

Spring 06 Algebra Evaluation

MTY Academy

Spring 06-Algebra

1. West bought 1.2 lb of apples and 3 lb of oranges. The total cost is \$5.04. If the price of the oranges is 35 cents more than the price of the apples, what is the price for each type of fruit?

2. How many liters of a 70% alcohol solution must be added to 50 liters of a 40% alcohol solution to produce a 50% alcohol solution?

3. Find the selling price per pound of a coffee mixture made from 8 pounds of coffee that sells for \$9.20 per pound and 12 pounds of coffee that costs \$5.50 per pound.

4. Solve each of the following inequalities. Graph your solutions. Write the solution set in interval notation.

(1) $3 - 4(x - 7) \leq 3(4) - x$

(2) $3x + 5 < 2$ or $4(x - 1) \geq -2$

(3) $-4x - 1 < 7$ and $5 - 2x \geq 1$

5. Write an inequality in **two variables** for each of the following sentences. Describe each variable you use in English.

(1) the total number of red balls and the blue marbles is at most 100

(2) the number of pennies and dimes is not exceeding 25

6. Solve each of the following inequalities. Graph your solutions.

(1) $3x - 5y < 10$

(2) $\frac{1}{4}x - \frac{1}{2}y \geq 3$

7. Solve the following system of inequalities and draw the solution set by shading the region.:

$$\begin{aligned} x + y &< 4 \\ -3x + y &< 6 \\ 4x - 3y &\leq 12 \end{aligned}$$

8. Train A and Train B depart at the same time from the same station for a destination 1,300 miles away. If Train A travels at constant rate of 160 miles per hour and Train B travels at a constant rate of 200 miles per hour, how far will the two trains be from each other, in miles, when Train B reaches its destination?
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9. Solve each of the following equations. Verify your answers.

(1) $\left| \frac{2}{3} - 6x \right| = 4$

(2) $|20x - 5| + 19 = 3$

(3) $|2(x + 3)| = 5x - 4$

10. Solve each of the following inequalities, Draw the graph for the solution set and write the solution set in interval notation.

(1) $|3x - 4| - 8 < 0$

(2) $|4 - x| - 2 \leq -6$

(3) $\left| \frac{2}{3}x - 4 \right| \geq 2$

(4) $|3x - 2| < x + 8$

11. Perform the indicated operations and simplify your answers.

(1) $(x^2 - 5x + 2) - 3(2x^2 - 4x - 3)$

(2) $(x^2 - x - 4)(5 - 4x)$

(3) $(2x - 3)(5x - 2) - (x + 2)(x - 2)$

12. Simplify each of the following. Assume that all variable exponents are positive integers.

(1) $-(3x)^2(-2x^4)^3$

(2) $(-3x^3y^8)^3$

(3) $(-2xy^2z)^3(-3x^2y)^2(4x^3y^3z^2)^2$

13. Perform the indicated operations.

(1) $(4x - 3y)^2$

(2) $(4x - 6)(4x + 6)$

(3) $(2x + 7y)^2 - (x - 2y)(x + 2y)$

(4) $(x + 3 + 2y)(x + 2y - 3)$

(5) $(2x + 3)^3$

14. Factor each of the following completely.

(1) $3ax^2 + 6a^2x^3 - 12ax^4$

(2) $2(a + b)^2 - 4(a + b)$

(3) $(a + 3b)(x - 2y) - 2(a + 3b)(3x - 2y)$

(4) $25x^2 - 121y^2$

(5) $8(2x - 5)^2 - 2(x + 3)^2$

(6) $81e^4 - 16d^4$

15. Factor each of the following completely. Verify your answers.

(1) $x^2 + 5x + 6$

(2) $2a^2 - 10a - 28$

(3) $y^2 + 9xy + 18x^2$

(4) $6x^2 + x - 12$

(5) $4ax^2 + 7ax - 15a$

(6) $6x^2 - xy - 12y^2$

16. Find the value of the following by using the formula: $a^2 - b^2 = (a + b)(a - b)$.

(1) $55^2 - 54^2 - 46^2 + 48^2$

(2) $340^2 + 341^2 - 342^2 - 343^2$