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Unit Test
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True/False

Indicate the correct answer by writing "True" or "False." Do not correct the problem if it is false .

Problem 1 The difference of squares says that for any two numbers a and b, $a^2 + b^2 = (a - b)(a + b)$.

Problem 2 We are allowed to add, subtract, multiply, and divide polynomials.

Problem 3 The y-intercept of the function $y = 5x^2 + 7x + 2$ is 8.

Problem 4 The zeros (x-intercepts) of the function $y = 5x^2 + 8x + 2$ are $x = -1$ and $x = \frac{-2}{5}$.

Multiple Choice

Problem 5 Find the proper factorization for the polynomial $21x^2 + 7x - 14$.

(a) $(21x - 1)(x + 14)$
(b) $(3x - 14)(x + 1)$
(c) $(7x + 7)(3x - 2)$
(d) none of the above

Problem 6 Find the zeros (x-intercepts) of the function $f(x) = 13x^2 + 12x - 1$

(a) $(13x - 1)(x + 1)$
(b) $(13x + 1)(x - 1)$
(c) $x(x + 12)$
(d) none of the above

Problem 7 What is the sum of cubes formula?

(a) $a^3 + b^3 = a^3b^3$
(b) $a^3 + b^3 = (a + b)^3$
(c) $a^3 + b^3 = (a + b)(a^2 - ab + b^2)$
(d) $a^3 + b^3 = (a - b)^3$

Question 8 What is the difference of cubes formula?

(a) $a^3 - b^3 = (a - b)^3$
(b) $a^3 - b^3 = (a - b)(a + b)(a - b)$
(c) $a^3 - b^3 = (a - b)(a^2 + ab + b^2)$
(d) $a^3 - b^3 = (a^4 - a^2)(b^4 - b^2)$

Question 9 Use the function $f(x) = x^2 - 25$ to answer the following questions.

(a) Factor the equation to rewrite it in simplest form.

(b) Use the factorization of the function to find the zeros.

(c) Use the zeros (x-intercepts) and the y-intercept of the function to draw a simple graph of the function.

Question 10 Use the functions $f(x) = x^2 + 5x + 4$ and $g(x) = x^2 - 16$ to answer the following questions.

(a) Find the factorization of $f(x)$.

(b) Find the factorization of $g(x)$.

(c) If $h(x) = f(x) + g(x)$, what is $h(x)$?

(d) What is the factorization of $h(x)$? What are the zeros (x-intercepts) of $h(x)$?

Question 11 If the zeros (x-intercepts) of a function are $x = 10$, $x = 2$, and $x = 7$, find a function which satisfies the conditions. Proceed to FOIL the function if necessary.

Question 12 If a function has a zero (x-intercept) at $x = 2$, and a $y - intercept$ at 3

(a) Find a quadratic equation which will satisfy the conditions. Poceed to FOIL the function if necessary.

(b) Find a graph that satisfies the conditions.

Question 13 Use polynomial long division to factor $\frac{x^3+9x^2-22x-120}{x+3}$.

Challenge Problem: Use the Binomial Theorem to rewrite the expression $(x + y)^{13}$.