Math Placement Sample

Question 1: (1 points)

\[
\frac{2x}{x^2 - 16} - \frac{1}{x - 4} =
\]

☐ \( \frac{2x - 1}{x^2 - 16} \)

☐ \( \frac{1}{x - 4} \)

☐ \( x - 4 \)

☐ \( \frac{2x - 1}{x^2 - x - 12} \)

☐ \( \frac{1}{x + 4} \)

Question 2: (1 points)

\[
\frac{6}{\sqrt{10x}} =
\]

☐ \( \frac{\sqrt{15x}}{5x} \)

☐ \( \frac{3\sqrt{5x}}{5x} \)

☐ \( \frac{3\sqrt{10x}}{5x} \)

☐ \( \frac{\sqrt{5x}}{3} \)

☐ \( \frac{\sqrt{10x}}{6} \)
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Question 3: (1 points)
If \(3x + 2 = 5y + 4\) then \(y =\)

- \(\frac{3x - 2}{5}\)
- \(\frac{5x + 2}{3}\)
- \(\frac{1}{5}\)
- \(-\frac{3x - 2}{5}\)
- \(\frac{3x + 6}{5}\)

Question 4: (1 points)
The positive root of the equation \(x^2 + 10 = 29\) lies between

- 4 and 5
- 9 and 10
- 6 and 7
- 1 and 3
- 5 and 6

Question 5: (1 points)
One of the factors of \(35x^2 - 8x - 3\) is

- \(7x + 1\)
- \(7x - 3\)
- \(7x + 3\)
- \(35x - 1\)
- \(5x - 1\)
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**Question 6: (1 points)**
Graph the equation $-3x - 2y = 6$

**Question 7: (1 points)**
Graph $y = |x - 2|$
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Question 8: (1 points)
If \( f(x) = x^2 - kx - 1 \) and \( f(2) = -5 \), then \( k = \)

- [ ] -5
- [ ] -4
- [ ] 2
- [ ] 4
- [ ] 1

Question 9: (1 points)
\[
\frac{1}{1 + \sqrt{5}} = 
\]

- [ ] \( \frac{1 + \sqrt{5}}{4} \)
- [ ] \( -\frac{1 + \sqrt{5}}{24} \)
- [ ] \( -\frac{1 + \sqrt{5}}{4} \)
- [ ] \( -\frac{1 + \sqrt{5}}{24} \)
- [ ] \( \frac{1 - \sqrt{5}}{4} \)

Question 10: (1 points)
If, for all values of \( x \), \( (x - k)^2 = k^2 + 2x + x^2 \), then \( k = \)

- [ ] -2
- [ ] 1
- [ ] 0
- [ ] 2
- [ ] -1
Question 11: (1 points)
If \( f(x) = x^2 + 1 \) and \( h(x) = 4x + 2 \), then \( f(h(3)) = \)
- 10
- 140
- 42
- 15
- 197

Question 12: (1 points)
The graph of the system of equations \( \begin{cases} x - 2y = 1 \\ 3x + 6y = 3 \end{cases} \) consists of
- two lines intersecting where \( y = 3 \).
- one line.
- two distinct parallel lines.
- two lines intersecting where \( x = 3 \).
- two lines intersecting where \( x = 1 \).

Question 13: (1 points)
If \( \log_{10} x = 3 \), then \( x = \)
- 1,000
- \( \frac{1}{1,000} \)
- 100
- 10
- \( \frac{3}{10} \)
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Question 14: (1 points)
In the figure shown below, if \( \sin(P) = 0.37 \) and \( p = 4 \), then \( q = \)

- \( 4(0.37) \)
- \( \frac{4}{5} \)
- \( \frac{4}{0.37} \)
- 5
- Insufficient information is given to solve this problem.

Question 15: (1 points)
\( \sin(90^\circ - \theta) = \)

- \( \sin(\theta) \)
- \( \cos(\theta) \)
- \( -\sin(\theta) \)
- \( 1 + \cos(\theta) \)
- \( -\cos(\theta) \)

Question 16: (1 points)
For all real numbers \( x \), \( \cos^2(4x) + \sin^2(4x) = \)

- 1
- 0
- \( \sin(8x) \)
- 4
- \( \cos(8x) \)
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Question 17: (1 points)

For which value(s) of x in the interval $0 \leq x \leq 2\pi$ does $(\cos(x) - 1)(\cos(x) - 3) = 0$?

- $\frac{\pi}{2}$

- $\frac{\pi}{2}$ and $\frac{3\pi}{2}$

Question 18: (1 points)

Recall that for the triangle $\triangle ABC$ the law of cosines states that $a^2 = b^2 + c^2 - 2bc \cos(A)$ where $a$ is the length of the side opposite angle $A$, $b$ is the length of the side opposite angle $B$, and $c$ is the length of the side opposite angle $C$.

In the triangle shown in the figure below, what is $\cos(P)$?

Note: The figure shown in the figure below is not drawn to scale.

- $\frac{55}{64}$

- $\frac{5}{8}$

- $\frac{4}{5}$

- $\frac{73}{80}$

- $\frac{23}{40}$
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Question 19: (1 points)
If \( f(x) = -2^x + x^2 \), then \( f(-1) = \)

- 3
- \( \frac{1}{2} \)
- \( -\frac{3}{2} \)
- \( -\frac{1}{2} \)
- \( \frac{3}{2} \)

Question 20: (1 points)
\( \log_5\left(\frac{1}{25}\right) = \)

- 5
- \(-2\)
- 2
- \(-5\)
- \(\frac{1}{2} \)