2Β σελ. 171 iii) $21\cdot 3^x + 5^{x+3} = 3^{x+4} + 5^{x+2} \Leftrightarrow$

$$\frac{21\cdot 3^x}{5^x} + \frac{5^{x+3}}{5^x} = \frac{3^{x+4}}{5^x} + \frac{5^{x+2}}{5^x} \Leftrightarrow 21\cdot\left(\frac{3}{5}\right)^x + \frac{5^x\cdot 5^3}{5^x} = \frac{3^x\cdot 3^4}{5^x} + \frac{5^x\cdot 5^2}{5^x}$$

$$\Leftrightarrow 21\left(\frac{3}{5}\right)^x + 5^3 = \left(\frac{3}{5}\right)^x\cdot 81 + 25 \Leftrightarrow$$

$$\Leftrightarrow (21-81)\left(\frac{3}{5}\right)^x = 25 - 125 \Leftrightarrow (-60)\left(\frac{3}{5}\right)^x = -100 \cdot$$

$$\Leftrightarrow \left(\frac{3}{5}\right)^x = \frac{100}{60} \Leftrightarrow \left(\frac{3}{5}\right)^x = \frac{10}{6} \Leftrightarrow \left(\frac{3}{5}\right)^x = \frac{5}{3} \Leftrightarrow \left(\frac{3}{5}\right)^x = \left(\frac{3}{5}\right)^{-1} \Leftrightarrow x = -1.$$

iv) $3^{2x} + 9^x = 11\cdot 4^{x-1} + 4^{x+1} \Leftrightarrow 3^{2x} + 3^{2x} = 11\cdot\frac{4^x}{4} + 4^x\cdot 4 \Leftrightarrow$

$$\Leftrightarrow 2\cdot 3^{2x} = \left(\frac{11}{4} + 4\right)4^x \Leftrightarrow 2\cdot 3^{2x} = \left(\frac{11}{4} + \frac{16}{4}\right)\cdot 4^x \Leftrightarrow$$

$$\Leftrightarrow 2\cdot 3^{2x} = \frac{27}{4}\cdot 2^{2x} \Leftrightarrow \frac{3^{2x}}{2^{2x}} = \frac{27}{8} \Leftrightarrow \left(\frac{3}{2}\right)^{2x} = \frac{3^3}{2^3} \Leftrightarrow \left(\frac{3}{2}\right)^{2x} = \left(\frac{3}{2}\right)^3 \Leftrightarrow$$

$$\Leftrightarrow 2x = 3 \Leftrightarrow x = \frac{3}{2}.$$

v) $4^x - 3^{x-\frac{1}{2}} = 3^{x+\frac{1}{2}} - 2^{2x-1} \Leftrightarrow 2^{2x} + 2^{2x-1} = 3^{x+\frac{1}{2}} + 3^{x-\frac{1}{2}} \Leftrightarrow$

$$2^{2x} + \frac{2^{2x}}{2} = 3^x\cdot 3^{\frac{1}{2}} + 3^x\cdot 3^{-\frac{1}{2}} \Leftrightarrow 2^{2x} + \frac{2^{2x}}{2} = 3^x\cdot\sqrt{3} + 3^x\cdot\frac{1}{\sqrt{3}} \Leftrightarrow$$

$$2\sqrt{3}\cdot 2^{2x} + \sqrt{3}\cdot\frac{2^{2x}}{2} = 2\sqrt{3}\cdot\sqrt{3}\cdot 3^x + 2\sqrt{3}\cdot\frac{1}{\sqrt{3}}\cdot 3^x \Leftrightarrow$$

$$2\sqrt{3}\cdot 2^{2x} + \sqrt{3}\cdot 2^{2x} = 2\cdot 3\cdot 3^x + 2\cdot 3^x \Leftrightarrow$$

$$(2\sqrt{3} + \sqrt{3})\cdot 2^{2x} = 6\cdot 3^x + 2\cdot 3^x \Leftrightarrow 3\sqrt{3}\cdot 2^{2x} = 8\cdot 3^x \Leftrightarrow$$

$$\frac{2^{2x}}{3^x} = \frac{8}{3\sqrt{3}} \Leftrightarrow \frac{2^{2x}}{(\sqrt{3})^{2x}} = \frac{2^3}{(\sqrt{3})^2\sqrt{3}} \Leftrightarrow \frac{2^{2x}}{(\sqrt{3})^{2x}} = \frac{2^3}{(\sqrt{3})^3} \Leftrightarrow$$

$$\left(\frac{2}{\sqrt{3}}\right)^{2x} = \left(\frac{2}{\sqrt{3}}\right)^3 \Leftrightarrow 2x = 3 \Leftrightarrow x = \frac{3}{2}.$$