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

1. $f(x) = 4x^2 - 7x$. Find $\dfrac{f(a+h) - f(a)}{h}$.

   A) $8a + 2h$ B) $4a + 2h - 7$ C) $8a + 4h - 7$ D) $6a + 2h - 7$

2. 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) $(x-2)^2 + (y+1)^2 = 4$

3. 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) $9x^2 - 9x + 1$

4. 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) $f(x) = -x^3 - 2x$

5. The domain of the function $f(x) = \sqrt{4 - 2x}$ is

   A) $\{x \mid x \le 2\}$ B) $\{x \mid x > 0\}$ C) $\{x \mid x \ge 2\}$ D) $\{x \mid x > 2\}$

6. 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) $x - 3y = -3$

7. Find the distance between the points $P(-3,-5)$ and $Q(1,-3)$.

   A) 12 B) 8 C) $4\sqrt{5}$ D) $2\sqrt{5}$

8. 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 $\dfrac{\sqrt{6}}{\sqrt{5}+8}$.

A) $\dfrac{\sqrt{30}+8\sqrt{6}}{-59}$ B) $\dfrac{\sqrt{30}-8\sqrt{6}}{13}$ C) $\dfrac{3\sqrt{30}+5\sqrt{6}}{40}$ D) $\dfrac{\sqrt{30}-8\sqrt{6}}{-59}$

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 $\begin{aligned} 9x+9y&=81 \\ -7x+4y&=36 \end{aligned}$

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(3) = 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) $\dfrac{x-2}{7}$ C) $\dfrac{x}{7}-2$ D) $\dfrac{1}{7x+2}$

17. Compute and simplify the difference quotient $\dfrac{f(x+h)-f(x)}{h}$, $h\neq 0$ where $f(x)=\dfrac{1}{6-x}$.

A) $\dfrac{1}{(6-x-h)(6-x)}$ B) $\dfrac{x}{(6-x+h)(6-x)}$ C) $-\dfrac{6}{(6-x+h)(6-x)}$ D) $\dfrac{hx}{(6-x-h)(6-x)}$

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) $\varnothing$ 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 θ lie if sin θ < 0 and cos θ > 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) π 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) (π/6, 1/4) C) (π/2, 1) D) (π, −1)

34. What is the period of the function y = 4 sin (πx)?

A) 2π B) 4π 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 − π/2) is:

A) - π/6 B) π/2
C) π/6 D) - π/2

37. The period and phase shift of the graph of y = 2 sin (x/2 − π) are:

A) 4π and π B) 4π and 2π C) 2π and π D) π and 2π

ANSWER KEY

1. C 2. A 3. D
4. C 5. A 6. D
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
34. C 35. C 36. C
37. B