Precalculus
Solving Systems using Inverses

Use inverses to solve each system. Be sure to set up your matrix equations.

1) $-4x + y = -1$
   $2x - 4y = 18$

2) $4x + 5y = -10$
   $-2x - 3y = 4$

3) $-4x + 3y = -23$
   $-4x - 4y = -16$

4) $x - 5y = 21$
   $4x - 2y = -6$

5) $2x - 6y = 16$
   $x + 6y - 3z = -1$
   $-5x - y + 4z = -16$

6) $-3x - 4y - 5z = -3$
   $6x + z = -14$
   $5x - 5y - 2z = -13$

Write a system of equations. Then use inverses to solve the system. Be sure to set up your matrix equations.

7) Scott and Cody are selling wrapping paper for a school fundraiser. Customers can buy rolls of plain wrapping paper and rolls of shiny wrapping paper. Scott sold 2 rolls of plain wrapping paper and 8 rolls of shiny wrapping paper for a total of $162. Cody sold 5 rolls of plain wrapping paper and 2 rolls of shiny wrapping paper for a total of $99. What is the cost each of one roll of plain wrapping paper and one roll of shiny wrapping paper?

8) The school that Amanda goes to is selling tickets to a spring musical. On the first day of ticket sales the school sold 8 senior citizen tickets and 10 student tickets for a total of $140. The school took in $65 on the second day by selling 3 senior citizen tickets and 5 student tickets. What is the price each of one senior citizen ticket and one student ticket?

9) New York City is a popular field trip destination. This year the senior class at High School A and the senior class at High School B both planned trips there. The senior class at High School A rented and filled 8 vans and 1 bus with 94 students. High School B rented and filled 14 vans and 3 buses with 202 students. Every van had the same number of students in it as did the buses. Find the number of students in each van and in each bus.

10) James and Lisa each improved their yards by planting daylilies and geraniums. They bought their supplies from the same store. James spent $208 on 8 daylilies and 14 geraniums. Lisa spent $129 on 9 daylilies and 7 geraniums. What is the cost of one daylily and the cost of one geranium?

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Solving Systems using Inverses

Use inverses to solve each system. Be sure to set up your matrix equations.

1) $-4x + y = -1$
   $2x - 4y = 18$

   $(-1, -5)$

2) $4x + 5y = -10$
   $-2x - 3y = 4$

   $(-5, 2)$

3) $-4x + 3y = -23$
   $-4x - 4y = -16$

   $(5, -1)$

4) $x - 5y = 21$
   $4x - 2y = -6$

   $(-4, -5)$

5) $2x - 6y = 16$
   $x + 6y - 3z = -1$
   $-5x - y + 4z = -16$

   $(-1, -3, -6)$

6) $-3x - 4y - 5z = -3$
   $6x + z = -14$
   $5x - 5y - 2z = -13$

   $(-3, -2, 4)$

Write a system of equations. Then use inverses to solve the system. Be sure to set up your matrix equations.

7) Scott and Cody are selling wrapping paper for a school fundraiser. Customers can buy rolls of plain wrapping paper and rolls of shiny wrapping paper. Scott sold 2 rolls of plain wrapping paper and 8 rolls of shiny wrapping paper for a total of $162. Cody sold 5 rolls of plain wrapping paper and 2 rolls of shiny wrapping paper for a total of $99. What is the cost each of one roll of plain wrapping paper and one roll of shiny wrapping paper?

   roll of plain wrapping paper: $13, roll of shiny wrapping paper: $17

8) The school that Amanda goes to is selling tickets to a spring musical. On the first day of ticket sales the school sold 8 senior citizen tickets and 10 student tickets for a total of $140. The school took in $65 on the second day by selling 3 senior citizen tickets and 5 student tickets. What is the price each of one senior citizen ticket and one student ticket?

senior citizen ticket: $5, student ticket: $10

9) New York City is a popular field trip destination. This year the senior class at High School A and the senior class at High School B both planned trips there. The senior class at High School A rented and filled 8 vans and 1 bus with 94 students. High School B rented and filled 14 vans and 3 buses with 202 students. Every van had the same number of students in it as did the buses. Find the number of students in each van and in each bus.

Van: 8, Bus: 30

10) James and Lisa each improved their yards by planting daylilies and geraniums. They bought their supplies from the same store. James spent $208 on 8 daylilies and 14 geraniums. Lisa spent $129 on 9 daylilies and 7 geraniums. What is the cost of one daylily and the cost of one geranium?

daylily: $5, geranium: $12