

4.8 Bestimmtes Integral als Flächeninhalt (LÖSUNGEN)

Lösungen Maturaaufgaben (BHS):

- 1) Gehe zum Aufgabenpool Mathematik BHS: <https://prod.aufgabenpool.at/amn/index.php?id=AM>
- 2) Gib im Feld „**Titel-/ID-Suche**“ die **Nummer** ein. Du kommst zur zugehörigen Aufgabe. Die Lösungen sind bei der Aufgabe enthalten.

Deskriptor

Schlagwortsuche

Aufgabentyp ▾

Titel-/ ID-Suche

Baseball * (A_237)



Nummer

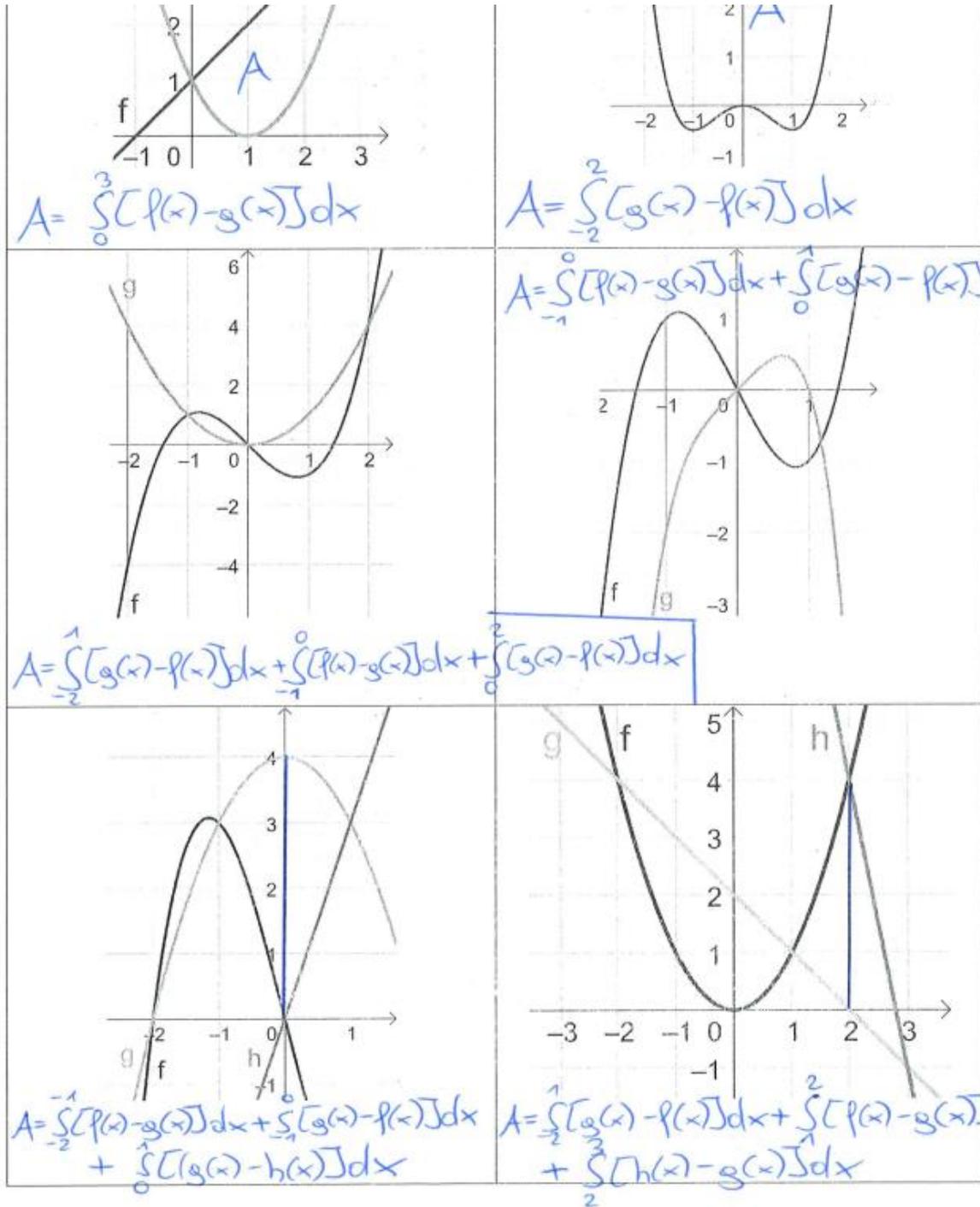
Bsp. 1)

<p>a. $f(x) = 3x^2 - 3$ $[-2; 4]$</p> <p>$f(x) = 0 \Leftrightarrow x_1 = -1, x_2 = 1$</p> <p>$A = \int_{-2}^{-1} f(x) dx - \int_{-1}^1 f(x) dx + \int_1^4 f(x) dx$</p> <p>$A = 4 - (-4) + 20 = \underline{\underline{28 E^2}}$</p>	<p>b. $f(x) = 2x + 4$ $[-6; 2]$</p> <p>$f(x) = 0 \Leftrightarrow x = -2$</p> <p>$A = -\int_{-6}^{-2} f(x) dx + \int_{-2}^2 f(x) dx$</p> <p>$A = -(-16) + 16 = \underline{\underline{32 E^2}}$</p>
<p>c. $f(x) = x^3 - 9x$ $[-5; 4]$</p> <p>$f(x) = 0 \Leftrightarrow x_1 = -3, x_2 = 0, x_3 = 3$</p> <p>$A = -\int_{-5}^{-3} f(x) dx + \int_{-3}^0 f(x) dx - \int_0^3 f(x) dx + \int_3^4 f(x) dx$</p> <p>$A = -(-64) + 20,25 - (-20,25) + 12,25 = \underline{\underline{116,75 E^2}}$</p>	<p>d. $f(x) = x^4 - 4x^2$ $[-1; 3]$</p> <p>$f(x) = 0 \Leftrightarrow x_1 = -2, x_2 = 0, x_3 = 2$</p> <p>$A = -\int_{-1}^0 f(x) dx - \int_0^2 f(x) dx + \int_2^3 f(x) dx$</p> <p>$A = -(-1,13) - (-4,27) + 16,87 = \underline{\underline{22,27 E^2}}$</p>
<p>e. $f(x) = e^x - 2$ $[-3; 5]$</p> <p>$f(x) = 0 \Leftrightarrow x = 0,69$</p> <p>$A = -\int_{-3}^{0,69} f(x) dx + \int_{0,69}^5 f(x) dx$</p> <p>$A = 5,44 + 137,8 = \underline{\underline{143,24 E^2}}$</p>	<p>f. $f(x) = \frac{1}{x} - 1$ $[0,5; 3]$</p> <p>$f(x) = 0 \Leftrightarrow x = 1$</p> <p>$A = \int_{0,5}^1 f(x) dx - \int_1^3 f(x) dx$</p> <p>$A = 0,19 + 0,9 = \underline{\underline{1,09 E^2}}$</p>

Bsp. 2)

<p>a. $f(x) = -x + 3$ $A = 10 E^2$ -2</p> <p>$f(x) = 0 \Leftrightarrow x = 3$</p> <p>① $\int_1^3 f(x) dx = \underline{2}$ ✓ $8E^2$</p> <p>② $\int_3^e f(x) dx = -8$</p> <p>$\left(-\frac{x^2}{2} + 3x\right) \Big _3^e = -8$</p> <p>$\left(-\frac{e^2}{2} + 3e\right) - \left(-\frac{9}{2} + 9\right) = -8$</p> <p style="text-align: right;">GG $e_1 = -1$ $e_2 = 7$ <u>$[1; 7]$</u></p>	<p>b. $f(x) = -3x^2 + 12$ $A = 37 E^2$ -5</p> <p>$f(x) = 0 \Leftrightarrow (x_1 = -2) \quad x_2 = 2$ -5</p> <p>① $\int_1^2 f(x) dx = 5$ ✓ $32E^2$</p> <p>② $\int_2^e f(x) dx = -32$ -32!</p> <p style="text-align: right;">GG $e_1 = -2$ $e_2 = 4$ ✓ $[1; 4]$</p>
<p>c. $f(x) = x^3 - 3x^2$ $A = 270 E^2$ -6</p> <p>$f(x) = 0 \Leftrightarrow (x_1 = 0) \quad x_2 = 3$</p> <p>① $\int_1^3 f(x) dx = \underline{-6}$ → +6 ✓ $264E^2$</p> <p>② $\int_3^e f(x) dx = 264$</p> <p>$e_1 = -4,88$ $e_2 = 7$ <u>$[1; 7]$</u></p>	<p>d. $f(x) = -4x + 16$ $A = 146 E^2$ -18</p> <p>$f(x) = 0 \Leftrightarrow x = 4$</p> <p>① $\int_1^4 f(x) dx = \underline{18}$ ✓ $128E^2$</p> <p>② $\int_4^e f(x) dx = -128$</p> <p>$e_1 = -4$ $e_2 = 12$ <u>$[1; 12]$</u></p>

Bsp. 3)



Bsp. 4)

Bsp. 27) Berechne den Flächeninhalt, der von den Graphen der Funktionen f und g begrenzt wird.

<p>a. $f(x) = x^4 - 3x^2 + 4$, $g(x) = 2x + 4$</p> <p>① $f(x) = g(x) \Leftrightarrow x_1 = -1, x_2 = 0, x_3 = 2$</p> <p>② $A = \int_{-1}^0 [f(x) - g(x)] dx + \int_0^2 [g(x) - f(x)] dx$</p> <p>$= 0,2 + 5,6 = \underline{\underline{5,8 E^2}}$</p>	<p>b. $f(x) = -x$, $g(x) = x^3 - 2x$</p> <p>① $f(x) = g(x): x_1 = -1; x_2 = 0; x_3 = 1$</p> <p>② $A = \int_{-1}^0 [g(x) - f(x)] dx + \int_0^1 [f(x) - g(x)] dx$</p> <p>$A = 0,25 + 0,25 = \underline{\underline{0,5 E^2}}$</p>
<p>c. $f(x) = x^3 + 4x^2 + 2$, $g(x) = 8 - x$</p> <p>① $f(x) = g(x): x_1 = -3; x_2 = -2; x_3 = 1$</p> <p>② $A = \int_{-3}^{-2} [f(x) - g(x)] dx + \int_{-2}^1 [g(x) - f(x)] dx$</p> <p>$A = 0,58 + 11,25 = \underline{\underline{11,83 E^2}}$</p>	<p>d. $f(x) = x^3 - 4x$, $g(x) = 4 - x^2$</p> <p>① $f(x) = g(x): x_1 = -2; x_2 = -1; x_3 = 2$</p> <p>② $A = \int_{-2}^{-1} [f(x) - g(x)] dx + \int_{-1}^2 [g(x) - f(x)] dx$</p> <p>$A = 0,58 + 11,25 = \underline{\underline{11,83 E^2}}$</p>