Esercizio 1. *Simplify these powers:*

1. $(3^3)^3 = 3^{(3^3)}$ *Sol:* $[NO]$

2. $\left((3x^5)^2\right)^3$ *Sol:* $[(3x^5)^6 = 3^6 x^{30}]$

3. $12^3 \cdot 15^7$ *Sol:* $[2^6 3^3 \cdot 3^7 5^7 = 2^6 3^{10} 5^7]$

4. $(2^3 a^5 6)^2$. *Sol:* $[2^6 a^{10} 6^3 = 2^9 3^3 a^{10}]$

5. $5^5 + 5^4 + 5^3$ *Sol:* $[5^3(5^2 + 5 + 1)]$

6. $3^5 + 6^3 + 12^2$ *Sol:* $[3^2(3^3 + 32^3 + 2^4)]$

7. $15 \cdot 12 \cdot 18$ *Sol:* $[3 \cdot 5 \cdot 2^2 \cdot 3 \cdot 2 \cdot 3^2 = 2^3 \cdot 3^4 \cdot 5]$

Esercizio 2. *Write down Pascal's triangle seventh row.*

Esercizio 3. *Write down Pascal's triangle tenth row.*

Esercizio 4. *Compute these powers:*

1. $(2a + 2b)^4$ *Sol:* $[16a^4 + 64a^3 b + 96a^2 b^2 + 64ab^3 + 16b^4]$

2. $(x - y)^3$ *Sol:* $[x^3 - 3x^2 y + 3xy^2 - y^3]$

3. $(2x - 3y)^5$ *Sol:* $[32x^5 - 240x^4 y + 720x^3 y^2 - 1080x^2 y^3 + 810xy^4 - 243y^5]$

4. $(x - 1)^4$ *Sol:* $[x^4 - 4x^3 + 6x^2 - 4x + 1]$

5. $(x - 1/3)^3$ *Sol:* $[x^3 - x^2 + 1/3x - 1/27]$

6. $(2/3x - 1/2)^3$ *Sol:* $[8/27x^3 - 2/3x^2 + 1/2x - 1/8]$

7. $(2x + \sqrt{2})^3$ *Sol:* $[8x^3 + 12x^2\sqrt{2} + 12x + 2\sqrt{2}]$

8. $(2\sqrt{6}x - 1/2\sqrt{5})^3$ *Sol:* $[48x^3\sqrt{6} - 36\sqrt{5}x^2 + 15/2\sqrt{6}x - 5/8\sqrt{5}]$

9. $(x - y + z)^3$ *Sol:* $[x^3 - 3x^2 y + 3xy^2 - y^3 + 3x^2 z - 6xyz + 3y^2 z + 3xz^2 - 3yz^2 + z^3]$

Esercizio 5. *Simplify these square roots*

1. $\sqrt{4b^5(x-2)^3}$. *Sol:* $[2b^2(x-2)\sqrt{b(x-2)}]$

2. $\sqrt{4x^2 - 12xb + 9b^2}$. *Sol:* $[2x - b]$

3. $\sqrt{x^3 + 3x^2 + 3x + 1}$. *Sol:* $(x+1)\sqrt{x+1}$

4. $\sqrt{(x^2-1)(x-1)}$. *Sol:* $(x-1)\sqrt{x+1}$