3. Read pages 241-242 in the textbook. Using that information, write pseudocode for computing the LCM of an array A[1..n] of integers. You may assume there is a working gcd() function. (6 points)

```
ALGORITHM LCM(A[1..n]):
    // Computes the least common multiple of all the integer in array A
```

4. Horner's method:

$$p(x) = 4x^4 + 5x^3 - 2x^2 - 4x + 7$$

a. Repeatedly factor out x in the following polynomial so that you can apply Horner's method. Write your expression for $p(x)$. (5 points)

$P(x) = 4x^4 + 5x^3 - 2x^2 - 4x + 7 \quad = (4x^3 + 5x^2 - 2x - 4)x + 7$ No x^n terms in $p(x)$

$= ((4x^2 + 5x - 2)x - 4)x + 7 \quad = (((4x + 5)x - 2)x - 4)x + 7$

b. Show values of the array P[0..n] as needed to apply Horner's method. (3 points)

P[] = [4, 5, -2, -4, 7]

c. Apply Horner's method to evaluate the polynomial at $x = 2$. Make a table as we did in class showing the values x, p, n, and i, and then state your final answer for $p(2)$. (5 points)

x	p	n	i	P[i]	result

$p(2) =$ 95

d. Use **synthetic** (not long) **division** to divide $p(x)$ by $x - 2$ to check your work. Be sure to show your work. (5 points)

$$\frac{4x^4 + 5x^3 - 2x^2 - 4x + 7}{x - 2}$$

$$\begin{array}{r|rrrrr} 2 & 4 & 5 & -2 & -4 & 7 \\ & \downarrow & 8 & 26 & 48 & 88 \\ \hline & 4 & 13 & 24 & 44 & 95 \end{array}$$

$\rightarrow 95 = \left(\begin{array}{l} \text{Ans. C)} \\ P(2) = 95 \end{array} \right)$

5. Rewrite the *LeftRightBinaryExponentiation* algorithm on page 237 in the textbook to work for $n = 0$ as well as any positive integer. *No credit will be given for answers that simply start with an if statement for n = 0.* (6 points)

```
ALGORITHM LeftRightBinaryExponentiation(a, b(n)):
    // Computes a^n
```