

1. The common ratio in a geometric sequence is $\frac{5}{3}$, and the fourth term is $\frac{7}{3}$. Find the third term.
- 2
 - $\frac{5}{7}$
 - $\frac{14}{5}$
 - $\frac{2}{5}$
 - $\frac{7}{5}$
2. Find all solutions of the equation $z + 2 + \frac{17}{z} = 0$.
- $z = -4 + 16i, z = -4 - 16i$
 - No solutions
 - $z = 4 + 2i, z = 4 - 2i$
 - $z = -1 + 4i, z = -1 - 4i$
 - $z = 1, z = -1$
3. Find the polynomial $P(x)$ of degree 2 with integer coefficients and zeros $2 - i$ and $2 + i$.
- $x^2 + 4x - 4$
 - $x^2 - 4x + 5$
 - $x^2 + 2x + 5$
 - $x^2 + 2x - 4$
 - $x^2 - 2x + 4$
4. Determine the correct equation for the line passing through the point $(1, 11)$ and the point $(15, 8)$.
- $14y - 3x + 157 = 0$
 - $14y + 3x + 157 = 0$
 - $14y + 3x - 157 = 0$
 - $14y - 3x - 157 = 0$
 - $11y - 15x - 8 = 0$
5. Use $f(x) = 2x - 9$ and $g(x) = 10 - x^2$ to evaluate $f(g(1))$.
- 2
 - 9
 - 39
 - 23
 - 18
6. Find the inverse function of $f(x) = (1 - x^3)^{\frac{1}{5}}$.
- $f^{-1}(x) = (1 - x^5)^3$
 - $f^{-1}(x) = \sqrt[3]{(1 - x^5)}$
 - $f^{-1}(x) = \sqrt[3]{(1 - x^{\frac{1}{5}})}$
 - $f^{-1}(x) = 1 - x^{\frac{5}{3}}$
 - $f^{-1}(x) = \frac{1}{(1 - x^3)^{\frac{1}{5}}}$
7. Express the equation $e^{x+6} = 0.1$ in logarithmic form.
- $x = 0.1 + \ln 6$
 - $x = -6 + \ln 0.1$
 - $x = 6 + \ln 0.1$
 - $x = 0.1 - \ln 6$
 - $x = 6 \ln 0.1$
8. Find all the real zeros of the polynomial $P(x) = x^3 + 9x^2 + 7x - 1$.
- $x = -4, x = -1 \pm \sqrt{17}$
 - $x = -4, x = -4 \pm \sqrt{17}$
 - $x = 1, x = -1 \pm \sqrt{17}$
 - $x = -1, x = 1 \pm \sqrt{17}$
 - $x = -1, x = -4 \pm \sqrt{17}$
9. For the function $f(x) = 4x^3$, find $\frac{f(a+h) - f(a)}{h}$.
- $4a^3 + 12ah + 12h^2$
 - $12a^2 - 12ah + 4h^2$
 - $12a^2 + 4ah + 12h^2$
 - $12a^2 + 12ah + 4h^2$
 - $8a^3 + 12ah - 4h^2$
10. Use the Laws of Logarithms to rewrite the expression $\log\left(\frac{x}{9}\right)$.
- $\frac{\log x}{\log 9}$
 - $(\log x)(\log 9)$
 - $\frac{\log x}{9}$
 - $\log x - \log 9$
 - $\log x + \log 9$

11. The fox population in a certain region has a relative growth rate of 7% per year. It is estimated that the population in 1996 was 14000. Find a function $n(t)$ that models the population t years after 1996.
- $n(t) = 14000e^{-0.07t} + 1996$
 - $n(t) = 14000e^t$
 - $n(t) = 14000e^{7t}$
 - $n(t) = 14000e^{0.07t}$
 - $n(t) = 14000 + e^{7t}$
12. Rewrite the expression $\log 32 + \frac{1}{2} \log 2 - \log 8$ as a single logarithm.
- $\log \frac{1}{4} \sqrt{2}$
 - $\log 4\sqrt{2}$
 - $\ln 2\sqrt{4}$
 - $\log \frac{1}{2} \sqrt{4}$
 - $\log 8$
13. Solve $2|x + 8| + 9 > 6$.
- $[6, \infty)$
 - $(-\infty, -3) \cup (3, \infty)$
 - $(-\infty, \infty)$
 - $(-\infty, -15) \cup (15, \infty)$
 - \emptyset
14. Find the vertical asymptote of the rational function $r(x) = \frac{x^2 + 6}{x - 9}$.
- $x = -9$
 - $x = -6$
 - $x = 6$
 - $x = 9$
 - $x = 18$
15. Find the point on the y -axis that is equidistant from the points $(1, -8)$ and $(7, 0)$.
- $(0, 4)$
 - $(-1, 0)$
 - $(0, 0)$
 - $(0, -3)$
 - $(0, -1)$
16. The 15th term of an arithmetic sequence is 11 and the second term is $\frac{5}{4}$. Find the first term.
- 2
 - 1.25
 - 0.25
 - 1
 - 0.5
17. Solve the equation $\sqrt{3}x + \sqrt{3} = \frac{2x + 1}{\sqrt{3}}$.
- 3
 - 3
 - 2
 - 3
 - 2
18. Find the third term of the recursively defined sequence $a_n = 6(a_{n-1} - 6)$ and $a_1 = 8$.
- 38
 - 6
 - 12
 - 36
 - 48
19. Indicate all x - and y -intercepts on the graph of the function $y = x^3 - 27$.
- x -intercept 3, y -intercept 27
 - x -intercept 3, y -intercept -3
 - x -intercept 27, y -intercept 3
 - x -intercept 27, y -intercept -3
 - x -intercept 3, y -intercept -27
20. Test the equation $y = 9x^3 + 2x$ for symmetry.
- The symmetry is around the point $(2, 2)$
 - The symmetry is around the x -axis.
 - The symmetry is around the y -axis.
 - The symmetry is around the origin.
 - There is no symmetry.

21. In a triangle ABC , $B = 120^\circ$, $C = 30^\circ$ and $b = 20$ inches. Find the length of the side c .
- 20 inches
 - $\frac{20}{\sqrt{3}}$ inches
 - $20\sqrt{3}$ inches
 - $20\sqrt{2}$ inches
 - 30 inches
22. Use the law of cosines to find a true statement from the list below, if $B = 90^\circ$.
- $b^2 = a^2 + c^2 + ac$
 - $b^2 = a^2 + c^2 + ac\sqrt{2}$
 - $b^2 = a^2 + c^2$
 - $b^2 = a^2 + c^2 - ac$
 - $b^2 = a^2 + c^2 - ac\sqrt{2}$
23. Find the remaining sides of a $30^\circ - 60^\circ - 90^\circ$ triangle if the longest side is 8.
- $\frac{5}{2}, \frac{5\sqrt{3}}{2}$
 - $3, 3\sqrt{3}$
 - $\frac{7}{2}, \frac{7\sqrt{3}}{2}$
 - $5, 5\sqrt{3}$
 - $4, 4\sqrt{3}$
24. Simplify $\csc \theta - \sin \theta \cot^2 \theta$.
- $\sin \theta$
 - $\tan \theta$
 - $\cot \theta$
 - $2 \cos \theta$
 - $\sin \theta \cos \theta$
25. Simplify $\sin^2 45^\circ - 20 \sin 45^\circ \cos 45^\circ + \cos^2 45^\circ$.
- 9
 - $20 - \sqrt{3}$
 - 12
 - 20
 - 1
26. Evaluate $\sin^{-1}\left(-\frac{1}{2}\right)$.
- $\frac{\pi}{2}$
 - $-\frac{\pi}{6}$
 - $\frac{\pi}{3}$
 - $\frac{\pi}{6}$
 - 0
27. If $\cos A = \frac{1}{\sqrt{10}}$ with A in quadrant IV, find $\cot 2A$.
- $-\frac{3}{4}$
 - $\frac{4}{3}$
 - $-\frac{2}{3}$
 - $\frac{4}{6}$
 - $\frac{8}{9}$
28. Solve $\cos x - 2 \sin x \cos x = 0$ if $0 \leq x < 2\pi$.
- $\frac{\pi}{2}, \frac{3\pi}{2}, \frac{\pi}{3}, \frac{5\pi}{3}$
 - $0, \pi, \frac{\pi}{3}, \frac{5\pi}{3}$
 - $0, \pi, \frac{\pi}{6}, \frac{5\pi}{6}$
 - $\frac{\pi}{2}, \frac{3\pi}{2}, \frac{\pi}{6}, \frac{5\pi}{6}$
 - $0, \pi, \frac{2\pi}{3}, \frac{4\pi}{3}$
29. Write the equation $r = 6 \cos \theta$ in rectangular coordinates.
- $x^2 + y^2 = 5x$
 - $x^2 + y = 6x$
 - $x^2 - y^2 = 5x$
 - $x^2 + y^2 = 6x$
 - $x^2 - y^2 = 6x$

30. Evaluate $(\cos 15^\circ + i \sin 15^\circ)^9$ by using DeMoivre's theorem.

a) $1 - i$

b) $-\frac{\sqrt{2}}{2} + i\frac{\sqrt{2}}{2}$

c) $-\frac{1}{2} + i\frac{\sqrt{2}}{2}$

d) $-\frac{\sqrt{2}}{2} - i\frac{\sqrt{2}}{2}$

e) $-\frac{1}{2} - i\frac{1}{2}$

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ITEM NO.	FORM:	A
1		E
2		D
3		B
4		C
5		B
6		B
7		B
8		E
9		D
10		D
11		D
12		B
13		C
14		D
15		E
16		E
17		E
18		D
19		E
20		D
21		B
22		C
23		E
24		A
25		A
26		B
27		B
28		D
29		D
30		B