

$$1. \ln(e^2) - 2e + \ln 1 = 2 \ln e - 2e = 2 - 2e \Rightarrow a)$$

$$2. \ln(x^2) = 0 \quad x^2 > 0 \Rightarrow x = 0 \quad \forall \mathbb{R}.$$

$$x^2 = 1 \Rightarrow S = \{-1; 1\} \Rightarrow c)$$

$$3. \ln(4\sqrt{2}) = \ln(2^2 \cdot 2^{1/2}) = \ln(2^{5/2}) = \frac{5}{2} \ln 2 \Rightarrow b)$$

$$4. \ln(x) = \frac{1}{2} \quad x > 0$$

$$x = e^{1/2} \Rightarrow S = \{\sqrt{e}\} \Rightarrow b)$$

$$5. \ln(2+\sqrt{3}) + \ln(2-\sqrt{3}) = \ln((2+\sqrt{3})(2-\sqrt{3})) = \\ = \ln(4 - 2\sqrt{3} + 2\sqrt{3} - 3) = \ln 1 = 0 \Rightarrow a)$$

$$6. \ln(1-x) > 1 \quad 1-x > 0 \Rightarrow x < 1$$

$$1-x > e \Rightarrow -x > e-1 \Rightarrow x < 1-e$$

$$S =]-\infty; 1-e[\Rightarrow b)$$

$$7. x \ln(0,3) - 1 \leq 0 \Rightarrow x \geq \frac{1}{\ln(0,3)}$$

$$\left[\triangle \ln(0,3) < 0 \right]$$

$$\Rightarrow S = \left[\frac{1}{\ln(0,3)} ; +\infty[\Rightarrow b)$$

$$8. \quad 1 - x \ln 2 > 0 \Rightarrow x \leq \frac{1}{\ln 2}$$

$$\Rightarrow S =]-\infty; \frac{1}{\ln 2}] \Rightarrow a)$$

[faute de frappe
dans l'annonce,
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$$9. \quad -x > 0 \Rightarrow x < 0 \Rightarrow]-\infty; 0[\Rightarrow a)$$

$$10. \quad \ln(x^2 - x) = 0 \quad x^2 - x > 0 \Rightarrow D =]-\infty; 0[\cup]1; +\infty[$$

$$x^2 - x = 1 \Rightarrow x^2 - x - 1 = 0$$

$$\Delta = 1 + 4 = 5 \Rightarrow x_1 = \frac{1 - \sqrt{5}}{2} \quad x_2 = \frac{1 + \sqrt{5}}{2}$$

$$S = \left\{ \frac{1 - \sqrt{5}}{2}; \frac{1 + \sqrt{5}}{2} \right\} \Rightarrow c)$$

$$11. \quad \frac{e^a}{e^b} = e^{a-b} \Rightarrow b)$$

$$12. \quad \ln(x+1) + \ln(x+3) = \ln(3x+5)$$

$$x > -1 \quad x > -3 \quad x > -\frac{5}{3} \Rightarrow D =]-1; +\infty[$$

$$\ln((x+1)(x+3)) = \ln(3x+5)$$

$$(x+1)(x+3) = 3x+5$$

$$x^2 + 3x + x + 3 = 3x + 5$$

$$x^2 + x - 2 = 0$$

$$\Delta = 1 + 8 = 9$$

$$x_1 = \frac{-1-3}{2} = -2 \quad x_2 = \frac{-1+3}{2} = 1$$

$$x_1 < -1 \Rightarrow x_1 \notin D \Rightarrow S = \{1\} \Rightarrow c)$$

$$13. (e^x)^2 \times e^{3x-1} = e^{2x+3x-1} = e^{5x-1} = \frac{e^{5x}}{e} \Rightarrow c)$$

$$14. \ln(e^{-2}) = -2 \Rightarrow c)$$

$$15. \ln(x+3) < \ln 6 \quad x+3 > 0 \Rightarrow x > -3$$

$$x+3 < 6 \Rightarrow x < 3 \Rightarrow S =]-3; 3[\Rightarrow b)$$

$$16. e^x - 1 = 0 \Rightarrow e^x = 1 \Rightarrow x = 0$$

$$\Rightarrow D = \mathbb{R} \setminus \{0\} =]-\infty; 0[\cup]0; +\infty[\Rightarrow b)$$

$$17. e^{3x} - 1 \geq 0 \Rightarrow e^{3x} \geq 1 \Rightarrow 3x \geq 0$$

$$\Rightarrow x \geq 0 \Rightarrow S = [0; +\infty[\Rightarrow a)$$

$$18. f(x) = ax + b$$

$$\begin{cases} f(-2) = -2a + b = 1 \Rightarrow b = 1 + 2a \end{cases}$$

$$\begin{cases} f(1) = a + b = -2 \Rightarrow a + 1 + 2a = -2 \end{cases}$$

$$3a = -3 \Rightarrow a = -1$$

$$\Rightarrow b = 1 - 2 = -1$$

$$\Rightarrow f(x) = -x - 1 \Rightarrow c)$$

$$19. \quad 2e^{2x} - 5e^x + 3 = 0$$

$$e^x = X \quad ; \quad X > 0$$

$$2X^2 - 5X + 3 = 0$$

$$\Delta = 25 - 24 = 1 \Rightarrow X_1 = \frac{5-1}{4} = 1 \quad X_2 = \frac{5+1}{4} = \frac{3}{2}$$

$$\Rightarrow e^x = 1 \Rightarrow x = 0$$

$$\text{et } e^x = \frac{3}{2} \Rightarrow x = \ln \frac{3}{2} = \ln 3 - \ln 2$$

$$\Rightarrow S = \{0; \ln 3 - \ln 2\} \Rightarrow b)$$

20. x = nombre de livres que la maison doit vendre.

$$\text{Coût de production} = 30000 + 3,5x$$

$$\text{Bénéfice} = 6,5x - (30000 + 3,5x) = 3x - 30000$$

$$\text{Bénéfice} > 0 \text{ si } 3x - 30000 > 0 \Rightarrow x > 10000$$

$$\Rightarrow \text{Plus que } 10000 \Rightarrow c)$$