AICE Mathematics - SUMMER ASSIGNMENT:

**This packet is to be completed in its entirety, showing all of your work, and is to be turned in to your respected AICE Math teacher by the 2nd day of school next year. **

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 $\log\left(\frac{x^2 y}{z^3}\right)$.

7. Express $(log3\sqrt{10} - \frac{1}{3}\log(\frac{8}{10}) - \log\frac{10}{3})$ in the form c+ logd 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. $y = -lnx$ 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' =   _____

    b. cos 30' =   _____

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

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

11. Within the interval 0' ≤ x ≤ 360', find the following values:

    a. $\cos^{-1}\left(\frac{1}{2}\right) =$ _____

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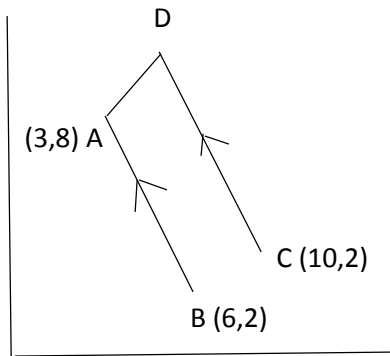
    c. $\csc^{-1}(2) =$ _____

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.

D

(3,8) A

C (10,2)

B (6,2)

14. Solve:

    a. $x^{\frac{3}{2}} = 8$

    b. $8^z = 2$

    c. $\frac{1}{8^z} = 128$

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

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 $y = 9 - \dfrac{6}{x}$

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

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