NATIONAL EXAMINATION 2003/2004

MATHEMATICS VII

SECTION A

ANSWER 001

$$\frac{0,54x0,04x0,08}{0,9xx0,16} = 0,012$$

)r $$= \frac{0,001728}{0.4144} = 0,012$$

ou bein $$= \frac{0,14x0,04x0,008}{0,9x0,16} = \frac{\frac{54}{100}x\frac{4}{100}x\frac{8}{100}}{\frac{9}{10}x\frac{16}{100}}$$

$$= \frac{54}{100}x\frac{4}{100}x\frac{8}{100}x\frac{10}{9}x\frac{100}{16} = \frac{6x2}{100x10} = \frac{3}{250} = 0.012$$

ANSWER 002

The slope coefficient (Director) of the right $= \frac{5-(-1)}{3-0} = 2$

The equation of the line = y-5=2(x-3)

$\Leftrightarrow y-5=2x-6$

$\Leftrightarrow y=2x-1 \qquad (\Leftrightarrow 2x-y-1=0)$

Or y-(-1)=2(x-0)

$\Leftrightarrow y=1=2x$

$\Leftrightarrow y=2x-1 \qquad (\Leftrightarrow 2x-y-1=0)$

$m=2$

$y = mx + c$

$5 = 2x.3 + c$

$c = -1$

$y = 2x - 1$

Or $\begin{cases} 5 = 3x + c \\ -1 = 0 + c \end{cases}$ $m = 2$ $c = -1$ $y = 2x - 1$

Or $A(a_1, a_2) = (0,-1)$ $B(b_1, b_2) = (3,5)$

$D \equiv (b_2 - a_2)x - y(b_1, a_1) + a_2 b_1 - a_1 b_2 = 0$

$D \equiv (5+1)x - y(3-0) + (-1.3 - 0,5) = 0$

$D \equiv 6x - 3y - 3 = 0$

$D \equiv 2x - y - 1 = 0$

$ou \quad y - y_2 = \frac{y_2 - y_1}{x_2 - x_1} \Leftrightarrow y - 5 = \frac{5+1}{3}(x-3) \quad \Rightarrow y - 5 + 2 \qquad (x = 3)$

$y - 5 = 2x - 6 \Leftrightarrow y = 2x - 1$

ANSWER 003

$\frac{\overline{CD}}{9} = \frac{12+24}{12}(Cm)$

$\overline{CD} = \frac{36x9}{12}(Cm) = 27Cm$

$\overline{AD}^2 = (36^2 = 17^2)cm^2 = 2025cm^2$

$\overline{AD} = \sqrt{2025cm^2} = 45cm$

$\overline{AE}^2 = \overline{AB}^2 + \overline{BE}^2$

$12^2 + 9^2 = 225$

$\overline{AE} = \sqrt{225} = 15cm$

$\frac{AB}{BC} = \frac{AE}{ED} \Leftrightarrow \frac{12}{24} = \frac{15}{ED}$

$\Rightarrow 12\overline{ED} = 15x24$

$\overline{ED} = \frac{15x24}{12} = 30$

$AD = AE + ED$

$= 15cm + 30cm = 45cm \qquad ou \qquad pourThales: \ \frac{\overline{AD}}{\overline{AE}} = \frac{\overline{AC}}{\overline{ED}}$

$\overline{AD} = \frac{\overline{AE}.\overline{AC}}{\overline{AB}}$

$\overline{AD} = 15x36cm = 45cm$

ANSWER 004

The curved surface of the cone = 3,14 x 3cm x g or 3,14 x 3,3 x g = **47,1cm²**

$$\Rightarrow g = \frac{47{,}1cm^2}{3{,}14x3} = 5cm$$

The height of cone = $\sqrt{5^2 - 3^2}\,cm = 4cm$

The volume of cone $= \frac{1}{3}x3{,}14x3^2x4cm^3 = 37{,}68cm^3$

ANSWER 005

$(1{,}25)x : (25)2x = 1 = 1$

$\Leftrightarrow 53x : 52(2x+1) = 5$

$\Leftrightarrow 3x3x - 2(2x = 1) = 0$

$\Leftrightarrow 3x - 4x - 2 = 0 \quad \Rightarrow x = -2$

ou $5^{3x} : 5^{2(2x+1)} = 1$

$5^{3x} = 5^{2(2x+1)}$

$3x + 2(2x+1) = 0$

$3x = 4x + 2 \quad \Leftrightarrow x = -2$

ou $3x : 4x + 2 + 1$

$3x = 4x + 2$

$3x - 4x = 2$

$-x = 2$

$x = -2$

ANSWER 006

$$\begin{cases} x+2y=40 \\ y=60-3x \end{cases} \Leftrightarrow \begin{cases} x+2(60-3x)=40 \\ y=60-3x \end{cases}$$

$$\Leftrightarrow \begin{cases} x+120-6x=40 \\ y=60-3x \end{cases}$$

$$\Leftrightarrow \begin{cases} -5x=-80 \\ y=60-3x \end{cases} \Leftrightarrow \begin{cases} x=16 \\ y=12 \end{cases}$$

$$\begin{cases} x=2y=40 \\ y=60-3x \end{cases} \Leftrightarrow \begin{cases} x=2y=30 \mid x3 \\ 3x+y=60 \mid x1 \end{cases}$$

$$\begin{cases} 3x-6y=-12 \\ \underline{3x+\ y=60} \end{cases}$$

$$-5y=-60 \Rightarrow y=12 \Leftrightarrow (3) dans (1): x+2(12)=40 \Rightarrow x+24=40 \qquad alors\ x=16$$

$$S=\{(16,12)\}$$

ANSWER 007

$$\overrightarrow{AB}=\begin{pmatrix} 3,-(-2) \\ 6,-1 \end{pmatrix}=\begin{pmatrix} 5 \\ 5 \end{pmatrix}$$

$$\overrightarrow{CD}=\begin{pmatrix} 3,-0 \\ -1,-(-4) \end{pmatrix}=\begin{pmatrix} 3 \\ 3 \end{pmatrix}$$

$[A,B]$et $[C,D]$ are parallel $\Leftrightarrow k\begin{pmatrix} 3 \\ 3 \end{pmatrix}=\begin{pmatrix} 5 \\ 5 \end{pmatrix}$ so $3k = 5 \Rightarrow \frac{5}{3}$

thus $\frac{5}{3}\begin{pmatrix}5\\3\end{pmatrix}=\begin{pmatrix}5\\5\end{pmatrix}$ et two segments are parallel. $(\because \exists k \in \Re^*)$

or $\left\|\begin{array}{l}\overrightarrow{AB}\begin{pmatrix}5\\5\end{pmatrix} \text{ et } \overrightarrow{CD}\begin{pmatrix}3\\3\end{pmatrix}\\ \overrightarrow{AB} \text{ colinéairte à } \overrightarrow{CD}\end{array}\right.$ because 5 x 3 = 3 x5

ANSWER 008

- Coef.ang. = 1
- Coef.ang. = 1
- Condition = 1
- Conclusion=0,5

Let x age in years of greater student

The age of the youngest will $\frac{x}{2}$

therefore one third will $\frac{3}{4}x$

$$Ainsi \quad \frac{x}{2}+x+4x+\frac{3}{4}x=15x3=45 \Leftrightarrow 2x+4x+3x=180$$

$$\Leftrightarrow 9x=180 \quad \Rightarrow x=20$$

Years of the three students were 10.25 and 20 years

ANSWER 009

$$\frac{m}{y}-\frac{n}{x}=\frac{5}{9}-\frac{1}{6}$$

$$=\frac{10-3}{18}$$

$$=\frac{7}{18}$$

$$\frac{m}{x}+\frac{x}{y}=\frac{5}{6}+\frac{1}{9}$$
$$=\frac{15+2}{18}$$
$$=\frac{17}{18}$$

Hence $$\frac{\frac{m}{y}-\frac{n}{x}}{\frac{m}{x}+\frac{n}{y}}=\frac{7}{18}x\frac{18}{17}=\frac{7}{17}$$

ANSWER 010

$$\sqrt{x2-2x+1}=3 \quad \Leftrightarrow \quad x^2=2x+1$$
$$\Leftrightarrow \quad x2+2x-8=0$$
$$\Leftrightarrow \quad x2+4x-2x-8=0$$
$$\Leftrightarrow \quad x(x+4)--2(x+4)=0 \quad \Rightarrow x=2 \ et \ \ x=-4$$

Or

$$\sqrt{x^2+2x+1}=3 \quad \Leftrightarrow \quad x+1+3 \qquad -x-1+3$$
$$\sqrt{(x+1)^2}=3 \qquad\qquad x=3-1 \qquad -x=4$$
$$|x+1|=3 \qquad\qquad x=2 \qquad x=-4$$

ANSWER 011

$$\frac{\sqrt{45}+125}{\sqrt{30}-20}=\frac{3\sqrt{5}+5\sqrt{5}}{4\sqrt{5}-2\sqrt{5}}=\frac{8\sqrt{5}}{2\sqrt{5}}=4$$

Ou
$$=\frac{(3\sqrt{5}+5\sqrt{5})(4\sqrt{5}+2\sqrt{5})}{(4\sqrt{5}-2\sqrt{5})(4\sqrt{5}+2\sqrt{5})}=\frac{3\sqrt{5}x4\sqrt{5}+3\sqrt{5}x2\sqrt{5}+5\sqrt{5}x4\sqrt{4}+5\sqrt{5}x2\sqrt{5}}{(4\sqrt{5})^2-(2\sqrt{5})^2}$$
$$=\frac{12x5+6x5+20x5+10x5}{16.5-4.5}=\frac{60=30+100+50}{80-20}=\frac{240}{60}=4$$

ANSWER 012

$$\frac{1}{3}x-(x+1)\geq 3 \Leftrightarrow x-3(x+1)\geq 3.3$$

$$x-3x-3\geq 9$$

$$-2x\geq 12$$

$$x\leq -6 \qquad S=]-\infty,6]=]\leftarrow,6]$$

ANSWER 013

Let x be the number of students who play football only

Let y the number of students who only play volleyball

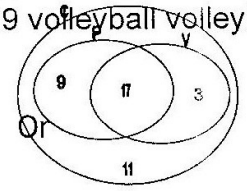
Z is the number of students who play football or n9 volleyball volleyball

Hence

$$x=17=26 \qquad \Rightarrow x=9$$

$$y=17=20 \qquad \Rightarrow y=3$$

$$17+9+3+z=40 \qquad \Rightarrow z=11$$



Or

ANSWER 014

A) x measure the interior angle of regular polygon is, the exterior angle x-60

Thus $\Leftrightarrow x + (x-60^{o}) = 180^{0}$

$\Leftrightarrow 2x = 24^{0}$

$\Leftrightarrow x = 120^{0}$

b) the exterior angle $=12^{0}-60^{0} = 60^{0}$

The number of sides $=\frac{360^{0}}{60^{0}} = 6$

$(n-2)180 = n\,x\,120$

$180n - 360 = 120n$

$180n - 120n = 360$

$60n = 360$

$n = 6$

ANSWER 015

Let x(RwF) investment of John

The investment of Sally is (x-200) RwF

Consider the investment period the interest of John = $x.\frac{6}{100}Frw$

Interest by Sally =(x-2000) $\frac{9}{100}$ t Frw

$\Leftrightarrow \frac{6x}{100}t = \frac{(x-2000).9}{1000}t$

$\Leftrightarrow 6x = (x-2000).9$

$\Leftrightarrow 6x = 9x - 15000$

$\Leftrightarrow 3x = 18000$

$\Leftrightarrow x = 600$. John has invested $600Frw$

SECTION B

ANSWER 016

1°)

x	-3	-2	-1	0	1	2	3
Y	10	4	0	-2	-2	0	4

For x = -3, $y = (-3)^2-(-3)-2=10$
x = -2, $y = (-2)^2-(-2)-2=4$
x = -1, y = (-1)2-(-1)-2=0
x = 0, $y = 0^2-0-2 = -2$
x = 1, y = (1)2-(1)-2 = -2
x = 2, $y = 2^2 = 2 = 2 =0$
x = 3, $y n= 3^2-3-2=4$

3°) *a)* $x = 0,5$; $y \cong -2,3$

b) $y = -1$; $x = 1,5$ *ou* $x = -0,6$

ANSWER 017

1) 1°. a)

b).

$10x^2 + 17x + 3 = 10x^2 + 15X + 2x + 3$

$= 5x(2x+3) + (2x+3)$

$= (5x+1)(2x+3)$

$10x^2 - 3x^2 - 31x - 6 = (x-2)(5x+1)(2x+3) = 0$

$\Rightarrow x = 2 \quad ou \quad x = -\frac{1}{5} \quad ou\, x = -\frac{3}{5}$

2°).

$3x^2 + 7x + 2 = 3x^2 + 6x + x + 2$

$= 3x(x+2) + (x+2)$

$= (3x = 1)(x+2)$

$\frac{5}{(x+2)(3x+1)} + \frac{2x-3}{x+2} = 0 \quad \Leftrightarrow 5 + (3x+1)(2x-3) = 0$

$\Leftrightarrow 5 + 6x^2 - 7x - 3 = 0$

$\Leftrightarrow 6x^2 - 7x + 2 = 0$

$\Leftrightarrow 6x^2 - 4x - 3x + 2 = 0$

$\Leftrightarrow 2x(3x-2) - (3x-2) = 0$

$\Leftrightarrow (2x-1)(3x-2) = 0 \qquad x = \frac{1}{2} \quad ou \quad x = \frac{2}{3}$

$3x^2 + 7x + 2 = 3x^2 + 6x + x + 2$

$= 3x(x+2) + (x+2)$

$= (3x = 1)(x+2)$

$\frac{5}{3x^2 + 7x + 2} = -\frac{2x-3}{x+2} \quad \Leftrightarrow 5 + (3x+1)(2x-3) = 0$

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

$\Leftrightarrow 6x^2 - 7x + 2 = 0$

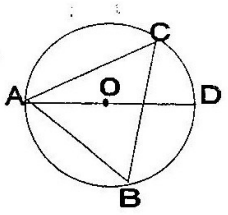
$\Leftrightarrow 6x^2 - 4x - 3x + 2 = 0$

$\Leftrightarrow 2x(3x-2) - (3x-2) = 0$

$\Leftrightarrow (2x-1)(3x-2) = 0 \qquad x = \frac{1}{2} \quad ou \quad x = \frac{2}{3}$

ANSWER 018

2) 1.



A) connecting B to D

$A\hat{D}B = A\hat{C}B = 50$ (they underlie the same Arc

AB)

B) $A\hat{B}D = 90^0$ $CAD = Diamètre$

$D\hat{A}B = 180^0 - (90^0 + 50^0) = 40^0$

The sum of the angles of the triangle ABD = 1800

A).

$\overline{MO}^2 = a + b$ et $\overline{MO}^2 = c^2 + d^2 \Rightarrow ainsi$ $a2 + b2 = c^2 + d^2$

$a^2 = c^2 + d^2 - b^2$

$a^2 = \sqrt{c^2 + d^2 + b^2}$

B). l'aire du $\frac{1}{2}$ cercle $\overline{MP0} = \frac{1}{2} x3{,}14x5cm\,x\,5cm = 39{,}25Cm^2$

$\overline{PO}^2 = \overline{MO}^2 - \overline{PM}^2 = (10cm)^2 - (8cm)^2$

$\overline{PO} = \sqrt{36cm} = 6cm$

The area of triangle $MPO = \frac{1}{2} x6cmx8cm = 24cm^2$

The shaded area=39,25cm2 x -24cm2=15,25cm^2

C). $\overline{MO}$). is common to triangles $\overline{MPO}$ et $\overline{MNO}$

$\overline{MN}$ = $\overline{OP}$ (data)

$M\hat{P}O$ = $M\hat{N}O$ - 90 (angles subtended by the diameter of the circumference)

Δ MNO ≡ ΔOPM (Right Angle - hypotenuse-size)