27.8 1)

α) $7^{x^2-2x+1}=5^{(x-1)^2} \Rightarrow 7^{(x-1)^2}=5^{(x-1)^2} \Rightarrow \left(\frac{7}{5}\right)^{(x-1)^2}=\left(\frac{7}{5}\right)^0 \Rightarrow (x-1)^2=0 \Rightarrow x=1$

β) $2^{x+1}\cdot 5^x=200 \Rightarrow 2\cdot 2^x\cdot 5^x=200 \Rightarrow (2\cdot 5)^x=100 \Rightarrow \Rightarrow 10^x=10^2 \Rightarrow x=2$

γ) $6^{2x+4}=27^x\cdot 2^{x+8} \Rightarrow (2\cdot 3)^{2x+4}=3^{3x}\cdot 2^{x+8} \Rightarrow 2^{2x+4}\cdot 3^{2x+4}=3^{3x}\cdot 2^{x+8} \Rightarrow$

$\Rightarrow 2^{2x+4-x-8}=3^{3x-2x-4} \Rightarrow 2^{x-4}=3^{x-4} \Rightarrow \left(\frac{2}{3}\right)^{x-4}=1 \Rightarrow \left(\frac{2}{3}\right)^{x-4}=\left(\frac{2}{3}\right)^0 \Rightarrow x-4=0 \Rightarrow x=4$

δ) $25^x-7^x-35\cdot 5^{2x}+5\cdot 7^{x+1}=0 \Rightarrow 25^x-7^x-35\cdot 25^x+5\cdot 7\cdot 7^x=0 \Rightarrow$

$\Rightarrow -34-25^x+34\cdot 7^x=0 \Rightarrow 25^x=7^x \Rightarrow \left(\frac{25}{7}\right)^x=1 \Rightarrow \left(\frac{25}{7}\right)^x=\left(\frac{25}{7}\right)^0 \Rightarrow x=0$

ε) $3\cdot 4^x+\frac{1}{3}\cdot 9^{x+2}=6\cdot 4^{x+1}-\frac{1}{2}\cdot 9^{x+1} \Rightarrow 2\cdot 3^{2x}+\frac{9}{3}\cdot 9^{x+1}=6\cdot 4\cdot 4^x-\frac{1}{2}\cdot 9^{x+1} \Rightarrow$

$\Rightarrow 3\cdot 2^{2x}+3\cdot 9^{x+1}=24\cdot 2^{2x}-\frac{1}{2}\cdot 9^{x+1} \Rightarrow 3\cdot 2^{2x}+3\cdot 9\cdot 9^x=24\cdot 2^{2x}-\frac{9}{2}\cdot 9^x \Rightarrow$

$\Rightarrow 3\cdot 2^{2x}+27\cdot 9^x=24\cdot 2^{2x}-\frac{9}{2}\cdot 3^{2x} \Rightarrow 21\cdot 2^{2x}=\frac{63}{2}\cdot 3^{2x} \Rightarrow$

$\Rightarrow \left(\frac{2}{3}\right)^{2x}=\frac{3}{2} \Rightarrow \left(\frac{2}{3}\right)^{2x}=\left(\frac{2}{3}\right)^{-1} \Rightarrow 2x=-1 \Rightarrow x=-\frac{1}{2}$

27.8 2)

$3^{x^2-4x+4}=4^{(x-2)^2} \Rightarrow 3^{(x-2)^2}=4^{(x-2)^2} \Rightarrow \left(\frac{3}{4}\right)^{(x-2)^2}=1 \Rightarrow$

$\Rightarrow \left(\frac{3}{4}\right)^{(x-2)^2}=\left(\frac{3}{4}\right)^0 \Rightarrow (x-2)^2=0 \Rightarrow x=2$

27.8 3)

$3^{|x|-2}=5^{|x|-2} \Rightarrow \left(\frac{3}{5}\right)^{|x|-2}=1 \Rightarrow \left(\frac{3}{5}\right)^{|x|-2}=\left(\frac{3}{5}\right)^0 \Rightarrow |x|-2=0 \Rightarrow |x|=2 \Rightarrow x=\pm 2$

27.8 4)

$2^{x+1}\cdot 5^x=200 \Rightarrow 2\cdot 2^x\cdot 5^x=200 \Rightarrow (2\cdot 5)^x=100 \Rightarrow \Rightarrow 10^x=10^2 \Rightarrow x=2$

27.8 5)

$3^{2x-1}\cdot 5^{3x+2}=\frac{9}{5}\cdot 5^{2x}\cdot 3^{3x} \Rightarrow 3^{2x-1}\cdot 5^{3x+2}=5^{2x-1}\cdot 3^{3x+2} \Rightarrow$

$\Rightarrow \left(\frac{3}{5}\right)^{2x-1}=\left(\frac{3}{5}\right)^{3x+2} \Rightarrow 2x-1=3x+2 \Rightarrow x=-3$

27.8 6)

$\sqrt{3^x}\cdot\sqrt{5^x}=225 \Rightarrow 3^{\frac{x}{2}}\cdot 5^{\frac{x}{2}}=225 \Rightarrow$

$$\Rightarrow (3\cdot 5)^{\frac{x}{2}} = 15^2 \Rightarrow 15^{\frac{x}{2}} = 15^2 \Rightarrow \frac{x}{2} = 2 \Rightarrow x = 4$$

27.8 7)

$$5\cdot 2^x + 4\cdot 3^x = 8\cdot 3^x - 4\cdot 2^x \Rightarrow$$
$$\Rightarrow 5\cdot 2^x + 4\cdot 3^x - 8\cdot 3^x + 4\cdot 2^x = 0 \Rightarrow$$

$$\Rightarrow 9\cdot 2^x - 4\cdot 3^x = 0 \Rightarrow \frac{2^x}{3^x} = \frac{4}{9} \Rightarrow \left(\frac{2}{3}\right)^x = \left(\frac{2}{3}\right)^2 \Rightarrow x = 2$$

27.8 8)

$$4\cdot 5^x - 2^{x+1} = 5^{x+1} - 3\cdot 2^x \Rightarrow 2^2\cdot 5^x - 2^x\cdot 2 = 5^x\cdot 5 - 3\cdot 2^x \Rightarrow$$

$$\Rightarrow 5^x - 2^x = 0 \Rightarrow 5^x = 2^x \Rightarrow \left(\frac{5}{2}\right)^x = 1 \Rightarrow \left(\frac{5}{2}\right)^x = \left(\frac{5}{2}\right)^0 \Rightarrow x = 0$$

27.8 9)

$$5^{2x} - 3^x - 15\cdot 25^x + 15\cdot 3^x = 0 \Rightarrow 5^{2x} - 3^x - 15\cdot 5^{2x} + 15\cdot 3^x = 0 \Rightarrow$$

$$\Rightarrow 14\cdot 5^{2x} = 14\cdot 3^x \Rightarrow 5^{2x} = 3^x \Rightarrow 25^x = 3^x \Rightarrow$$

$$\Rightarrow \left(\frac{25}{3}\right)^x = 1 \Rightarrow \left(\frac{25}{3}\right)^x = \left(\frac{25}{3}\right)^0 \Rightarrow x = 0$$

27.8 10)

$$8\cdot 2^{x-2} + \frac{2^x}{4} = 6^{x-1} - 3\cdot 6^{x-2} \Rightarrow 8\cdot 2^{x-2} + 2^{x-2} = 6\cdot 6^{x-2} - 3\cdot 6^{x-2} \Rightarrow$$

$$\Rightarrow 9\cdot 2^{x-2} = 3\cdot 6^{x-2} \Rightarrow 3\cdot 2^{x-2} = 6^{x-2} \Rightarrow$$

$$\Rightarrow \left(\frac{6}{2}\right)^{x-2} = 3 \Rightarrow 3^{x-2} = 3 \Rightarrow x - 2 = 1 \Rightarrow x = 3$$

27.8 11)

$$7\cdot 3^{x+1} - 5^{x+2} = 3^{x+4} - 5^{x+3} \Rightarrow 7\cdot 3^{x+1} - 5\cdot 5^{x+1} = 27 - 3^{x+1} - 25\cdot 5^{x+1} \Rightarrow$$

$$\Rightarrow 7\cdot 3^{x+1} - 5\cdot 5^{x+1} = 27\cdot 3^{x+1} - 25\cdot 5^{x+1} \Rightarrow 20\cdot 3^{x+1} = 20\cdot 5^{x+1} \Rightarrow$$

$$\Rightarrow \left(\frac{3}{5}\right)^{x+1} = 1 \Rightarrow \left(\frac{3}{5}\right)^{x+1} = \left(\frac{3}{5}\right)^0 \Rightarrow x + 1 = 0 \Rightarrow x = -1$$

27.8 12)

$$2\cdot 9^{x+1} - 3\cdot 2^{2x} = 5\cdot 4^x - 9\cdot 3^{2x} \Rightarrow 2\cdot 9\cdot 9^x - 3\cdot 2^{2x} = 5\cdot 2^{2x} - 9\cdot 3^{2x} \Rightarrow$$

$$\Rightarrow 18\cdot 3^{2x} - 3\cdot 2^{2x} = 5\cdot 2^{2x} - 9\cdot 3^{2x} \Rightarrow 27\cdot 3^{2x} = 8\cdot 2^{2x} \Rightarrow$$

$$\Rightarrow 3^3\cdot 3^{2x} = 2^3\cdot 2^{2x} \Rightarrow 3^{2x+3} = 2^{2x+3} \Rightarrow$$

$$\Rightarrow \left(\frac{3}{2}\right)^{2x+3} = 1 \Rightarrow \left(\frac{3}{2}\right)^{2x+3} = \left(\frac{3}{2}\right)^0 \Rightarrow 2x + 3 = 0 \Rightarrow x = -\frac{3}{2}$$