Math0 pre test test

FCS UNIPI - Math classes

1. Is it true that 2003 is prime ? $\boxed{\text{True}}$
2. Compute $(2x-3)^3$. $\boxed{8x^3-36x^2+54x-27}$
3. Solve, considering existence conditions, the equation
$$\frac{x+1}{x\sqrt{x^2+1}}=0$$
$\boxed{-1,0}$
4. Solve, considering existence conditions, the inequality
$$\frac{x+1}{x\sqrt{x^2+1}}\leq 0$$
$\boxed{x\in[-1,0)}$
5. Solve, considering existence conditions, the equation
$$\frac{x^3+2x^2-2x-4}{x^2-4}=0$$
$\boxed{x=\pm\sqrt{2}}$
6. Solve, considering existence conditions, the inequality
$$\frac{x^3+2x^2-2x-4}{x^2-4}>0$$
$\boxed{x\in(-\sqrt{2},\sqrt{2})\cup(2,+\infty)}$
7. Simplify the fraction $\dfrac{a^3-b^3}{a-b}$. $\boxed{a^2+ab+b^2}$
8. Find the greater common divisor and the least common multiple of the integers $1771, 1463$. $\boxed{77, 33649}$
9. Perform the division x^4+x^3+2x-3 by x^2+x. $\boxed{\text{Quotients} = x^2, \text{ Remainder} = 2x-3}$

10. Find the greater common divisor of the polynomials

$$x^3 + 3x^2 - x - 3, \quad x^2 + 4x + 3$$

$\boxed{x + 1}$

11. Solve the inequality $2x^2 - x - 3 < 0$. $\boxed{x \in (1, 3/2)}$

12. Draw on the Cartesian plane x, y the parabola $\gamma : \ y = 3x^2 + 2x + 2$.

13. Draw on the Cartesian plane x, y the circle $\gamma : \ x^2 + y^2 - 2x - 4y + 1 = 0$.
$\boxed{C : (1, 2), \quad r = 2}$

14. Given the function $f(x) = x^2$, find $f(2)$ and $f^{-1}(1)$. $\boxed{4, \{\pm 1\}}$

15. Put in rational standard form the fraction $\dfrac{3 - \sqrt{5}}{2 + \sqrt{5}}$. $\boxed{5\sqrt{5} - 11}$