Algebra II | PRACTICE Exam 7 | Name:
Dr. Paul L. Bailey | Tuesday, January 18, 2022

The exam will contain ten problems worth ten points each. To study, *make sure you can do all of the problems on the previous exams and quizzes*, and in this practice exam.

**Problem 1.** Write the slope-intercept form ($y = mx + b$) of the equation of the line which passes through the points $(-8, 13)$ and $(20, -1)$.

**Problem 2.** Solve the equation $x^3 - 2x^2 + 3x - 6 = 0$. Correctly write the solution set.

**Problem 3.** Let $f(x) = \dfrac{x^2 - 9}{x - 6}$. Solve the equation $f(x) = 1$. Correctly write the solution set.

**Problem 4.** Let $g(x) = x^4 - 3x^3 - 23x^2 - 37x + 8$ and $f(x) = x - 7$. Find the quotient and remainder when $g$ is divided by $f$. (Use synthetic division.)

**Problem 5.** Let $f(x) = \dfrac{7x - 31}{x + 15}$. Find the domain and range of $f$.

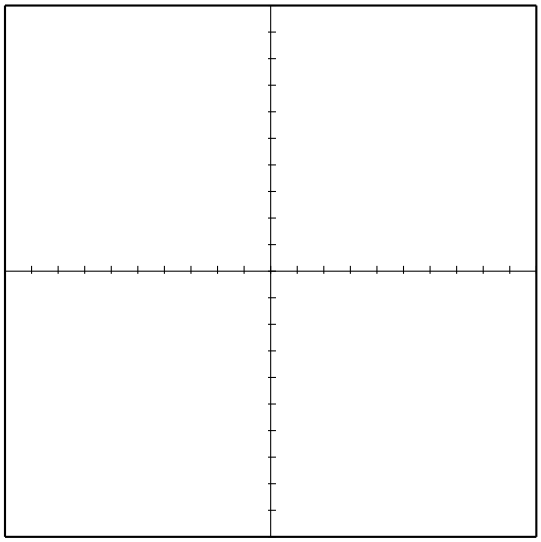
**Problem 6.** Let $f(x) = \sqrt{3x - 8} + 21$. Find the domain and range of $f$.

**Problem 7.** Solve the inequality $|3x - 8| < 21$. Write the solution using correct interval notation.

**Problem 8.** Solve the inequality $x^3 - 2x^2 + 3x - 6 \geq 0$. Write the solution using correct interval notation.

**Problem 9.** 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. For each set, invent an equation whose solutions lie in that set and no smaller set.

**Problem 10.** Consider the rational function $f(x) = \dfrac{2x - 8}{x + 4}$. Find its degree, zeros, and poles. Find its intercepts and asymptotes. Graph the function and label these features.



**Rational Function:** $f(x) = \dfrac{2x - 8}{x + 4}$

**Degree:**

**Zeros:**

**Poles:**

**$y$-intercept:**

**$x$-intercepts:**

**Vertical Asymptotes:**

**Polynomial Asymptote:**

**Problem 11.** Let $A = [2, 8]$, $B = (5, 11)$, and $C = \{1, 3, 5\}$. Write the following sets, using correct set notation.

**(a)** $A \cup B$

**(b)** $A \cap B$

**(c)** $A \setminus B$

**(d)** $B \setminus A$

**(e)** $A \setminus C$