

Show all work needed to complete the problem.

I. Review: Perform the indicated operations. There should be no negative exponents or parenthesis in your answer. Reduce where possible. (5 points each)

1.  $\frac{(-2x)^{-3}}{-2x^2}$

2.  $\frac{5x^{-2}}{(-2xy)^2}$

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

II. Factor the following problems completely. (5 points each)

1.  $4x^2 - 9$

2.  $x^2 - 8x + 15$

3.  $2x^2 + 18x + 28$

4.  $2x^2 + x - 15$

5.  $3xy + x + 6y + 2$

III. Solve for the unknown. (6 points each)

1.  $5x^2 - x = 0$

2.  $x^2 + x - 6 = 6$

3.  $2x^2 - 5x - 3 = 0$

4.  $(x + 2)(x - 1) = 4$

IV. Multiple Choice: Circle the correct answer.

If you mix 3 liters of concentrate that is 25% acid with 2 liters of concentrate that is 45% acid then you will get 5 liters of concentrate that is:

- a. less than 25% acid      b. between 25% and 45% acid      c. more than 45% acid

V. Solve the following story problems. (8 points each)

1. Lena put 40% of her investment money into an account that paid 8% simple annual interest. She put the rest into an account that paid 5% simple annual interest. If she earned \$868 in one year, how much did she put into each account?

2. An investment of \$3000 is made into an account that pays 8.5% annual simple interest. How much additional money must be invested into an account that pays 5% annual simple interest so that a total of \$350 is earned?

3. Two passenger trains are 450 miles apart and heading towards each other on the same tracks. If the first one is averaging 45 m.p.h. and the second one is averaging 30 m.p.h. and they leave their respective depots at the same time, how long until they crash?

4. How many grams of pure salt must be added to 40 grams of a 20% salt solution to make a solution that is 36% salt?