

**Practice Quiz on Prerequisites
Calculus**

1. Write the equation of the line that goes through (4, -1) and is parallel to $3x + 4y = 12$.

$$y - 1 = -\frac{3}{4}(x - 4)$$

$$y + 1 = -\frac{3}{4}x + 3$$

$$y = -\frac{3}{4}x + 2$$

$$4y = 12 - 3x$$

$$y = 3 - \frac{3}{4}x$$

$$m = -\frac{3}{4}$$

2. Solve for x: $|2x - 4| = 4 - 2x$. Write in interval form.

$$2x - 4 < 0$$

$$2x < 4 \quad x < 2$$

$$(-\infty, 2)$$

3. For which values of x is $|x^2 - 5x + 6| = x^2 - 5x + 6$? Write in interval form.

$$x^2 - 5x + 6 \geq 0$$

$$(x - 2)(x - 3) \geq 0$$

A number line with tick marks at 2 and 3. The region to the left of 2 is marked with a plus sign (+), the region between 2 and 3 is marked with a minus sign (-), and the region to the right of 3 is marked with a plus sign (+). The solution set is indicated as $(-\infty, 2] \cup [3, \infty)$.

4. Find all values of x for which the given expression yields a real number:

$$\sqrt{x^2 + 7x + 12}$$

$$x^2 + 7x + 12 \geq 0$$

$$(x + 4)(x + 3) \geq 0$$

A number line with tick marks at -4 and -3. The region to the left of -4 is marked with a plus sign (+), the region between -4 and -3 is marked with a minus sign (-), and the region to the right of -3 is marked with a plus sign (+). The solution set is indicated as $(-\infty, -4] \cup [-3, \infty)$.

5. Solve the inequality and write in interval form: $x^2 < 25$

$$x^2 - 25 < 0$$

$$(x + 5)(x - 5) < 0$$

A number line with tick marks at -5 and 5. The region between -5 and 5 is marked with a minus sign (-), and the regions to the left of -5 and to the right of 5 are marked with a plus sign (+). The solution set is indicated as $(-5, 5)$.

6. Find the exact values of all six trigonometric functions of θ if $\cot \theta = \frac{2}{5}$, $0 \leq \theta < \frac{\pi}{2}$

$\cot \theta = \frac{\text{adj}}{\text{opp}}$

A right-angled triangle with a horizontal base of length 2, a vertical height of length 5, and a hypotenuse of length $c = \sqrt{29}$. The angle θ is at the bottom-right vertex.

$$c = \sqrt{29} \quad 5^2 + 2^2 = c^2$$

$$25 + 4 = c^2$$

$$c = \sqrt{29}$$

$$\sin \theta = \frac{5}{\sqrt{29}} \quad \csc \theta = \frac{\sqrt{29}}{5}$$

$$\cos \theta = \frac{2}{\sqrt{29}} \quad \sec \theta = \frac{\sqrt{29}}{2}$$

7. Find the value of all six trigonometric functions of θ using the unit circle if:

a) $\theta = -\frac{\pi}{3}$ $-\frac{\pi}{3} + \frac{2\pi}{3}$ $-\frac{\sqrt{3}}{2}$ b) $\theta = \frac{5\pi}{2}$ $\frac{5\pi}{2} - \frac{4\pi}{2} = \frac{\pi}{2}$

$$\sin \theta = -\frac{\sqrt{3}}{2} \quad \csc \theta = -\frac{2}{\sqrt{3}}$$

$$\cos \theta = \frac{1}{2} \quad \sec \theta = 2$$

$$\tan \theta = -\sqrt{3} \quad \cot \theta = -\frac{1}{\sqrt{3}}$$

$$\sin \theta = 1 \quad \csc \theta = 1$$

$$\cos \theta = 0 \quad \sec \theta = \text{undef}$$

$$\tan \theta = \text{undef} \quad \cot \theta = 0$$

Name _____

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8. Write as a piecewise function: $f(x) = x^2 - x - 12$

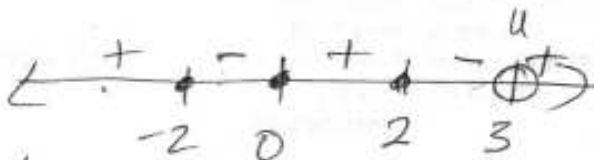
$$f(x) = \begin{cases} x^2 - x - 12, & x^2 - x - 12 \geq 0 \\ -x^2 + x + 12, & x^2 - x - 12 < 0 \end{cases}$$

$$x^2 - x - 12 = (x-4)(x+3)$$

$$f(x) = \begin{cases} x^2 - x - 12, & (-\infty, -3] \cup [4, \infty) \\ -x^2 + x + 12, & (-3, 4) \end{cases}$$

9. Solve and write the solution for x in interval form: $\frac{x^3 - 4x}{x-3} \leq 0$

$$\frac{x(x^2 - 4)}{x-3} \leq 0 \quad \frac{x(x+2)(x-2)}{x-3} \leq 0$$



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$$[-2, 0] \cup [2, 3]$$

Answers for #10 and #11:

10. a) $x^2 - 10x + 23$

b) -6

11. a) $f(x) = \frac{4}{x^2}$

b) $g(x) = x - 6$