College Algebra

1. next term = previous term $* \left(\frac{-1}{4}\right) = \left(\frac{-1}{4}\right) * \left(\frac{-1}{4}\right) = \frac{1}{16}$

2. # of tons processed by process A
   in 7 days= $A(7) = 7^2 + (2)(7) = 49 + 14 = 63$
   # of tons processed by Process B
   in 7 days= $B(7) = 10 \cdot 7 = 70$
   maximum output=70

3. $g(f(3)) = g(2) = -3$

4. $$\sqrt[6]{x^3y^4z^5} = x^{3/6}y^{4/6}z^{5/6} = x^{1/2}y^{2/3}z^{5/6}$$

5. $$\begin{bmatrix} (2)-(-2) & (-4)-(4) \\ (6)-(-6) & (0)-(0) \end{bmatrix} = \begin{bmatrix} 4 & -8 \\ 12 & 0 \end{bmatrix}$$

6. $$A \cdot f(g(x)) = f(cx) = 2^{cx}$$
   $$B \cdot f(g(x)) = f(c/x) = 2^{c/x}$$
   $$C \cdot f(g(x)) = f(x/c) = 2^{x/c}$$
   $$D \cdot f(g(x)) = f(x-c) = 2^{x-c}$$
   $$E \cdot f(g(x)) = f(\log_c x) = 2^{\log_c x}$$
   For $c > 1$ and $x > 1$ (A) yields the greatest value for $f(g(x))$ which is 2^{cx}

7. $$f(0) = f(0+0) = f(0) + f(0) \quad \text{by given relation}$$
   $$\text{i.e.,} \quad f(0) = 2f(0)$$
   So, the possible values of $f(0)$ is 0 only.

8. Note that $i + i^2 + i^3 + i^4 = i - 1 - i + 1 = 0$
   Sum of the next four terms $\quad i^5 + i^6 + i^7 + i^8$ is also zero, and so on
   So, $(i + i^2 + i^3 + \ldots + i^{48}) + i^{49} = 0 + i^{49} = i^{49} = (i^{48})(i) = (i^4)^{12}(i) = 1(i) = i$

9. If a is the 1st term and b is the common difference of an arithmetic series, then, i^{th} term of the series is $a + (i-1)b$
If the series has n terms, then the last term of the series is $a + (n-1)b$
The difference between the last term and the first term is

$$[a + (n-1)b] - a = (n-1)b = 136 - 3 = 133$$

Now the sum of the series is

$$\sum_{i=1}^{n} a + (i-1)b = na + b\{0 + 1 + 2 + \ldots + (n-1)\}$$

$$= na + \frac{(n-1)n}{2}b$$

Given, $na + \frac{n(n-1)}{2}b = 1390$, since $(n-1)b = 133$ and $a = 3$
$3n + \frac{n \cdot 133}{2} = 1390, \quad 139n = 2(1390), \ \ n = 20$. Then using again $(n-1)b = 133$
$19b = 133$, $b = 7$, The first 3 terms are $3, 10, 17$