Solve each system algebraically and check your solution.

1. $y = 3x$
   $5x + 2y = 44$

$5x + 2(3x) = 44$
$5x + 6x = 44$
$11x = 44$
$\boxed{x = 4}$

$y = 3x$
$y = 3(4)$
$\boxed{y = 12}$

check $(4, 12)$
$y = 3x$ $5x + 2y = 44$
$12 = 3(4)$ $5(4) + 2(12) = 44$
$12 = 12$ $20 + 24 = 44$
$\checkmark$ $44 = 44$
         $\checkmark$

2. $x = 5y - 1$
   $x + 2y = 13$

$5y - 1 + 2y = 13$
$7y - 1 = 13$
$7y = 14$
$\boxed{y = 2}$

$x = 5y - 1$
$x = 5(2) - 1$
$\boxed{x = 9}$

check $(9, 2)$
$x = 5y - 1$ $x + 2y = 13$
$9 = 5(2) - 1$ $9 + 2(2) = 13$
$9 = 10 - 1$ $9 + 4 = 13$
$9 = 9$ $13 = 13$
$\checkmark$ $\checkmark$

3. $-3x + y = 7 \rightarrow y = 3x + 7$
   $5x + 2y = 3$

$5x + 2(3x + 7) = 3$
$5x + 6x + 14 = 3$
$11x + 14 = 3$
$11x = -11$
$\boxed{x = -1}$

$-3x + y = 7$
$-3(-1) + y = 7$
$3 + y = 7$
$\boxed{y = 4}$

check $(-1, 4)$
$-3x + y = 7$ $5x + 2y = 3$
$-3(-1) + 4 = 7$ $5(-1) + 2(4) = 3$
$3 + 4 = 7$ $-5 + 8 = 3$
$7 = 7$ $3 = 3 \checkmark$

4. Kasey sells athletic shoes at a department store. She earns $500 per month plus a 4% commission on her total sales. Kyle also sells athletic shoes at the same store but he earns $400 per month plus a 5% commission on total sales.

a. Write a system of equations that represent the total earnings of Kasey and Kyle in one month. Let x represent the amount of money generated in sales and let y represent the total amount of money earned. [Hint: *Percents need to be changed to decimals.*]

kasey $y = 500 + .04x$ Kyle $y = 400 + .05x$

$500 + .04x = 400 + .05x$
$100 + .04x = .05x$
$\dfrac{100}{.01} = \dfrac{.01x}{.01}$
$10,000 = x$

$y = 400 + .05x$
$y = 400 + .05(10,000)$
$y = 400 + 500$
$y = 900$

b. Solve the system algebraically. What is the solution? What does it mean in the context of the problem?

$(\underset{\text{sales}}{10,000}, \underset{\text{\$ earned}}{900})$

Both Kasey and kyle will earn the same amount of money ($900) when they each sell $10,000 worth of athletic shoes.