

10. If $f(x) = \sqrt{x^2 - 9}$, then $f(4)$ is

- (1) imaginary (3) real and irrational
 (2) undefined (4) real and rational

$$\sqrt{4^2 - 9} = \sqrt{16 - 9} = \sqrt{7}$$

11. If $f(x) = x^3 - 2x$, find $f(-2)$.

$$f(-2) = (-2)^3 - 2(-2) = -8 + 4 = -4$$

12. If $f(x) = x^2 + 2$, what is the value of $f(3i)$?

- (1) 8 (3) 11
 (2) -7 (4) -4

$$f(3i) = (3i)^2 + 2 = 9(-1) + 2 = -9 + 2 = -7$$

13. If $f(x) = (x^0 + x^{\frac{1}{2}})^{-2}$, find $f(9)$.

$$(9^0 + 9^{\frac{1}{2}})^{-2} = (1 + \sqrt{9})^{-2} = (1 + 3)^{-2} = 4^{-2} = \frac{1}{4^2} = \frac{1}{16}$$

14. If $f(x) = x - 3$ and $g(x) = x^3$, then $f(g(3))$ is

$$g(3) = 3^3 = 27$$

$$f(27) = 27 - 3 = 24$$

15. If $f(x) = 2x^2 + 4$ and $g(x) = x - 3$, which number satisfies

$$f(x) = (f \circ g)(x)?$$

put $g(x) \rightarrow f(x)$

$$f \circ g(x) = 2(x-3)^2 + 4$$

$$2(x-3)(x-3) + 4$$

$$2(x^2 - 6x + 9) + 4 = 2x^2 - 12x + 18 + 4$$

$$f \circ g(x) = 2x^2 - 12x + 22$$

$$f \circ g(x) = 2(x^2 + 6x + 11)$$

16. Solve for x : $81^x = 9^{x+1}$

$$81^x = 9^{x+1}$$

$$9^{2x} = 9^{x+1}$$

$$\frac{2x}{-x} = \frac{x+1}{-x}$$

$$x = 1$$

$$x = 1$$

17. Find the value of $16^{\frac{3}{4}}$.

$$16^{\frac{3}{4}} = (\sqrt[4]{16})^3 = 2^3 = 8$$

18. Evaluate $a^{-\frac{2}{3}}$ where $a = 27$.

$$27^{-\frac{2}{3}} = \frac{1}{27^{\frac{2}{3}}} = \frac{1}{(\sqrt[3]{27})^2} = \frac{1}{9} = \frac{1}{3^2}$$

19. Evaluate: $4^0 - 8^{\frac{2}{3}} + 9^{\frac{1}{2}}$

$$1 - (\sqrt[3]{8})^2 + (\sqrt{9})^1$$

$$1 - 2^2 + 3 = 1 - 4 + 3 = 0$$

20. Find the value of $x^{-\frac{3}{2}}$ if $x = 16$.

$$16^{-\frac{3}{2}} = \frac{1}{(\sqrt{16})^3} = \frac{1}{4^3} = \frac{1}{64}$$

21. The population of Henderson City was 3,381,000 in 1994, and is growing at an annual rate of 1.8%. If this growth rate continues, what will the approximate population of Henderson City be in the year 2000?

$y = ab$

$3,381,000(1.018)^6$

$3,381,000(1.113) = 3,762,979.38$

(growth $1 + \text{rate}$
 decay $1 - \text{rate}$)