NATIONAL EXAMINATION 2000/2001

MATHEMATICS VII

SECTION A
ANSWER 001

$\frac{12+19+28+x+51}{5} = 30$

$\Leftrightarrow \frac{110+x}{5} = 30$

$\Leftrightarrow 110 + X = 150$

$\Leftrightarrow X = 40$

ANSWER 002

$(\sqrt{2}+\sqrt{3})^2 = \sqrt{2}^2 + 2\sqrt{2} + \sqrt{3}^2$

$= 2 + 2\sqrt{6} + 3$

$= 5 + 2\sqrt{6}$

ANSWER 003

Y = 4° car correspondants

Z = 180°-(60°+y)

= 180° - (60° + 40°)

= 80°

X = 180° - (40 + z) °

= 180° - (40° + 80))

ANSWER 004

$\frac{21}{A} = \frac{1}{X} + \frac{1}{Y}$ et x = 3

Y = 4

$\Leftrightarrow \frac{21}{A} = \frac{1}{3} + \frac{1}{4}$

$= \frac{4+3}{12}$

$= \frac{7}{12}$

$\Leftrightarrow$ 7 A = 21.12

$\Leftrightarrow$ = A = $\frac{21.12}{7}$

A = 36

ANSWER 005

A = {0,1,2,3,4,6

B = {0,2,4,8

A ∩ B = {0,2,4}

A∪ B = {0,1,2,3,4,6,8}

A ∩ B, A∪ B { 1,3,6,8 }

ANSWER 006

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

$$= \frac{2x+1}{2x-1}$$

ANSWER 007

Diameter = hypotenuse of the triangle ABC

AC ^{2} = AB ^{2} + BC ^{2}

AC = $\sqrt{AB^2+BC^2 cm}$

= $\sqrt{4^2+3^2 cm}$

= 5cm

Circumference =D x Π

= 1cm x 5 x 3,14

= 15,7 cm

ANSWER 008

. **A** (5,-3) and B (-6,5)

⇔ M ($\frac{5-6}{2}$; $\frac{-3+5}{2}$)

⇔ M ($-\frac{1}{2}$, $\frac{2}{2}$)

⇔ M ($-\frac{1}{2}$, 1)

ANSWER 009

Volume sphere = $\frac{4}{3}\Pi^3$

$V = \frac{4}{3} . 3,143^3 x 1cm^3$

$= \frac{4}{3} .3,14.27cm^3$

$= 113,04cm^3$

ANSWER 010

a) 4 lines of symmetry: the diagonals and the 2 medians

b) s (A) = A

s (B) = B

s (C) = C

s (Δ) = B

ANSWER 011

$A = (3203)_4$

$B = (1111)_2$

$A = (3 x4°) + (0x41) + (2 x 4^2) + (3x4^3) = 3+0+32+192= (227)_{10}$

$B = (1 x2°) + (1 x2^1) + (1 x2^2) + (1x2^3) = 1+2+4+8= (15)_{10}$

$(227 + 15)_{10} = (242)_{10}$

$(242)_{10} = (?)_6$

$\frac{242}{2} / \frac{6}{40} / \frac{6}{6} / \frac{6}{1}$

$4 \quad 0$

$242_{10}: 1042_6$

ANSWER 012

Report of similarity: =: $\frac{3.6cm}{2,4cm} = \frac{3}{2}$

B'C' $= (3 \times \frac{3}{2})$ cm

$= \frac{9}{2}$ cm

$= 4,5$ cm

AC' $= (3,6 \times \frac{3}{2})$ cm

$= (1,8 \times 3)$ cm

$= 5,4$ cm

With the Thales theorem, we have:

$\frac{AB}{AB'} = \frac{AC}{AC''} = \frac{BC}{B'C''}$ and : $\frac{2,4}{3,6} = \frac{3,6}{B'C''}$

$\Leftrightarrow 2,4\ A'C' = 3,6^2$

$\Leftrightarrow A'C' = \frac{3,6^2}{2,4} = 5,4cm$

LAnd $\frac{2,4}{3,6} = \frac{BC}{B'C''}$

$\Leftrightarrow \frac{2,4}{3,6} = \frac{3}{B'C''}$

$\Leftrightarrow 2,4\ B'C' = 3.3,6$

⇔ B'C' = $\frac{3.3.6}{2,4} = \frac{9}{2}$

⇔ B'C' = 4,5cm

ANSWER 013

$$\frac{3x^3y^3 + 12x^2y^5}{9x^2y^4}$$

Demonstration of a common factor

$$\frac{3x^2y^9(x+4y^2)}{3x^2y^3(3y)} = \frac{x+4y^2}{3y}$$

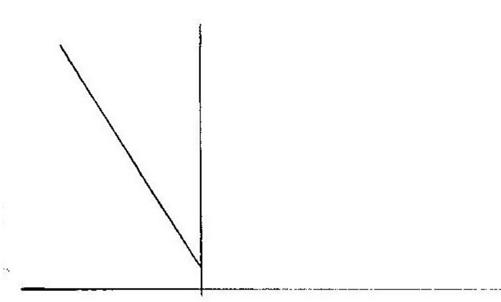
ANSWER 014

X (-2 ;4) et y (0,1)

Translation tv where V = $\begin{pmatrix} -2 \\ 3 \end{pmatrix}$

X' $\begin{bmatrix} -2-2 \\ 4+3 \end{bmatrix}$ = x' $\begin{bmatrix} -4 \\ 7 \end{bmatrix}$

Y' $\begin{bmatrix} 0-2 \\ 1+3 \end{bmatrix}$ = y' $\begin{bmatrix} -2 \\ 4 \end{bmatrix}$



The segments xy and x'y 'are collinear and of equal length

ANSWER 015

a) $2x + y + 1 = 0$

$x - y - 7 = 0$

$$\Leftrightarrow \begin{cases} 2x + y = -1 \\ x - y = 7 \end{cases}$$

$\Leftrightarrow \quad 3x = 6$

$\Leftrightarrow X = 2$

$2.2 + y + 1 = 0$

$\Leftrightarrow 4 + y + 1 = 0$

$\Leftrightarrow y = -5$

b) (-1 ; 1= and (2,5)

a_1 a_2 b_1 b_2

$\Delta = y - a_2 = m(x - a_1)$

And $m = \frac{b_2 - a_2}{b_1 - a_1} = \frac{5+1}{2+1} = \frac{6}{3} = 2$

$\Delta = y + 1 = 2(x+1)$

$\Delta = y + 1 = 2x + 2$

Δ = y = 2x + 2-1

Δ = y : 2x+1

Δ = 2x – y +1 = 0

SECTION B

ANSWER 016

a) $f(x) = 2x+1$

$G(x) = x^2 -2$

(1) $g(f(x)) = (2x+1)^2 -2$

$= (4x^2 +4x +1) -2$

$= 4x^2+4x-1$

(2) $g(f(-2) = 4.(-2)^2+4(-2)-1$

$= 16-8-1$

$= 7$

b) $p(x) = 2x^3+9x^2+7x+6$

(1) divide by 2x-1

$2x^3 + 9x^2 + 7x -6$ $\qquad \dfrac{2x-1}{x^2+5x+6}$

$\dfrac{2x^3+x^2}{10x^2+5x}$

$\dfrac{-10x^3+5x}{12x-6}$