Name:

Algebra II
PRACTICE Examination 13

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Thursday, January 12, 2022

The examination contains ten problems which are worth 10 points each.

Problem 1. Write the slope-intercept form ($y = mx + b$) of the equation of the line which passes through the points $(4, -2)$ and $(11, 12)$.

Problem 2. Solve the equation $8x - 3 = 5 - 3x$. Correctly write the solution set.

Problem 3. Solve the equation $x^3 - 2x^2 - 9x + 18 = 0$. Correctly write the solution set.

Problem 4. Let $f(x) = \dfrac{x^2 - 2x - 3}{x + 3}$. Find the set of all real numbers $x \in \text{dom}(f)$ such that $f(x) = 5$. That is, solve the equation $f(x) = 5$. Correctly write the solution set..

Problem 5. Let $f(x) = \dfrac{2x - 8}{x - 3}$. Find the domain and range of f..

Problem 6. Let $f(x) = (x + 3)(x - 2)^2(x - 7)$. Write a sign chart for f. Solve the inequality $f(x) \geq 0$. Write your answer in correct interval notation.

Problem 7. Let $f(x) = x^4 - 3x^3 - 23x^2 - 37x + 8$. Find $f(7)$.

Problem 8. Solve the inequality $\dfrac{x^2 - 1}{x} > 0$. Write the solution using correct interval notation.

Problem 9. State the name of the following sets of numbers.
For each of the following numbers, write the number under the smallest set in which it belongs.

Numbers: $5 + 0i$, $\sqrt{37}$, $\sqrt{25/16}$, $-5 + 0i$, $\dfrac{1 + \sqrt{3}i}{2}$

Sets:

(a) $\mathbb{N}$

(b) $\mathbb{Z}$

(c) $\mathbb{Q}$

(d) $\mathbb{R}$

(e) $\mathbb{C}$

Problem 10. Of the sets $\mathbb{N}$, $\mathbb{Z}$, $\mathbb{Q}$, $\mathbb{R}$, and $\mathbb{C}$, state the smallest set which contains all solutions to the given equation.

(a) $x^2 + 3x + 2 = 0$

(b) $x^2 + 3x + 3 = 0$

(c) $2x^2 - 50 = 0$

(d) $2x^2 - 16x + 30 = 0$

(e) $2x^2 + x - 15 = 0$