Precalculus Placement Review

1. Given: $f(x) = \frac{1}{x^3}$, evaluate the following: $f(3)$

   a) Undefined b) $\frac{1}{9}$ c) $\frac{1}{3}$ d) $\frac{1}{27}$ e) none of these

2. Solve the equation: $3^{-2x} = 9$

   a) $x = -1$ b) $x = 3$ c) $x = -2$ d) $x = 1$ e) none of these

3. Given: $f(x) = \frac{1}{x}$, evaluate the following: $\frac{f(x+h)-f(x)}{h}$

   a) $\frac{-1}{x^2+xh}$ b) $\frac{1}{xh}$ c) $3x^2 + 3xh + h^2$ d) $3x^2 + h$ e) none of these

4. Solve the equation: $log_3((x+1)^2) = 0$

   a) No solutions b) $x = \{-2, 0\}$ c) $x = \{-1\}$ d) $x = \{0, 2\}$ e) none of these

5. Determine the **minimum value** of the function: $y = x^2 - 8x$

   a) $y = 8$ b) $y = 0$ c) $y = -16$ d) No minimum value e) none of these

6. Solve the system: $\begin{cases} y = 4 - x^2 \\ y = x^2 \end{cases}$

   a) $(1, 1)$ b) $(2, 4)$ c) $(\pm\sqrt{2}, 2)$ d) $(-2, 0)$ e) none of these

7. Given: $f(x) = x^3$, evaluate the following: $f\left(\frac{1}{a}\right)$

   a) Undefined b) a^3 c) 3^a d) $\frac{1}{a}$ e) none of these

8. Determine the **domain** of the function: $f(x) = |log_3 2x|$

   a) All real numbers b) All reals, $x > 0$ c) All reals, $x < 2$ d) All reals, $x > \frac{1}{2}$ e) none of these

9. Solve the equation: $e^{-3x} = e$

   a) $x = -\frac{1}{3}$ b) $x = 1$ c) $x = -\frac{e}{3}$ d) $x = 0$ e) none of these

10. Solve the system: $\begin{cases} 3x + y = 1 \\ 6x - 2y = 10 \end{cases}$

    a) No solutions b) $(-1, 1)$ c) $(0, 1)$ d) $(1, -2)$ e) none of these

11. Solve the equation: $log_2(x+3) + log_2(x+2) = 1$

    a) $x = \{-4, -1\}$ b) $x = \{-1, 4\}$ c) $x = \{-1\}$ d) $x = \{1, 4\}$ e) none of these

12. The function: $f(x) = (x-3)^2 + 3$ is decreasing on the interval:

    a) $1 < x < 3$ b) All reals, $x > 3$ c) $0 < x < 2$ d) All reals, $x < 3$ e) none of these

13. Solve the system: $\begin{cases} y = x^{\frac{3}{2}} \\ x^{\frac{1}{2}} = y \end{cases}$

    a) $(1, 1)$ b) $(4, 2)$ c) $(4, 8)$ d) $\left(\frac{1}{2}, \frac{3}{2}\right)$ e) none of these

14. Determine the **domain** of the function: $f(x) = \sqrt{x^2 - 4}$

a) All real numbers b) All reals, $x \neq \pm 2$ c) All reals, $x < 2$ d) All reals, $x > 0$ e) none of these

15. Given: $f(x) = \frac{x}{2} - 5$, evaluate the inverse function: $y = f^{-1}(x)$

a) $y = 2x - 5$ b) $y = 2x + 10$ c) $y = x - 2$ d) $y = 10x + 5$ e) none of these

16. Determine the **maximum value** of the function: $y = 5 - |x - 1|$

a) $y = 5$ b) $y = 4$ c) $y = -1$ d) No maximum value e) none of these

17. Solve the equation: $2log_4(x + 2) = 1$

a) No solutions b) $x = \{0,4\}$ c) $x = \{3\}$ d) $x = \{0\}$ e) none of these

18. Determine the **range** of the function: $f(x) = (x + 5)^2 - 5$

a) All real numbers b) All reals, $y > 5$ c) $-5 < y < 5$ d) All reals, $y \neq -5$ e) none of these

19. Determine the ***y*-intercept** of the graph: $y = e^{1-x} - 2$

a) No y-intercept b) $y = e^{-2}$ c) $y = e - 2$ d) $y = -2$ e) none of these

20. Determine the ***x*-intercept** of the graph: $y = e^{1-x} - 2$

a) No x-intercept b) $x = e^{-2}$ c) $x = \ln 2$ d) $x = 1 - \ln 2$ e) none of these

21. Solve the equation: $log_2(x - 1) - log_2(x + 1) = 2$

a) No solutions b) $x = \frac{4}{3}$ c) $x = -\frac{5}{3}$ d) $x = 2$ e) none of these

22. Solve the equation: $\left(\frac{1}{16}\right)^3 = 2^{-(2x+4)}$

a) $x = 4$ b) $x = -2$ c) $x = 8$ d) $x = 0$ e) none of these

23. Solve the equation: $2^{1-3x} = -4$

a) $x = -\frac{1}{3}$ b) $x = -1$ c) $x = 2$ d) $x = log_2\left(\frac{4}{3}\right)$ e) none of these

24. Solve the equation: $log_6(x + 5) = 2$

a) No solutions b) $x = \{7\}$ c) $x = \{31\}$ d) $x = \{-7\}$ e) none of these

25. The function: $f(x) = x^2 - 10x + 26$ is increasing on the interval:

a) $1 < x < 5$ b) All reals, $x > 5$ c) $-5 < x < 5$ d) All reals, $x < -5$ e) none of these

26. Given: $f(x) = x^3 - 1$, evaluate the inverse function: $y = f^{-1}(x)$

a) $y = 3x + 3$ b) $y = \frac{1}{(x+1)^3}$ c) $y = \sqrt[3]{x + 1}$ d) $y = \frac{3}{x+1}$ e) none of these