Practice Problems for Algebra
from www.topmath.info

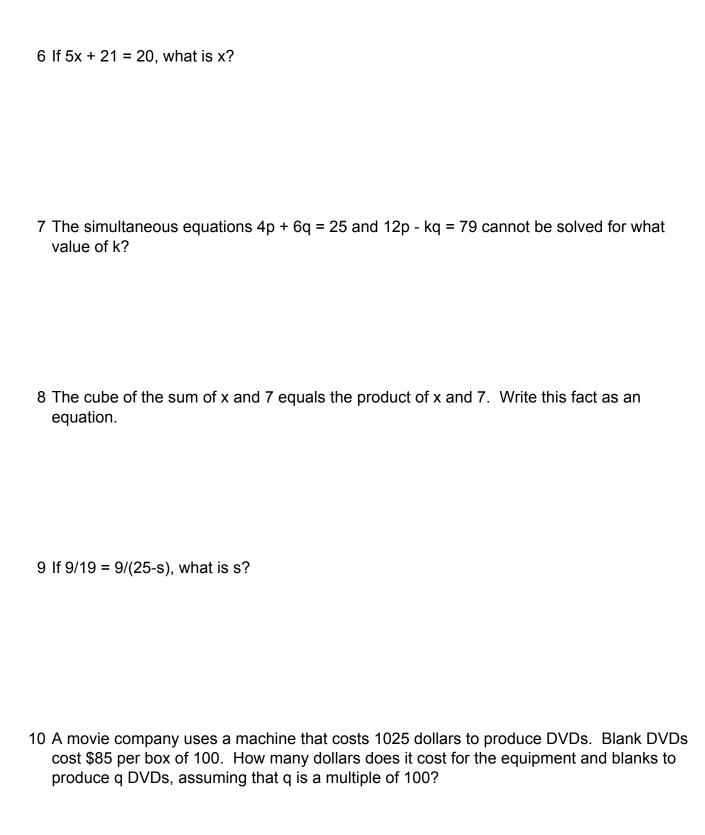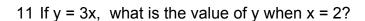1 We define a new operator, @, such that a @ b = a^b ÷ b^a. What is 5 @ 3?

2 (T/F): 5 = 4

3 (T/F): -1 = -2

4 (<, =, or >): Which symbol goes in the space to make the statement -7 ___ -4 true?

5 Find the range(s) for x that satisfy the condition 5 - x^2 >= -7x - 13 ?

6 If 5x + 21 = 20, what is x?

7 The simultaneous equations 4p + 6q = 25 and 12p - kq = 79 cannot be solved for what value of k?

8 The cube of the sum of x and 7 equals the product of x and 7. Write this fact as an equation.

9 If 9/19 = 9/(25-s), what is s?

10 A movie company uses a machine that costs 1025 dollars to produce DVDs. Blank DVDs cost $85 per box of 100. How many dollars does it cost for the equipment and blanks to produce q DVDs, assuming that q is a multiple of 100?

11 If y = 3x, what is the value of y when x = 2?

12 If y = 2x^2 + 9x - 7, what is the value of y when x = 10 ?

13 What is the value of 2s if s = 3w - 7 and w = 8?

14 What is the value of 10r if r = -5s + 9 and s = 3?

15 What is the value of -11s if s = -9w - 2 and w = 2?

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1 ANSWER: 125/243. EXPLANATION: By the definition of the function, 5 @ 3 = 5^3 ÷ 3^5. We know that 5^3=125, and 3^5=243. We then divide to get the answer.

2 ANSWER: False. EXPLANATION: Since 5 is not the same as 4, this is false, because the = symbol means they are the same.

3 ANSWER: False

4 ANSWER: <

5 ANSWER: -2 <= x <= 9. EXPLANATION: Add x^2 to both sides of the equation, and subtract 5 from both sides of the equation, and you get 0 >= x^2 - 7x - 18. Factor, and you get 0 >= (x - 9)(x + 2). The right side of the equation equals 0 when x = 9 or x = -2, and it is less than 0 when x < 9 but x > -2.

6 ANSWER: -1/5. EXPLANATION: Begin by subtracting 21 from both sides of the equation, which yields 5x = -1. Then divide both sides by 5 to get x = -1/5.

7 ANSWER: -18. EXPLANATION: If k = -18, then the left side of the second equation is exactly 3 times the left side of the first equation. However, the right side of the second equation is not 3 times the right side of the first equation, so the two equations have no solution.

8 ANSWER: (x + 7)^3 = 7x. EXPLANATION: The sum of x and 7 is simply x + 7. To cube 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 x + 7^3, only the 7 would be cubed. To finish, we simply write an equals sign (=), and then the product of x and 7, which is simply 7x.

9 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 25-s=19.

10 ANSWER: 1025 + 0.85q. EXPLANATION: The fixed cost is the cost of the equipment. Then for each additional DVD, we add 1/100th of the cost of a box of 100.

11 ANSWER: 6

12 ANSWER: 283

13 ANSWER: 34. EXPLANATION: If s = 3w - 7 and w = 8, then we substitute 8 for w and find that s = 3×8 - 7, or 17. Since the question asks us to find the value of 2s, we simply multiply 2 by 17 to get the answer.

14 ANSWER: -60. EXPLANATION: If r = -5s + 9 and s = 3, then we substitute 3 for s and find that r = -5×3 + 9, or -6. Since the question asks us to find the value of 10r, we simply multiply 10 by -6 to get the answer.

15 ANSWER: 220. EXPLANATION: If s = -9w - 2 and w = 2, then we substitute 2 for w and find that s = -9×2 - 2, or -20. Since the question asks us to find the value of -11s, we simply multiply -11 by -20 to get the answer.