Foundations & Pre-Calculus 10 Chapter 7 Test   [PRACTICE]
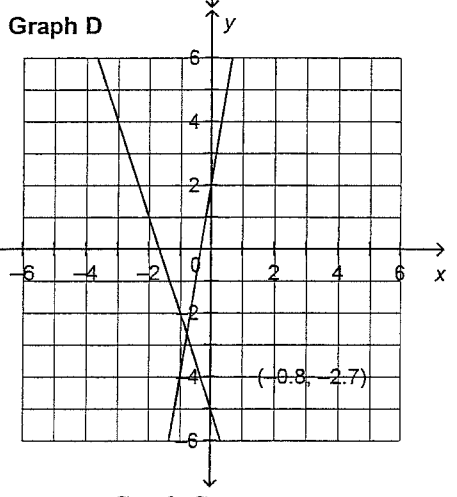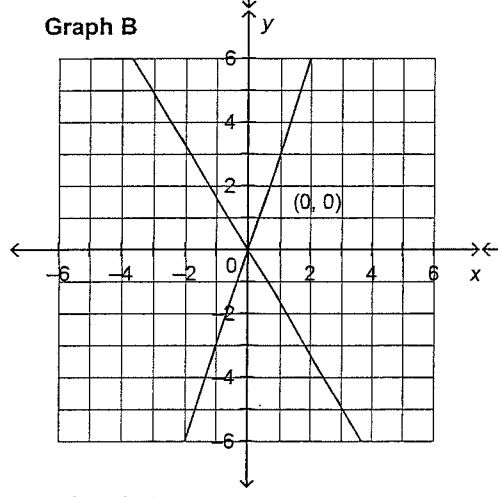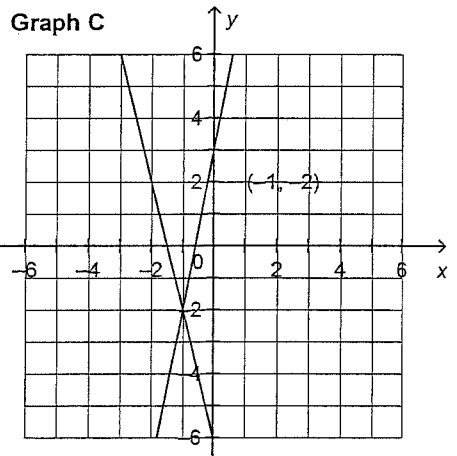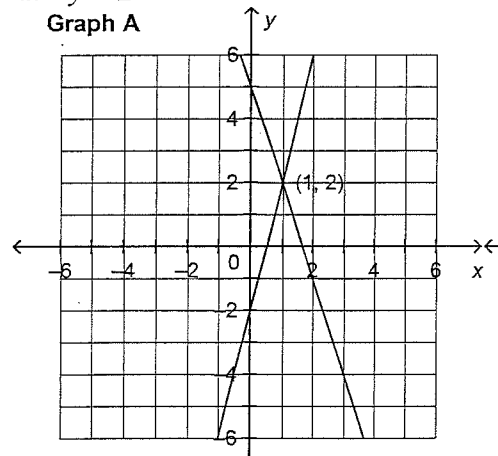
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Multiple Choice
Identify the choice that best completes the statement or answers the question.

A 1. Which linear system has the solution $x = -2$ and $y = 6$?

    a. $x + 3y = 16$
          $4x + 4y = 16$

    c. $x + 2y = -2$
          $2x + 4y = -4$

    b. $x + 3y = 17$
          $2x + y = 15$

    d. $2x + y = -2$
          $x + y = 16$

A 2. Which graph represents the solution of the linear system:
$$-3x - y = -5$$
$$4x - y = 2$$

    a.   Graph A
    b.   Graph B

    c.   Graph C
    d.   Graph D

D

3. Two life insurance companies determine their premiums using different formulas:
Company A: $p = 2a + 24$
Company B: $p = 2.25a + 13$, where p represents the annual premium, and a represents the client's age.
Use the graph to determine the age at which both companies charge the same premium.
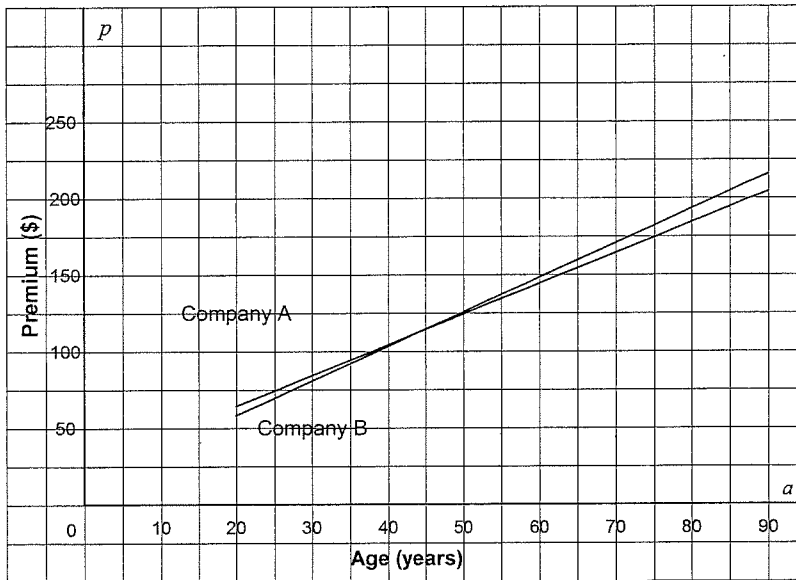
a. 62 years　　　b. 24 years　　　c. 59 years　　　d. 44 years

A

4. Write an equivalent system with integer coefficients.
$$\frac{3}{7}x + 3y = \frac{438}{7}$$
$$\frac{5}{6}x + 5y = \frac{310}{3}$$

a. $3x + 21y = 438$
　$5x + 30y = 620$
b. $21x + 3y = 438$
　$5x + 30y = 620$
c. $3x + 21y = 438$
　$30x + 5y = 620$
d. $3x + 21y = 1$
　$5x + 30y = 1$

B

5. Write an equivalent linear system where both equations have the same y-coefficients.
$4x + 4y = 7$
$8x + 7y = 11$

a. $4x + 4y = 7$ and $8x + 4y = 11$
b. $28x + 28y = 49$ and $32x + 28y = 44$
c. $11x + 28y = 28$ and $11x + 7y = 11$
d. $28x + 31y = 49$ and $32x + 31y = 44$

Short Answer

6. Create a linear system to model this situation. Then use substitution to solve the linear system to solve the problem.

   Bobbie has been saving dimes and quarters to buy a new toy. She has a total of 28 dimes and quarters, with a value of $4.30. How many of each type of coin does Bobbie have?

$$d + q = 28$$
$$10d + 25q = 430$$

or $0.10d + 0.25q = 4.30$.

/5

Bobbie has 18 dimes and 10 quarters.

7. Use an elimination strategy to solve this linear system.

$-5 \big(\ 12c + 28d = 12\ \big) \leftarrow$ multiply by -5 .
$-3 \big(-20c + 16d = 168\ \big) \leftarrow$ multiply by -3

$$-60c - 140d = -60$$
$$60c - 48d = -504$$
$$\overline{\quad\quad\quad}$$
$$-188d = -564$$
$$-188 \quad -188$$
$$d = 3$$

then...

$$12c + 28d = 12$$
$$12c + 28(3) = 12$$
$$12c + 84 = 12$$
$$-84 \quad -84$$
/3
$$12c = -72$$
$$12 \qquad 12$$
$$c = -6$$

Solution is $(-6, 3)$

8. The first equation of a linear system is $9x + 6y = 213$. Write a second equation to form a linear system with infinite solutions.

$$9x + 6y = 213 \leftarrow \text{multiply equation by 2}.$$

$$2\big(9x + 6y = 213\big)$$

$$18x + 12y = 426$$

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Problem

9. In a piggy bank, the number of nickels is 8 more than one-half the number of quarters. The value of the coins is \$21.85.
   a) Create a linear system to model the situation.
   b) If the number of quarters is 78, determine the number of nickels.
   c) Verify that this correct.

a.) $n = \frac{1}{2}q + 8$

$0.05n + 0.25q = 21.85$

b.) $n = \frac{1}{2}q + 8$ $0.05n + 0.25q = 21.85$

Substitute

Solve... $n = 47$

c.) verify   /5

$0.05(47) + 0.25(78) = 21.85$
$2.35 + 19.5 = 21.85$ ✓

10. **a)** Write a linear system to model the situation:
    For the school play, the cost of one adult ticket is \$6 and the cost of one student ticket is \$4. Twice as many student tickets as adult tickets were sold. The total receipts were \$2016.
    b) Use substitution to solve the related problem:
    How many of each type of ticket were sold?

a.) $2a = s$
   $6a + 4s = 2016$

b.) $s = 2a$
   $6a + 4s = 2016$
   $6a + 4(2a) = 2016$
   $6a + 8a = 2016$

$\frac{14a}{14} = \frac{2016}{14}$

$\boxed{a = 144}$ /4

then solve for s...

$2a = s$
$\uparrow$
144

$2(144) = s$
$\boxed{s = 288}$

There were 144 adult tickets and 288 student tickets.   /3

11. Use an elimination strategy to solve this linear system.
    $4x + 6y = 0$
    $-2\left(2x + 10y = 14\right)$

$2x + 10y = 14$

$4x + 6y = 0$
$-4x - 20y = -28$
_____
$-14y = -28$
$\frac{-14y}{-14} = \frac{-28}{-14}$
$\boxed{y = 2}$

$2x + 10y = 14$
$2x + 20 = 14$
$\quad -20 \quad -20$
$\frac{2x}{2} = \frac{-6}{2}$
$\boxed{x = -3}$

$\boxed{\text{The solution is } (-3, 2)}$

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12. Use an elimination strategy to solve this linear system. Verify the solution.

$20x + 35y = 705$

$-2\left(10x - 5y = 195\right)$

$20x + 35y = 705$
$-20x + 10y = -390$
_____

$\dfrac{45y}{45} = \dfrac{315}{45}$

$\boxed{y = 7}$

then... $10x - 5y = 195$

$10x - 5(7) = 195$

$10x - 35 = 195$

$+35 \quad +35$

$\dfrac{10x}{10} = \dfrac{230}{10}$

$\boxed{x = 23}$

$\boxed{\text{The solution is } (23, 7)}$

13. Explain what happens when you try to solve this linear system using an elimination strategy. What does this tell you about the graphs of these equations?

$-8x + 20y = -40$
$24x - 60y = 120$

$3\left(-8x + 20y = -40\right)3 \longleftarrow$ multiply by 3

$24x - 60y = 120$

$-24x + 60y = -120$
$24x - 60y = 120$
_____
$0 = 0$

* Every term is eliminated ∴ the equations are equivalent.

* Coincident Lines *
* Infinite solutions *

14. Determine the number of solutions of this linear system. Explain your reasoning.

① $4x + 12y = 28$
② $8x + 24y = 48$

* Change to slope Int. form *

① $y = -\frac{1}{3}x + \frac{7}{3}$

② $y = -\frac{1}{3}x + 2$

Same slope $\left(-\frac{1}{3}\right)$
y-int. is different

* Parallel lines with no solution *

/2

15. Determine the number of solutions of this linear system. Explain your reasoning.

① $6s + 6c = 50$
② $6s - 6c = 30$

* Change to slope int form *

① $c = -s + \frac{25}{3}$

② $c = s - 5$

Different Slope & different y-int.
∴ Intersecting Lines with only one solution.