

Practice Problems for Algebra
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1 (<, =, or >): Which symbol goes in the space to make the statement $-4 \underline{\hspace{1cm}} -5$ true?

2 Find the range(s) for x that satisfy the condition $31 - x^2 \geq -5x - 5$?

3 If $9x + 5 = 25$, what is x ?

4 The simultaneous equations $6t + 11u = 23$ and $36t - ku = 142$ cannot be solved for what value of k ?

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

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6 If $10/20 = 10/(27-q)$, what is q ?

7 A movie company uses a machine that costs 825 dollars to produce DVDs. Blank DVDs cost \$57 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?

8 If $y = 6x$, what is the value of y when $x = 4$?

9 If $y = -7x^2 + 10x + 8$, what is the value of y when $x = 5$?

10 What is the value of $6q$ if $q = 8v - 9$ and $v = 8$?

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11 What is the value of $9t$ if $t = -11v + 5$ and $v = 7$?

12 What is the value of $-8p$ if $p = -5q - 4$ and $q = 7$?

13 If $f(x) = 3x$, what is $f(p + q)$?

14 We define a new operator, $@$, such that $a @ b = a^b + b^a$. What is $5 @ 1$?

15 (T/F): $3 > 1$

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1 ANSWER: $>$

2 ANSWER: $-4 \leq x \leq 9$. EXPLANATION: Add x^2 to both sides of the equation, and subtract 31 from both sides of the equation, and you get $0 \geq x^2 - 5x - 36$. Factor, and you get $0 \geq (x - 9)(x + 4)$. The right side of the equation equals 0 when $x = 9$ or $x = -4$, and it is less than 0 when $x < 9$ but $x > -4$.

3 ANSWER: $2 \frac{2}{9}$. EXPLANATION: Begin by subtracting 5 from both sides of the equation, which yields $9x = 20$. Then divide both sides by 9 to get $x = \frac{20}{9}$.

4 ANSWER: -66. EXPLANATION: If $k = -66$, then the left side of the second equation is exactly 6 times the left side of the first equation. However, the right side of the second equation is not 6 times the right side of the first equation, so the two equations have no solution.

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

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6 ANSWER: 7. 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 $27 - q = 20$.

7 ANSWER: $825 + 0.57q$. EXPLANATION: The fixed cost is the cost of the equipment. Then for each additional DVD, we add $1/100$ th of the cost of a box of 100.

8 ANSWER: 24

9 ANSWER: -117

10 ANSWER: 330. EXPLANATION: If $q = 8v - 9$ and $v = 8$, then we substitute 8 for v and find that $q = 8 \times 8 - 9$, or 55. Since the question asks us to find the value of $6q$, we simply multiply 6 by 55 to get the answer.

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11 ANSWER: -648. EXPLANATION: If $t = -11v + 5$ and $v = 7$, then we substitute 7 for v and find that $t = -11 \times 7 + 5$, or -72. Since the question asks us to find the value of $9t$, we simply multiply 9 by -72 to get the answer.

12 ANSWER: 312. EXPLANATION: If $p = -5q - 4$ and $q = 7$, then we substitute 7 for q and find that $p = -5 \times 7 - 4$, or -39. Since the question asks us to find the value of $-8p$, we simply multiply -8 by -39 to get the answer.

13 ANSWER: $3(p + q)$. EXPLANATION: This problem is solved simply by substituting $p + q$ for x .

14 ANSWER: 6. EXPLANATION: By the definition of the function, $5 @ 1 = 5^1 + 1^5$. We know that $5^1=5$, and $1^5=1$. We then add to get the answer.

15 ANSWER: True