Precalculus Self-Assessment Test

Complete the problems below. Do not use a calculator or any assistance (electronic or not). Check your answers here to know whether to enroll in either Math 1A or Math 1B. If you scored 10 or better on this assessment, then you should enroll in Math 1B; for all other scores, you should enroll in Math 1A. Do your best. Good luck.

1) Simplify.

\[
\left(\frac{3uv^3}{w^{-1}}\right)^{-3}(v^{-2}w^7)
\]

Write your answers using only positive exponents.

2) Write the following as an exponential expression.

\[
\sqrt[5]{5^y}
\]

3) Simplify as much as possible.

\[
x\sqrt{12u^6} - u^2\sqrt{48ux^2}
\]

Assume that all variables represent positive real numbers.

4) Add.

\[
\frac{1}{x + 1} + \frac{1}{x + 2}
\]

Simplify your answer as much as possible.

5) Write the expression as a single logarithm.

\[
2(\log_2 y - 3 \log_2 x) + 3 \log_2 z
\]

6) Evaluate the expression when \( a = -6 \).

\[
a^2 - 6a + 4
\]

7) Solve for \( u \).

\[
8u + 20 = 4(u - 4)
\]

Simplify your answer as much as possible.
8) Factor completely.

9y^2 - 2y - 7

9) The length of a rectangle is four times its width. If the area of the rectangle is 100 in^2, find its perimeter.

10) Find an equation for the line below.

11) Find the domain of the function.

\[ u(x) = \sqrt{5 + x} \]

Write your answer using interval notation.

12) Solve the inequality for y.

\[-6y - 16 \geq -52 \]

Simplify your answer as much as possible.

13) The functions \( q \) and \( r \) are defined as follows.

\[ q(x) = x^2 + 6 \]
\[ r(x) = \sqrt{x} + 9 \]

Find the following.

\( (r \circ q)(7) \)
\( (q \circ r)(7) \)
14) Simplify.
\[
\frac{\frac{1}{7x} - 2}{3 + \frac{1}{7x}}
\]

15) Solve for x.
\[
125 = 25^{x+4}
\]

16) Find the exact value of \( \sin \left( -\frac{5\pi}{3} \right) \).

17) Find \( \cos \theta \), where \( \theta \) is the angle shown below.

18) Solve for \( y \).
\[
|2y + 3| = 11
\]

19) Solve for \( w \).
\[
4w^2 + 25 = -20w
\]

20) Rationalize the denominator and simplify.
\[
\frac{5}{6 - 3\sqrt{2}}
\]