IB Math Minds

Factor & Remainder Theorems

Exercises - **no** calculator allowed

1. Find the value(s) of *c* such that $x=2$ is a zero of the polynomial x^3+x^2+cx+2.

2. If $x^3+3x^2+kx+17$ has a remainder of 5 when divided by $x+3$, then find the value of *k*.

3. Given that $x=-1$ is a double root of the equation $4x^4-11x^2-6x+1=0$, find the other root(s) of the equation.

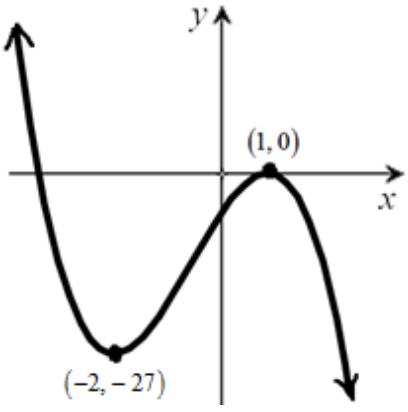
4. Find a polynomial of lowest degree with integer coefficients that has zeros of $x=2$ and $x=1+4i$.

5. When the polynomial $x^4-3x^3-3x^2+ax+b$ is divided by $(x+2)$ it leaves the same remainder as when it is divided by $(x-3)$. Find the value of *a*.

6. Find the value(s) of *m* such that $x+3$ is a factor of the polynomial $P(x)=x^3-x^2-m^2x$.

7. Given x^2-x-6 is a factor of $ax^3+x^2+bx-24$, find the value of *a* and the value of *b*.

8. The graph of a cubic function $g(x)=ax^3+bx^2-4bx+c$ is shown at right. The graph has a local minimum at $(-2,-27)$ and a local maximum at $(1,0)$. Find the values of *a*, *b* and *c*.



9. The polynomial $f(x)=x^3-2x^2+ax+b$ leaves the same remainder R when divided by $(x-1)$ as when divided by $(x+3)$. When $f(x)$ is divided by $(x-2)$ it leaves a remainder of 3R. Find the value of *a* and the value of *b*.

10. Given x^2+ax+b and x^2+cx+d have a common factor of $(x-k)$, show that $k=\dfrac{d-b}{a-c}$.