

AICE Mathematics - SUMMER ASSIGNMENT:

1st

1. Find the values of k if $kx^2 - 5x + 7 = 0$ has no roots.
2. Find the coordinates of the points of intersection of $x + y = 7$ and $x^2 + y^2 = 25$.
3. Solve $\sqrt{t}(\sqrt{t} - 6) = -9$.
4. Find the vertex, axis of symmetry, domain, and range of $y = 4x^2 - 12x + 3$.
5. Simplify $\frac{14}{\sqrt{2}} + \sqrt{98}$ giving the answer in terms of $k\sqrt{2}$.
6. Expand $\log\left(\frac{x^2y}{z^3}\right)$.

7. Express $(\log 3\sqrt{10} - \frac{1}{3}\log(\frac{8}{10}) - \log\frac{10}{3})$ in the form $c + \log d$ where c and d are rational numbers and the logarithms are base 10.

8. If $f(x) = x^2 - x - 6$ and $g(x) = 2x + 1$, find:

a. $f(g(x))$

b. $g(g(x))$

c. $f(g(f(-1)))$

9. Graph:

a. $y = -\ln x$

d. $y = e^{2x} - 1$

b. $y = 2 \cos\left(\frac{1}{2}x\right) - 4$

e. $y = 2|2x - 1|$

c. $y = \frac{1}{2}\sqrt{4x - 3} + 1$

10. Using the unit circle, find the following values:

a. $\sin 240^\circ =$ _____

b. $\cos 30^\circ =$ _____

c. $\tan(\pi/4) =$ _____

d. $\csc(2\pi/3) =$ _____

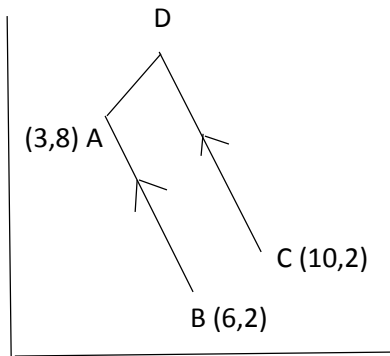
11. Within the interval $0^\circ \leq x \leq 360^\circ$, find the following values:

- a. $\cos^{-1}\left(\frac{1}{2}\right) =$ _____
- b. $\sin^{-1}\left(\frac{\sqrt{3}}{2}\right) =$ _____
- c. $\csc^{-1}(2) =$ _____

12. Within the interval $0 \leq x \leq 2\pi$, find the following values:

- a. $\sin^{-1}\left(\frac{\sqrt{3}}{2}\right) =$ _____
- b. $\cos^{-1}\left(-\frac{1}{2}\right) =$ _____
- c. $\cot^{-1}(\sqrt{3}) =$ _____

13. AB is parallel to DC. DA is perpendicular to AB. Calculate the coordinates of D.



14. Solve:

- a. $x^{\frac{3}{2}} = 8$
- b. $8^z = 2$
- c. $\frac{1}{8^z} = 128$

d. $\frac{9^y}{27^{2y+1}} = 81$

15. Give the vertex and the axis of symmetry of $y = (x + 8)^2 + 7$.

16. Find the least or greatest value of $2x^2 - 5x + 2$.

17. Give the range of $y = 2x^2 - 6x + 1$.

18. Show the whole curve lies above the x-axis for $y = x^2 - 3x + 4$.

19. Find the values of k if $-k + 3x + x^2 = 0$ and has repeated roots.

20. Find the coordinates of intersection of:

a. $x + y = 8$ and $y = 9 - \frac{6}{x}$

b. $y = 2 - x$ and $x^2 - y^2 = 8$

21. Solve the following:

a. $x^4 - 10x^2 + 9 = 0$

b. $2t + 5 = \frac{3}{t}$

c. $m = 3\sqrt{m} + 10$

22. Give the vertex and axis of symmetry of $y = 3(x - 1)^2 - 4$

23. Give the range of $y = 2x^2 - 8x$

24. Solve :

a. $4^z = \frac{1}{128}$

b. $(2^x)^3(4^{x-1}) = 16$

25. Simplify $\frac{12}{\sqrt{3}} - \sqrt{27}$ giving your answer in terms of $k\sqrt{3}$

26. Find the values of k if $kx^2 - 5x + 7 = 0$ has no roots.

27. Show that the whole curve lies below the x-axis for $y = 6x - x^2 - 10$

28. Simplify:

a. $(4x^6y^3)^{\frac{1}{2}}(27x^9y^2)^{\frac{1}{3}}$

b. $\frac{(4x^3z)^2}{(8xyz^3)^{\frac{2}{3}}}$

29. Solve: $x - \left(\frac{2}{x+2}\right) = \frac{1}{3}$