

1. Solve the equation $\sqrt{6}x + \sqrt{24} = \frac{5x + 10}{\sqrt{6}}$.
- 2
 - 24
 - 12
 - 2
 - 24
2. Find all solutions of the equation $z + 4 + \frac{20}{z} = 0$.
- $-4 + 3i, -4 - 3i$
 - 2, 2
 - $-8 + 16i, -8 - 16i$
 - $-2 + 4i, -2 - 4i$
 - $4 + 3i, 4 - 3i$
3. Solve the inequality $9|x + 4| + 9 > 2$.
- $(-\infty, -11) \cup (11, \infty)$
 - $(-\infty, -7) \cup (7, \infty)$
 - $(-\infty, \infty)$
 - $[2, \infty)$
 - $(2, 9)$
4. Find a point on the y -axis that is equidistant from the points $(1, -9)$ and $(8, 0)$.
- $(0, 5)$
 - $(0, 0)$
 - $(0, -3)$
 - $(0, -1)$
 - $(-1, 0)$
5. Test the equation $y = 7x^3 + 5x$ for symmetry.
- The symmetry is around the x -axis.
 - The symmetry is around the y -axis.
 - The symmetry is around the point $(5, 5)$.
 - The symmetry is around the origin.
 - There is no symmetry.
6. Determine the correct equation for the line passing through the points $(2, 19)$ and $(11, 5)$.
- $9y + 14x + 199 = 0$
 - $9y - 14x + 199 = 0$
 - $9y - 14x - 199 = 0$
 - $9y + 14x - 199 = 0$
 - $14y - 13x - 24 = 0$
7. For the function $f(x) = 4x^3$, find $\frac{f(a+h) - f(a)}{h}$.
- $12a^2 + 4ah + 12h^2$
 - $12a^2 + 12ah + 4h^2$
 - $12a^2 - 12ah + 4h^2$
 - $8a^3 + 12ah - 4h^2$
 - $4a^3 + 12ah + 12h^2$
8. Use $f(x) = 2x - 10$ and $g(x) = 1 - x^2$ to evaluate $f(g(5))$.
- 1
 - 10
 - 24
 - 48
 - 58
9. Find the inverse function of $f(x) = (6 - x^3)^{\frac{1}{5}}$.
- $f^{-1}(x) = \sqrt[3]{(6 - x^{\frac{1}{5}})}$
 - $f^{-1}(x) = (6 - x^5)^3$
 - $f^{-1}(x) = \sqrt[3]{(6 - x^5)}$
 - $f^{-1}(x) = 6 - x^{\frac{5}{3}}$
 - $f^{-1}(x) = \frac{1}{(6 - x^3)^{\frac{1}{5}}}$
10. Indicate all x - and y -intercepts on the graph of the function $y = x^3 - 64$.
- x -intercept 64, y -intercept -4
 - x -intercept 4, y -intercept -64
 - x -intercept 4, y -intercept 64
 - x -intercept 4, y -intercept -4
 - x -intercept 64, y -intercept 4

11. Find all the real zeros of the polynomial $P(x) = x^3 + 10x^2 + 15x - 54$.
- $-2, -2 \pm \sqrt{13}$
 - $-6, -2 \pm \sqrt{13}$
 - $6, -6 \pm \sqrt{13}$
 - $-6, 6 \pm \sqrt{13}$
 - $-2, -6 \pm \sqrt{13}$
12. Find the polynomial $P(x)$ of degree 2 with integer coefficients and zeros $5 - i$ and $5 + i$.
- $x^2 + 5x + 26$
 - $x^2 - 5x + 25$
 - $x^3 + 5x - 10$
 - $x^2 - 10x + 26$
 - $x^2 + 10x - 25$
13. Find the vertical asymptote of the rational function $r(x) = \frac{x^2 + 6}{x - 1}$.
- $x = -6$
 - $x = -1$
 - $x = 1$
 - $x = 6$
 - $x = 2$
14. Express the equation $e^{x-7} = 0.4$ in logarithmic form.
- $x = 7 + \ln 0.4$
 - $x = -7 + \ln 0.4$
 - $x = 0.4 + \ln 7$
 - $x = 0.4 - \ln 7$
 - $x = 7 - \ln 0.4$
15. Use the Laws of Logarithms to rewrite the expression $\log_7 \left(\frac{x}{6} \right)$.
- $\log_7 x - \log_7 6$
 - $(\log_7 x)(\log_7 6)$
 - $\log_7 x + \log_7 6$
 - $\frac{\log_7 x}{\log_7 6}$
 - $\frac{\log_7 x}{6}$
16. Rewrite the expression $\log 12 + \frac{1}{2} \log 5 - \log 2$ as a single logarithm.
- $\log 6\sqrt{5}$
 - $\ln 5\sqrt{6}$
 - $\log 30$
 - $\log \frac{\sqrt{5}}{6}$
 - $\log \frac{\sqrt{6}}{5}$
17. The fox population in a certain region has a relative growth rate of 8% per year. It is estimated that the population in 1997 was 18000. Find a function $n(t)$ that models the population t years after 1997.
- $n(t) = 18000e^t$
 - $n(t) = 18000e^{8t}$
 - $n(t) = 18000e^{-0.08t} + 1997$
 - $n(t) = 18000 + e^{8t}$
 - $n(t) = 18000e^{0.08t}$
18. Find the third term of the recursively defined sequence $a_n = 9(a_{n-1} - 9)$ and $a_1 = 11$.
- $a_3 = 99$
 - $a_3 = 9$
 - $a_3 = 18$
 - $a_3 = 81$
 - $a_3 = 83$
19. The 10th term of an arithmetic sequence is $\frac{21}{4}$ and the second term is $\frac{5}{4}$. Find the first term.
- $\frac{1}{4}$
 - 1
 - $\frac{5}{4}$
 - 3
 - $\frac{3}{4}$

20. The common ratio in a geometric sequence is $\frac{9}{4}$, and the fourth term is $\frac{5}{4}$. Find the third term.
- $\frac{5}{9}$
 - $\frac{10}{9}$
 - $\frac{9}{5}$
 - $-\frac{4}{9}$
 - 1
21. In a triangle ABC , $B = 120^\circ$, $C = 30^\circ$ and $b = 7\sqrt{3}$ inches. Find the length of the side c .
- 10 inches
 - 5 inches
 - 3 inches
 - 8 inches
 - 7 inches
22. Use the law of cosines to find a true statement from the list below, if $C = 120^\circ$.
- $c^2 = a^2 + b^2 + ab\sqrt{3}$
 - $c^2 = a^2 + b^2$
 - $c^2 = a^2 + b^2 - ab\sqrt{3}$
 - $c^2 = a^2 + b^2 - ab$
 - $c^2 = a^2 + b^2 + ab$
23. Find the remaining sides of a $30^\circ - 60^\circ - 90^\circ$ triangle if the longest side is 5.
- $5, 5\sqrt{3}$
 - $2, 2\sqrt{3}$
 - $\frac{7}{2}, \frac{7\sqrt{3}}{2}$
 - $\frac{5}{2}, \frac{5\sqrt{3}}{2}$
 - $\frac{9}{2}, \frac{9\sqrt{3}}{2}$
24. Simplify $\csc \theta - \sin \theta \cot^2 \theta$.
- $\sin \theta$
 - $2 \sin \theta$
 - $\tan \theta$
 - $\cot \theta$
 - $\cos \theta$
25. Simplify $\sin^2 30^\circ - 16 \sin 30^\circ \cos 30^\circ + \cos^2 30^\circ$.
- 3
 - $1 - 5\sqrt{3}$
 - $1 - 5\sqrt{2}$
 - $1 - 4\sqrt{3}$
 - 12
26. Evaluate $\sin^{-1}\left(\frac{1}{2}\right)$.
- $-\frac{\pi}{2}$
 - $\frac{\pi}{2}$
 - $\frac{\pi}{6}$
 - $-\frac{\pi}{6}$
 - $-\frac{\pi}{3}$
27. If $\cos A = -\frac{2}{\sqrt{13}}$ with A in quadrant II, find $\cot 2A$.
- $\frac{5}{18}$
 - $\frac{5}{12}$
 - $\frac{5}{36}$
 - $-\frac{5}{6}$
 - $-\frac{12}{5}$

28. Solve $\sin x + 2 \sin x \cos x = 0$ if $0 \leq x < 2\pi$.

- a) $\frac{\pi}{2}, \frac{3\pi}{2}, \frac{2\pi}{3}, \frac{4\pi}{3}$
- b) $\frac{\pi}{2}, \frac{3\pi}{2}, \frac{7\pi}{6}, \frac{11\pi}{6}$
- c) $\frac{\pi}{2}, \frac{3\pi}{2}, \frac{\pi}{6}, \frac{5\pi}{6}$
- d) $0, \pi, \frac{2\pi}{3}, \frac{4\pi}{3}$
- e) $0, \pi, \frac{7\pi}{6}, \frac{11\pi}{6}$

29. Write the equation $r = 4 \cos \theta$ in rectangular coordinates.

- a) $x^2 - y^2 = 4x$
- b) $x^2 + y^2 = 3x$
- c) $x^2 - y^2 = 3x$
- d) $x^2 + y = 4x$
- e) $x^2 + y^2 = 4x$

30. Evaluate $(\cos 21^\circ + i \sin 21^\circ)^{10}$ by using DeMoivre's theorem.

- a) $-\frac{\sqrt{3}}{2} + \frac{i}{2}$
- b) $-\frac{\sqrt{2}}{2} + \frac{i\sqrt{3}}{2}$
- c) $-\frac{\sqrt{2}}{2} - \frac{i\sqrt{3}}{2}$
- d) $1 - i$
- e) $-\frac{\sqrt{3}}{2} - \frac{i}{2}$

FALL 06 MATH 041 FINAL

ITEM NO. FORM: A

1	A
2	D
3	C
4	D
5	D
6	D
7	B
8	E
9	C
10	B
11	B
12	D
13	C
14	A
15	A
16	A
17	E
18	D
19	E
20	A
21	E
22	E
23	D
24	A
25	D
26	C
27	B
28	D
29	E
30	E