Practice Problems for Algebra
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1 What is the value of 11r if r = 4t and t = 3?

2 What is the value of -10p if p = 2q + 6 and q = 2?

3 What is the value of 5p if p = -7s - 7 and s = 4?

4 Let f(x) = x + 7, and let g(x) = (x^2 - 49)/(x - 7). What is the difference between these two functions?

5 We define a new operator, @, such that a @ b = a^b - b^a. What is 5 @ 5?

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6 Let r and s be positive integers, with r>s. Define an operation @ as follows: r@s = 2^(r+s) / 2^(r-s). What is 2@3 ?

7 (T/F): 10 < 14

8 (T/F): -1 < -3

9 Find the range(s) for x that satisfy the condition 46 - x^2 <= -7x - 32 ?

10 If 6x - 5 = 13, what is x?

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11 If e and f are real numbers such that the sum of e and 4 is f, what is the product of 4 and e in terms of f?

12 The square of the sum of w and 6 equals the product of w and 6. Write this fact as an equation.

13 If 6/12 = 6/(s+11), what is s?

14 If 12/17 = 12/(23-t), what is t?

15 Find the value of B + (C^2)/36 when B=21 and C=12.

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1 ANSWER: 132. EXPLANATION: If r = 4t and t = 3, then we substitute 3 for t and find that r = 4×3, or 12. Since the question asks us to find the value of 11r, we simply multiply 11 by 12 to get the answer.

2 ANSWER: -100. EXPLANATION: If p = 2q + 6 and q = 2, then we substitute 2 for q and find that p = 2×2 + 6, or 10. Since the question asks us to find the value of -10p, we simply multiply -10 by 10 to get the answer.

3 ANSWER: -175. EXPLANATION: If p = -7s - 7 and s = 4, then we substitute 4 for s and find that p = -7×4 - 7, or -35. Since the question asks us to find the value of 5p, we simply multiply 5 by -35 to get the answer.

4 ANSWER: The functions are identical, other than g(x) being undefined where x=7.. EXPLANATION: Divide the denominator of g(x) into the numerator of g(x) to see that the functions appear to be identical. However, note that g(x) is undefined when the denominator is 0, because division by 0 is undefined.

5 ANSWER: 0. EXPLANATION: By the definition of the function, 5 @ 5 = 5^5 - 5^5. We know that 5^5=3125, and 5^5=3125. We then subtract to find the difference.

6 ANSWER: 64. EXPLANATION: In this case, the value of r does not matter. The difference between the exponents in the numerator (r+3) and the denominator (r-3) will always be 6. Therefore, when you divide the numerator by the denominator, your answer will be 2^6, regardless of the value of r.

7 ANSWER: True

8 ANSWER: False

9 ANSWER: x >= 13 and x <= -6. EXPLANATION: Add x^2 to both sides of the equation, and subtract 46 from both sides of the equation, and you get 0 <= x^2 - 7x - 78. Factor, and you get 0 <= (x - 13)(x + 6). The right side of the equation equals 0 when x = 13 or x = -6, and it is greater than 0 when x > 13 or x < -6.

10 ANSWER: 3. EXPLANATION: Begin by adding 5 to both sides of the equation, which yields 6x = 18. Then divide both sides by 6 to get x = 18/6. Finally, convert this improper fraction to the correct form, 3.

11 ANSWER: 4(f-4). EXPLANATION: The problem asks for the product of 4 and e, which is obviously 4e. However, it asks for this sum in terms of f. Since we know that 4 + e = f, then e = f-4, and we can use this equation to substitute for e to get the answer in terms of f.

12 ANSWER: (w + 6)^2 = 6w. EXPLANATION: The sum of w and 6 is simply w + 6. To square it, we must put parentheses around it, because raising a number to a power is higher in the order of operations than adding. In other words, if we wrote w + 6^2, only the 6 would be squared. To finish, we simply write an equals sign (=), and then the product of w and 6, which is simply 6w.

13 ANSWER: 1. EXPLANATION: Because the numerators on both sides of the equals sign are the same, the denominators must also be the same. Therefore, we simply need to solve the equation s+11=12.

14 ANSWER: 6. EXPLANATION: Because the numerators on both sides of the equals sign are the same, the denominators must also be the same. Therefore, we simply need to solve the equation 40-t=17.

15 ANSWER: 25. EXPLANATION: Notice that C (12) goes into the denominator of the fraction exactly 3 times. Therefore, the fraction reduces to 12/3. Add this to the value of B (21) to obtain the answer.