Pre Calculus Team Test

1. Over what domain could the graph of y=cscx be restricted to guarantee that its inverse is a function?
2. Find the exact value of $sin^{-1}(cos(\frac{2\pi}{3}))$.
3. Find the value of the x^{8} coefficient of the expression $(2x+1)^{9}$.

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4. For what values of x is it true that arcsinx=arccosx?
5. Larsen was making his famous strawberry-banana smoothie when Annie wondered, how does he get that perfect texture? Larsen said that there are $sin(tan^{-1}\frac{12}{5})$ parts strawberry to banana. Annie is dumb and doesn't know what this means. Help Annie figure out the ratio of strawberries to bananas.
6. Evaluate $(sin^2(\frac{13\pi}{4}) + cos^2(\frac{13\pi}{4}))(2tan(\frac{5\pi}{4}))$.
7. If $f(x) = sinx$ and $f(a) = 1/3$ find the exact value of $f(a) + f(a+2\pi) + f(a+4\pi)$.

$\frac{1}{3}+\frac{1}{3}+\frac{1}{3}$

8. Consider the function $f(x) = 3cos(\frac{1}{2}x) + 4$, how many distinct points of intersection exist between the line $y = f(x)$ and $y = 5$ on $[-2\pi, 2\pi]$
9. How many ways can you get from the origin to the point (5,7) on a standard Cartesian plane if you can only go one unit up or right at a time and you must pass through the point (2,3)?

$\boxed{350}$

10. Annie, Anisha, and Grace are playing a game of Mafia with 12 other people. Each player in the game is assigned a unique role, and each role belongs to a specific team. There are 8 roles in the town team, 4 roles in the mafia team, and 3 roles in the neutral team. If all roles are randomly assigned with equal probability, what is the probability that Annie, Anisha, and Grace are all on the same team?

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11. Convert 105° to radians.

$105 \cdot \frac{\pi}{180}$

$\boxed{\frac{7\pi}{12}}$

12. Let $x = 2(\ln(6)) + 4(\ln(2)) + 4(\ln(3)) - 2(\ln(18))$. Compute e^x

-191 $\boxed{144}$ $\log_e \underline{?} = 2(\log_e 6) + 4(\log_e 2) + 4(\log_e 3) - 2(\log_e 18)$

$\log_e 36$

$36 \times 16 + 81 - 18^2$

13. Solve the equation $cos^2(x) + sin(x) = 2,\ 0 \le x < 2\pi$ (write no solution if there is no real solution).

$0, \frac{\pi}{2}$

$18 + 3 - 10 < x$

$-10 < 0$

14. Solve the inequality $2x^2 < x + 10$

$2x^2 - x - 10 < 0$

$(2x-5)(x+2) < 0$

$-2 \quad 0 \quad 2.5$

15. Find the sum of the squares of the roots of $f(x) = x^3 + x^2 - 26x + 24$

53

$(x^2 - 5x - 6)(x-4)$

$(x-6)(x+1)$

16. Compute: $3cos(x) + 3 = 2sin^2x,\ 0 \le x < 2\pi$.

$x = 0$

$1 - \sin^2 x + \sin x - 2 = 0$

$-\sin^2 x + \sin x = 1$

$\sin x(-\sin x + 1) = 1$

$\sin x = 0$ $\boxed{x = 0, \pi}$

$\sin x = 1$ $\boxed{x = \frac{\pi}{2}}$

17. Given: $y = \cos\left(x + \frac{\pi}{3}\right) + \sin\left(x + \frac{\pi}{6}\right)$, what is the product of the amplitude and the period of y?

2π

18. A class has four boys and three girls. If the students are called randomly to the office once at a time, what is the probability that they go in alternating boy/girl order?

-1

$\frac{2\pi}{6}$

19. Evaluate: $4\log_3\frac{1}{3} + 2\log_9 27 + 6\log_{27} 3$

1

$4\log_3 3^{-1} + 2\log_9 3^3 + 6\log_{27} 3$

$-4 \quad 3 \quad 2$

$-2\cos x = 4$

$\cos x = -2$

20. How many different integers satisfy both $|3x - 4| \le 10$ and $|3x + 2| > 4$?

3

$3x - 4 \le 10$ $\quad 3x - 4 \ge -10$ $\quad 3x + 2 > 4$ $\quad 3x + 2 < -4$

$3x \le 14$ $\quad 3x \ge 6$ $\quad 3x > 2$ $\quad 3x < -6$

$x \le \frac{14}{3}$ $\quad x \ge 2$ $\quad x > \frac{2}{3}$ $\quad x < -2$

$x \ge 2$ or $x \le 14/3$ and $x > 2/3$ or $x \le -2$

less than -2

less than $\frac{14}{3}$

more or equal to 2,

more than $2/3$

$2(1 - \cos^2 x) - 3\cos x - 3 = 0$

$2 - 2\cos^2 x - 3\cos x - 3 = 0$

$-2\cos^2 x - 3\cos x = 1$

$\cos x(-2\cos x - 3) = 1$

$\cos x = 1$ $\quad -2\cos x - 3 = 1$

$\boxed{x = 0}$ $\quad \cos x = -2$