

**8.EE.8 Analyze and solve pairs of simultaneous linear equations**

Amy needed to rent a car for a day so she researched two rental companies. Company A charges a flat rate of \$25 plus \$0.15 for every mile she drove the car. Company B charges a flat rate of \$50 plus \$0.05 for every mile she drove the car. If Amy had to drive a total of 370 miles, which rental car company would be a better deal and by how much?

- A) Company A by \$12  
 B) Company A by \$80.50  
 C) Company B by \$12  
 D) Company B by \$68.50
- Co. A  $y = .15x + 25$   
 Co. B  $y = .05x + 50$   
 $A: y = .15(370) + 25$   
 $y = 80.50$   
 $B: y = .05(370) + 50$   
 $y = 68.50$

What value of  $x$  satisfies the system of equations below?

$x + y = 7$   
 $(x + 2y = 5) - 1$   
 $x + y = 7$   
 $-x - 2y = -5$   
 $\hline -y = 2$   
 $y = -2$   
 $x + (-2) = 7$   
 $+2 + 2$   
 $x = 9$

(A) 9  
 B) 6  
 C) 3  
 D) -2

Sophia has 8 books in her locker. All the books are either personal books or school books. She has three times as many school books as personal books. How many school books does Sophia have in her locker?

- A) 2      B) 3      C) 6      D) 7
- $p + s = 8$      $3p = s$      $4p = 8$      $p = 2$

In a game, two players scored a total of 121 points. One player had 13 more points than the other player. How many points did the player with the fewer points score?

- A) 52      B) 54      C) 67      D) 108
- $o + t = 121$      $o + 13 = t$   
 $o + o + 13 = 121$      $one = 54$

Three packaging companies use the expressions shown to calculate the cost, in dollars, for shipping an item weighing  $x$  pounds.

Company R:  $\frac{3}{4}(2x + 7)$

Company S:  $\frac{3}{2}(x + 1) + x$

Company T:  $\frac{5}{2}(x + 2) + 1$

Part A: For what weight will the cost be the same for Company R and Company S? Show your work.

Company R = Company S  
 $\frac{3}{4}(2x + 7) = \frac{3}{2}(x + 1) + x$   
 $\frac{3}{2}x + \frac{21}{4} = \frac{3}{2}x + \frac{3}{2} + x$      $x = \frac{15}{4} = 3\frac{3}{4}$  lbs

Part B: For what weight will the cost be the same for Company S and Company T? Show your work.

Company S = Company T  
 $\frac{3}{2}(x + 1) + x = \frac{5}{2}(x + 2) + 1$   
 $\frac{3}{2}x + \frac{3}{2} + (\frac{2}{2})x = \frac{5}{2}x + 5 + 1$   
 $\frac{5}{2}x + \frac{3}{2} = \frac{5}{2}x + 6$   
 $\frac{3}{2} \neq 6$   
 Never the same

Part C: Which company has the highest rate? Explain your answer.

Company R:  $\frac{3}{4}(2x + 7) = \frac{3}{2}x + \frac{21}{4}$   
 Company S:  $\frac{3}{2}(x + 1) + x = \frac{5}{2}x + \frac{3}{2}$   
 Company T:  $\frac{5}{2}(x + 2) + 1 = \frac{5}{2}x + 6$

Part D: Avery says it is less expensive to ship an item using Company S than Company R. Is Avery correct? Explain your answer.

According to part A, Company R & S are the same if  $x = 3\frac{3}{4}$  lbs. Company S is cheaper if the package is less than  $3\frac{3}{4}$  lbs.  
 Ex.  $x = 1$

Co. R:  $\frac{3}{2}(1) + \frac{21}{4} = \frac{3}{2} + \frac{21}{4} = \frac{6}{4} + \frac{21}{4} = \frac{27}{4} = 6.75$   
 Co. S:  $\frac{5}{2}(1) + \frac{3}{2} = \frac{8}{2} = 4$  — Cheaper  
 $4 < 6.75$