The exam consists of 25 multiple choice questions. Problems generally fall into one of 3 categories – simplify, solve, or identify. The problems below are representative of those on the exam, but the list is not necessarily complete. The wording of the actual problems may vary slightly.

Simplify

- Find \( x + \frac{2}{x} - 3 \) if \( x = \frac{1}{7} \)
- \( \sqrt{81y^6 + 16y^6} = \)
- \( \frac{2a}{3b} + \frac{3a}{2b} = \)
- \( \frac{h + 2}{h^2 - 16} \cdot \frac{3h + 12}{5h + 10} = \)
- \( 32^{1/5} \cdot \left( \frac{1}{16} \right)^{3/4} = \)
- \( \log_2 32 = \)
- Simplify \( |7 - w| \) if \( w > 7 \)
- Rationalize \( \frac{2}{1 - \sqrt{3}} \)
- \( \frac{t^3 + 8}{t + 2} = \)
- \( \sqrt{3} \sqrt[3]{9f^8g^{10}} = \)
- Find \( f(h(x)) \) if \( f(x) = \frac{x + 1}{2 - x} \) and \( h(x) = 3x - 2 \)
- \( \frac{(3 + i)(1 - 2i)}{(2 + i)(2 - i)} = \)

Solve

- \( \frac{3}{x} - 1 = \frac{7}{4} \)
- \( \log_{10} k = 4 \)
- Find \( m \) if \( f(y) = y^2 + 2m + 1 \) and \( f(2) = 3 \).
- Find \( x \) if \( 2a(x + d) = dx - b \)
- \( x^2 + 3x = -9 \)
- \( 3^x = 10 \)
- \( |1 - 3x| < 5 \)
- \( x^2 - 18x < 19 \)
- \( x - 1 + \sqrt{2x} = 0 \)
• Solve the system of equations for $x$ and $y$:

\[
\begin{align*}
  x + 2y &= \frac{7}{2} \\
  3x - 4y &= -\frac{9}{2}
\end{align*}
\]

Identify

• Identify the graph of $y - 7x - 2 = 0$ from a set of 4 choices.
• Identify the graph of $x^2 + y = 4$ from a set of 4 choices.
• Identify the factors of $a^4 - 81$ from a set of 4 choices.
• Identify the region in the $xy$ plane where $x + y < 6$, $1 \leq x \leq 3$ from a set of 4 choices.