

2^{nde} 3 - Vendredi 20 octobre 2006
Interrogation de mathématiques n°3 - Corrigé du Sujet A

Exercice 1 :

$$A = (3x - 2)(-x - 1)$$

$$B = \left(-5x - \frac{1}{4}\right) \left(-5x + \frac{1}{4}\right)$$

$$A = -3x^2 + 2x - 3x + 2$$

$$B = 25x^2 - \frac{1}{16}$$

$$\boxed{A = -3x^2 - x + 2}$$

$$C = -5(-x - 3)^2 - (3x - 1)^2$$

$$C = -5(x^2 + 6x + 9) - (9x^2 - 6x + 1)$$

$$C = -5x^2 - 30x - 45 - 9x^2 + 6x - 1$$

$$\boxed{C = -14x^2 - 24x - 46}$$

$$D = (7x - 2)^2 - 7x + 2 - (4x - 3)(7x - 2)$$

$$D = 49x^2 - 28x + 4 - 7x + 2 - (28x^2 - 21x - 8x + 6)$$

$$D = 49x^2 - 35x + 6 - (28x^2 - 29x + 6)$$

$$D = 49x^2 - 35x + 6 - 28x^2 + 29x - 6$$

$$\boxed{D = 21x^2 - 6x}$$

$$E = x(2x + 7) - (2x + 7)^2$$

$$F = \frac{x - 4}{5} - \frac{x^2 - 2x + 3}{2}$$

$$E = 2x^2 + 7x - (4x^2 + 28x + 49)$$

$$F = \frac{2(x - 4) - 5(x^2 - 2x + 3)}{10}$$

$$E = 2x^2 + 7x - 4x^2 - 28x - 49$$

$$F = \frac{2x - 8 - 5x^2 + 10x - 15}{10}$$

$$\boxed{E = -2x^2 - 21x - 49}$$

$$\boxed{F = \frac{-5x^2 + 12x - 23}{10}}$$

ou

$$\boxed{F = -\frac{1}{2}x^2 + \frac{6}{5}x - \frac{23}{10}}$$

Exercice 2 :

$$G = (3x - 5)^2 - (-4x + 2)^2$$

$$H = \frac{49}{4}x^2 + \frac{21}{4}x + \frac{9}{16}$$

$$G = (3x - 5 - (-4x + 2))(3x - 5 - 4x + 2)$$

$$H = \left(\frac{7}{2}x\right)^2 + 2 \times \frac{7}{2}x \times \frac{3}{4} + \left(\frac{3}{4}\right)^2$$

$$G = (3x - 5 + 4x - 2)(-x - 3)$$

$$\boxed{H = \left(\frac{7}{2}x + \frac{3}{4}\right)^2}$$

$$G = (7x - 7)(-x - 3)$$

$$\boxed{G = -7(x - 1)(x + 3)}$$

$$I = (x + 5)(-x + 7) - 3(x^2 - 25)$$

$$I = (x + 5)(-x + 7) - 3(x + 5)(x - 5)$$

$$I = (x + 5)(-x + 7 - 3(x - 5))$$

$$I = (x + 5)(-x + 7 - 3x + 15)$$

$$I = (x + 5)(-4x + 22)$$

$$I = \boxed{2(x + 5)(-2x + 11)}$$

$$D = (7x - 2)^2 - 7x + 2 - (4x - 3)(7x - 2)$$

$$D = (7x - 2)[7x - 2 - 1 - (4x - 3)]$$

$$D = (7x - 2)(7x - 3 - 4x + 3)$$

$$\boxed{D = 3x(7x - 2)}$$

$$E = x(2x + 7) - (2x + 7)^2$$

$$E = (2x + 7)[x - (2x + 7)]$$

$$E = (2x + 7)(x - 2x - 7)$$

$$E = \boxed{(2x + 7)(-x - 7)}$$

$$J = x(6x - 30) - 14(3x - 15)$$

$$J = 2x(3x - 15) - 14(3x - 15)$$

$$J = (3x - 15)(2x - 14)$$

$$\boxed{J = 6(x - 5)(x - 7)}$$

Exercice 3 :

$$A(x) = \frac{4x + 1}{7} - \frac{2x + 3}{5}$$

$$B(x) = \frac{7}{3x - 12} - \frac{1}{x}$$

$$C(x) = \frac{4x - 7}{2x + 1} - \frac{2x - 1}{4x + 2}$$

Pas de valeur interdite

Valeurs interdites : 0 et 4

Valeur interdite : $-\frac{1}{2}$

$$A(x) = \frac{5(4x + 1) - 7(2x + 3)}{35}$$

Pour $x \neq 0$ et $x \neq 4$

Pour $x \neq -\frac{1}{2}$

$$A(x) = \frac{20x + 5 - 14x - 21}{35}$$

$$B(x) = \frac{7x - (3x - 12)}{x(3x - 12)}$$

$$C(x) = \frac{2(4x - 7) - 2x - 1}{4x + 2}$$

$$\boxed{A(x) = \frac{6x - 16}{35}}$$

$$\boxed{B(x) = \frac{4x + 12}{3x(x - 4)}}$$

$$C(x) = \frac{8x - 14 - 2x + 1}{4x + 2}$$

$$\boxed{C(x) = \frac{6x - 13}{2(2x + 1)}}$$

Exercice 4

Périmètre = côté x + 3 × longueur d'un demi-cercle de diamètre x

Aire = aire d'un carré de côté x + 3 × aire d'un demi-disque de rayon $(x/2)$.

$$\begin{aligned} \text{Périmètre} &= x + 3 \times \left(\frac{1}{2} \pi \times x\right) \\ &= x + \frac{3}{2} \pi x \end{aligned}$$

$$\text{Aire} = x^2 + 3 \times \frac{1}{2} \pi \left(\frac{x}{2}\right)^2$$

$$\text{Aire} = x^2 + \frac{3}{8} \pi x^2$$

$$\boxed{\text{Périmètre} = x \left(1 + \frac{3}{2} \pi\right)}$$

$$\boxed{\text{Aire} = x^2 \left(1 + \frac{3}{8} \pi\right)}$$

Pour $x = 10$ cm

$$\text{Périmètre} = 10 \times \left(1 + \frac{3}{2} \pi\right)$$

$$\text{Périmètre} \approx 57,12 \text{ cm}$$

$$\text{Aire} = 100 \left(1 + \frac{3}{8} \pi\right)$$

$$\text{Aire} \approx 217,81 \text{ cm}^2$$

2^{nde} 3 - Vendredi 20 octobre 2006
Corrigé de l'interrogation de mathématiques n°3 - Sujet B

Exercice 1 :

$$A = (7x - 4)(-x + 1)$$

$$B = \left(-3x - \frac{2}{9}\right) \left(-3x + \frac{2}{9}\right)$$

$$A = -7x^2 + 4x + 7x - 4$$

$$B = \boxed{9x^2 - \frac{4}{81}}$$

$$A = \boxed{-7x^2 + 11x - 4}$$

$$C = -7(-x - 2)^2 - (4x - 1)^2$$

$$C = -7(x^2 + 4x + 4) - (16x^2 - 8x + 1)$$

$$C = -7x^2 - 28x - 28 - 16x^2 + 8x - 1$$

$$C = \boxed{-23x^2 - 20x - 29}$$

$$D = (3x - 5)^2 - 3x + 5 - (2x - 7)(3x - 5)$$

$$D = 9x^2 - 30x + 25 - 3x + 5 - (6x^2 - 21x - 10x + 35)$$

$$D = 9x^2 - 33x + 30 - 6x^2 + 31x - 35$$

$$D = \boxed{3x^2 - 2x - 5}$$

$$E = x(-x + 7) - (-x + 7)^2$$

$$F = \frac{x - 7}{4} - \frac{x^2 + 3x + 1}{5}$$

$$E = -x^2 + 7x - (x^2 - 14x + 49)$$

$$F = \frac{5(x - 7) - 4(x^2 + 3x + 1)}{20}$$

$$E = -x^2 + 7x - x^2 + 14x - 49$$

$$F = \frac{5x - 35 - 4x^2 - 12x - 4}{20}$$

$$E = \boxed{-2x^2 + 21x - 49}$$

$$F = \boxed{\frac{-4x^2 - 7x - 39}{20}}$$

ou
$$F = \boxed{-\frac{1}{5}x^2 - \frac{7}{20}x - \frac{39}{20}}$$

Exercice 2 :

$$G = (6x - 1)^2 - (-2x + 5)^2$$

$$H = \frac{36}{25}x^2 + \frac{18}{5}x + \frac{9}{4}$$

$$G = [6x - 1 - (-2x + 5)][6x - 1 - 2x + 5] \quad H = \left(\frac{6}{5}x\right)^2 + 2 \times \frac{6}{5}x \times \frac{3}{2} + \left(\frac{3}{2}\right)^2$$

$$G = (6x - 1 + 2x - 5)(6x - 1 - 2x + 5)$$

$$H = \boxed{\left(\frac{6}{5}x + \frac{3}{2}\right)^2}$$

$$G = (8x - 6)(4x + 4)$$

$$G = 2(4x - 3) \times 4(x + 1) \quad G = \boxed{8(4x - 3)(x + 1)}$$

$$\begin{aligned}
 I &= (x+4)(-x+3) - (x^2 - 16) & D &= (3x-5)^2 - 3x+5 - (2x-7)(3x-5) \\
 I &= (x+4)(-x+3) - (x+4)(x-4) & D &= (3x-5)[3x-5-1-(2x-7)] \\
 I &= (x+4)[-x+3-(x-4)] & D &= (3x-5)(3x-6-2x+7) \\
 I &= (x+4)(-x+3-x+4) & D &= \boxed{(3x-5)(x+1)} \\
 I &= \boxed{(x+4)(-2x+7)}
 \end{aligned}$$

$$\begin{aligned}
 E &= x(-x+7) - (-x+7)^2 & J &= 3x(2x-10) - 3(4x-20) \\
 E &= (-x+7)[x-(-x+7)] & J &= 3x \times 2 \times (x-5) - 3 \times 4(x-5) \\
 E &= (-x+7)(x+x-7) & J &= \boxed{6(x-5)(x-2)} \\
 E &= \boxed{(-x+7)(2x-7)}
 \end{aligned}$$

Exercice 3 :

$$\begin{aligned}
 A(x) &= \frac{2x+7}{4} - \frac{x-3}{5} & B(x) &= \frac{5}{6x-12} - \frac{1}{x} & C(x) &= \frac{5x-2}{5x+2} - \frac{x-8}{10x+4} \\
 \text{Pas de valeur interdite} & & \text{Valeurs interdites : 2 et 0} & & \text{Valeur interdite : } -\frac{2}{5} \\
 A(x) &= \frac{5(2x+7) - 4(x-3)}{20} & \text{Pour } x \neq 2 \text{ et } x \neq 0 & & \text{Pour } x \neq -\frac{2}{5} \\
 A(x) &= \frac{10x+35-4x+12}{20} & B(x) &= \frac{5x-(6x-12)}{(6x-12)x} & C(x) &= \frac{2(5x-2)-(x-8)}{10x+4} \\
 A(x) &= \boxed{\frac{6x+47}{20}} & B(x) &= \boxed{\frac{-x+12}{6x(x-2)}} & C(x) &= \frac{10x-4-x+8}{2(5x+2)} \\
 & & & & C(x) &= \boxed{\frac{9x+4}{2(5x+2)}}
 \end{aligned}$$

Exercice 4 :

Périmètre = 1 côté x + 3 \times longueur d'un demi-cercle de diamètre x
 Aire = aire d'un carré de côté x + aire d'un demi-disque de rayon $(x/2)$

$$\begin{aligned}
 \text{Périmètre} &= x + 3 \times \left(\frac{1}{2} \pi x \right) & \text{Aire} &= x^2 + \frac{1}{2} \pi \left(\frac{x}{2} \right)^2 \\
 \text{Périmètre} &= \boxed{x \left(1 + \frac{3}{2} \pi \right)} & \text{Aire} &= \boxed{x^2 \left(1 + \frac{\pi}{8} \right)}
 \end{aligned}$$

Si $x = 5$ cm

$$\begin{aligned}
 \text{Périmètre} &= 5 \times \left(1 + \frac{3}{2} \pi \right) & \text{Aire} &= 25 \left(1 + \frac{\pi}{8} \right) \\
 &\approx 28,56 \text{ cm} & \text{Aire} &\approx 34,82 \text{ cm}^2
 \end{aligned}$$