



## Math Precalculus Test - *Sample Questions*

You have up to 90 minutes to complete **30 multiple choice questions**.  
Calculators and dictionaries are NOT allowed.

### Sample Questions

- $f(x) = 4x^2 - 7x$ . Find  $\frac{f(a+h) - f(a)}{h}$ .  
A)  $8a + 2h$       B)  $4a + 2h - 7$       C)  $8a + 4h - 7$       D)  $6a + 2h - 7$
- Which one of the following has a graph symmetric with respect to the  $y$ -axis?  
A)  $y = 2|x|$       B)  $x = 4y^2$       C)  $xy = 3$       D)  $(x-2)^2 + (y+1)^2 = 4$
- Find  $(g \circ f)(x)$ , if  $f(x) = 3x - 2$  and  $g(x) = x^2 + x - 1$   
A)  $3x^2 + 3x - 5$       B)  $9x^2 - 11x + 3$   
C)  $3x^2 + 3x - 3$       D)  $9x^2 - 9x + 1$
- Which one of the functions is **neither odd nor even**?  
A)  $f(x) = \sqrt[3]{x}$       B)  $f(x) = 2x^2 + 3$   
C)  $f(x) = |x - 1|$       D)  $f(x) = -x^3 - 2x$
- The domain of the function  $f(x) = \sqrt{4 - 2x}$  is  
A)  $\{x | x \leq 2\}$       B)  $\{x | x > 0\}$       C)  $\{x | x \geq 2\}$       D)  $\{x | x > 2\}$
- An equation of the line through the points  $(3, 2)$  and  $(-6, -1)$  is  
A)  $x + 3y = 3$       B)  $x - 3y = 3$   
C)  $3x - y = -3$       D)  $x - 3y = -3$
- Find the distance between the points  $P(-3, -5)$  and  $Q(1, -3)$ .  
A) 12      B) 8      C)  $4\sqrt{5}$       D)  $2\sqrt{5}$
- Find the equation of the line containing the point  $(6, -6)$  and **parallel** to the line  $2y - x = 10$ .  
A)  $y = -\frac{1}{2}x - 12$       B)  $y = -2x - 6$   
C)  $y = -2x + 6$       D)  $y = \frac{1}{2}x - 9$

9. Which line is perpendicular to  $2x + 6y = 1$ ?  
 A)  $y = -3x + 4$       B)  $2x - 6y = 1$       C)  $6x - 2y = 1$       D)  $2x + 6y = -1$
10. Rationalize the denominator  $\frac{\sqrt{6}}{\sqrt{5} + 8}$ .  
 A)  $\frac{\sqrt{30} + 8\sqrt{6}}{-59}$       B)  $\frac{\sqrt{30} - 8\sqrt{6}}{13}$       C)  $\frac{3\sqrt{30} + 5\sqrt{6}}{40}$       D)  $\frac{\sqrt{30} - 8\sqrt{6}}{-59}$
11. Which quadratic equation has the following solutions?  $3 + \sqrt{2}i$  and  $3 - \sqrt{2}i$   
 A)  $x^2 - 6x + 7 = 0$       B)  $x^2 - 6x + 11 = 0$   
 C)  $x^2 + 6x + 9 = 0$       D)  $x^2 + 6x + 7 = 0$
12. Solve the system  $\begin{matrix} 9x + 9y = 81 \\ -7x + 4y = 36 \end{matrix}$   
 A)  $-1, 10$       B) No solution      C)  $0, 9$       D)  $0, 10$
13. What is the value of  $k$  in the polynomial function  $P(x) = 2x^3 - 3x^2 + kx - 1$ , if  $P(-1) = 4$ ?  
 A)  $-10$       B)  $-4$       C)  $-2$       D)  $6$
14. Find  $(f+g)(x)$  when  $f(x) = x + 6$ , and  $g(x) = x - 1$ .  
 A)  $13$       B)  $-1$       C)  $1$       D)  $11$
15. For  $f(x) = 2x - 5$  and  $g(x) = \sqrt{x + 8}$ , what is the domain of  $g \circ f$ ?  
 A)  $[-\infty, -1.5)$       B)  $[8, \infty)$       C)  $[-1.5, \infty)$       D)  $(-8, 8)$
16. Given  $f(x) = 7x + 2$ , find  $f^{-1}(x)$ .  
 A)  $-7x - 2$       B)  $\frac{x - 2}{7}$       C)  $\frac{x}{7} - 2$       D)  $\frac{1}{7x + 2}$
17. Compute and simplify the difference quotient  $\frac{f(x+h) - f(x)}{h}$ ,  $h \neq 0$  where  $f(x) = \frac{1}{6-x}$ .  
 A)  $\frac{1}{(6-x-h)(6-x)}$       B)  $\frac{x}{(6-x+h)(6-x)}$       C)  $-\frac{6}{(6-x+h)(6-x)}$       D)  $\frac{hx}{(6-x-h)(6-x)}$
18. Solve:  $\log_x 8 = -3$

- A) 2                      B) 512                      C)  $\frac{1}{2}$                       D) -2
19. Solve:  $\log_x(\log_2 8) = 2$   
 A) 3                      B)  $\frac{3}{2}$                       C)  $\sqrt{2}$                       D)  $\sqrt{3}$
20. Solve:  $\log_4(x+6) - \log_4 x = 2$   
 A)  $\frac{2}{33}$                       B) 2                      C)  $\frac{5}{2}$                       D)  $\frac{2}{5}$
21. Solve for  $t$ :  $27^{2t-1} = 81^{t+2}$   
 A) 3                      B) -3                      C)  $-\frac{1}{2}$                       D)  $\frac{11}{2}$
22. Solve the equation  $\sqrt{x+6} + 7 = 9$ .  
 A) 2                      B) -2                      C) -6                      D) 6
23. Solve the inequality  $|13x - 9| < -3$ .  
 A)  $\left(\frac{6}{13}, \frac{12}{13}\right)$                       B)  $\emptyset$                       C)  $(-\infty, \infty)$                       D)  $\left(-\infty, \frac{6}{13}\right) \cup \left(\frac{12}{13}, \infty\right)$
24. Find the inverse of the function  $f(x) = \sqrt[3]{x} + 4$ .  
 A)  $f^{-1}(x) = (x+4)^3$     B)  $f^{-1}(x) = \sqrt[3]{x} - 4$     C)  $f^{-1}(x) = (x-4)^3$     D)  $f^{-1}(x) = x^3 - 4$
25. Solve:  $\log(3x+7) + \log(x-2) = 1$   
 A)  $\frac{8}{3}$                       B) 3                      C) -1                      D)  $\frac{5}{2}$
26. Solve the exponential equation  $3^{(1+2x)} = 27$ .  
 A) 3                      B) -1                      C) 1                      D) 9
27. Find the exact value of  $\cos \frac{9\pi}{4}$ .  
 A)  $-\frac{\sqrt{2}}{2}$                       B)  $\frac{\sqrt{2}}{2}$                       C)  $\frac{1}{2}$                       D)  $-\frac{1}{2}$
28. In a right triangle, if  $t = u \sec V$ , which side is the hypotenuse?  
 A)  $t$                       B)  $u$                       C)  $v$                       D) none of these

29. In which quadrant does  $\theta$  lie if  $\sin \theta < 0$  and  $\cos \theta > 0$ ?  
 A) I                      B) II                      C) III                      D) IV
30. Find the period of  $y = -4 \sin\left(8x + \frac{\pi}{2}\right)$ .  
 A) 8                      B)  $\pi$                       C) 4                      D)  $\frac{\pi}{4}$
31. Find the exact value of  $\cot(-120)$ . Do not use a calculator.  
 A)  $\sqrt{3}$                       B)  $\sqrt{3}/3$                       C)  $-\sqrt{3}/3$                       D)  $-\sqrt{3}$
32. Simplify  $\sin \theta(\sec \theta \tan \theta + \csc \theta + \cot \theta)$ .  
 A)  $\sin^2 \theta - 1 + \cos \theta$     B)  $\sec^2 \theta + \cos \theta$     C)  $\sin \theta + 2 \sec \theta$     D)  $1 + 2 \sin^2 \theta$
33. The graph of  $y = \sin x$  passes through the point:  
 A) (0, 1)                      B)  $(\pi/6, 1/4)$                       C)  $(\pi/2, 1)$                       D)  $(\pi, -1)$
34. What is the period of the function  $y = 4 \sin(\pi x)$ ?  
 A)  $2\pi$                       B)  $4\pi$                       C) 2                      D) 4
35. The amplitude of the function  $y = -4 \sin 3x$  is:  
 A) 1                      B) 3                      C) 4                      D) -4
36. The phase shift of the function  $y = -2 \cos(3x - \pi/2)$  is:  
 A)  $-\pi/6$                       B)  $\pi/2$   
 C)  $\pi/6$                       D)  $-\pi/2$
37. The period and phase shift of the graph of  $y = 2 \sin(x/2 - \pi)$  are:  
 A)  $4\pi$  and  $\pi$                       B)  $4\pi$  and  $2\pi$                       C)  $2\pi$  and  $\pi$                       D)  $\pi$  and  $2\pi$

### ANSWER KEY

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|-------|-------|-------|-------|-------|-------|
| 1. C  | 2. A  | 3. D  | 34. C | 35. C | 36. C |
| 4. C  | 5. A  | 6. D  | 37. B |       |       |
| 7. D  | 8. D  | 9. C  |       |       |       |
| 10. D | 11. B | 12. C |       |       |       |
| 13. A | 14. D | 15. C |       |       |       |
| 16. B | 17. A | 18. C |       |       |       |
| 19. D | 20. D | 21. D |       |       |       |
| 22. B | 23. B | 24. C |       |       |       |
| 25. A | 26. C | 27. B |       |       |       |
| 28. A | 29. D | 30. D |       |       |       |
| 31. B | 32. B | 33. C |       |       |       |