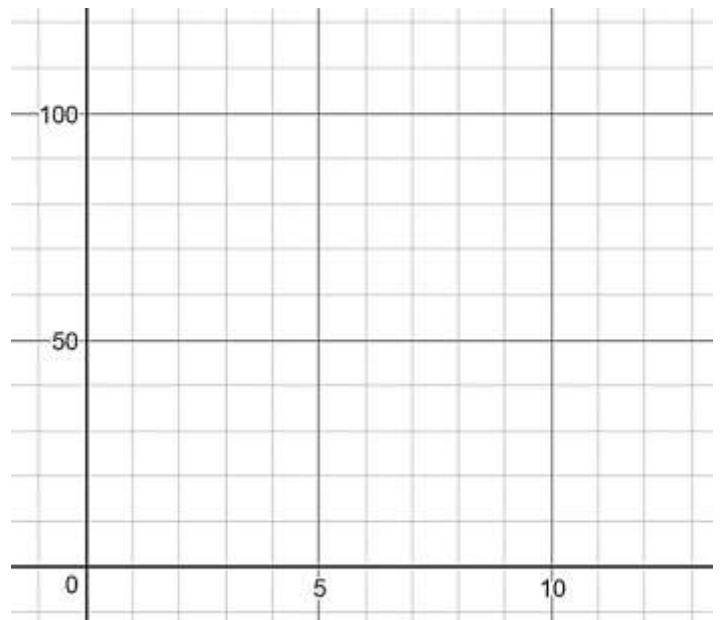
Therefore, \_\_\_\_\_ adults and \_\_\_\_\_ children/seniors attended the movie.

### Your Turn

1. Two grain bins are being emptied starting at the same time. The larger bin holds  $40 \text{ m}^3$  of grain. It is emptied at a rate of  $2 \text{ m}^3$  per minute. The smaller bin stores  $30 \text{ m}^3$  of grain. This bin is emptied at a rate of  $1 \text{ m}^3$  per minute.

- a) Model the volume of grain remaining as a function of time using a system of linear equations.

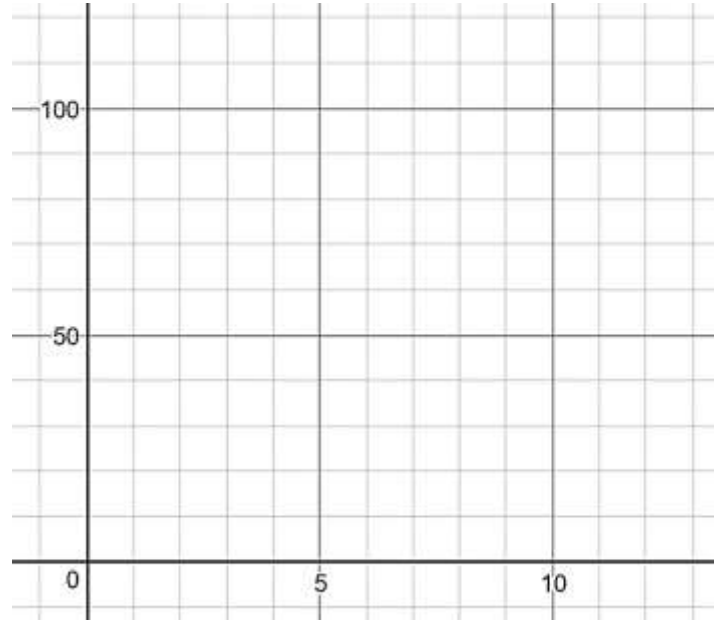
- b) Solve the linear system algebraically. Then graph the system. What does the solution represent?



2. Two pools start draining at the same time. The larger pool contains 100 L of water and drains at a rate of 25 L/min. The smaller pool contains 80 L of water and drains at a rate of 10 L/min.

a) Model the draining of the pools algebraically using a system of linear equations.

b) Solve the linear system algebraically. Then graph the system. What does the solution represent?



3. During a performance by a theater company, the main act was on stage for 3 min less than twice the time of the opening act. Together, the two acts performed 132 min.

a) Write a system of linear equations to represent the length of time each act performed.

b) Solve the linear system algebraically. What does the solution represent?

HW: Section 8.2 p. 440 #1, 2, 5, 6, 7, 8, 11, 17, 18