Question I- **(2 points)**

Choose the correct answer. Then justify your choice.

		Answers		
	Questions	**a**	**b**	**c**
1)	$\left(\dfrac{4}{5}\right)^{41}\left(\dfrac{5}{4}\right)^{40} =$	$\dfrac{4}{5}$	$\dfrac{5}{4}$	1
2)	If $x=\sqrt{6-\sqrt{11}}-\sqrt{6+\sqrt{11}}$, then $x^2=$	$6 - \sqrt{11}$	2	16
3)	If $P(x) = ax^3+(b+1)x^2+1$ $Q(x) = 9x^3+15x^2+ c$ are identical then	a=9 b=14 c=1	a=9 b=-14 c=0	a=3 b=0 c=1

Question II- **(2 points)**

A shop reduces the prices by 30%.

1) Let x be the original price of an article and y its reduced price.

   Show that y is a linear function in terms of x.

2) A shirt costs 100 $. What will be the reduced price?
3) We payed 90 $ for an item. What was its original price?

Question III- **(2.5 points)**

1)

   a. Rationalize F = $\dfrac{3\sqrt{7}+\sqrt{3}}{\sqrt{7}+\sqrt{3}}$

   b. Verify that $\dfrac{13}{2}-\dfrac{\sqrt{84}}{4}-F$ is an integer.

2) Given the equation $(x^2+1) (5x + 1) = 0$.

   a. Prove that - 1/5 is a root of this equation.

   b. ABC is a triangle of sides: $4 + 5P$; $\dfrac{11}{5}- 4P$; $\sqrt{\dfrac{44}{5}-P}$ **where P=- 1/5.**

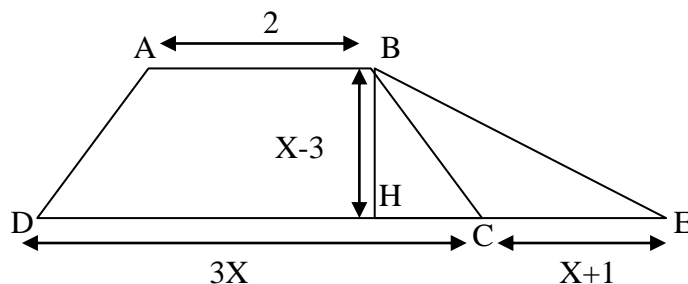   Is ABC an equilateral triangle? Justify.

Question IV- (3.5 points)

1) Consider the two polynomials:

P(x)=2(x-3)²–(3-x)(x+8)

and Q(x)= x²-2x -3.

   a. Show that P(x) = (x-3) (3x+2).

   b. Verify that Q(x) = (x+1) (x-3).

   c. Solve P(x) =Q(x).

2) In the adjacent figure, ABCD is an isosceles trapezoid of height [BH]. Find the value of X so that the trapezoid ABCD and the triangle BCE have the same area.

Question V- (4 points)

in an orthonormal system (x´Ox , y´Oy), consider the two lines (D) of equation y = -2x + 5 and (D´) of equation $y = \frac{x}{2}$.

1)
   a. Draw (D) and (D´).
   b. What is the relative position of (D) and (D´)? justify.
2) Let I be the point of intersection of (D) and   (D´).

   Calculate the coordinates of I.

3) Consider the three points A(-1 ; 3) , B(-2 ; 1) and E(2 ; m+1) where m is a real number.
   a. Plot the points A and B.
   b. Write the equation of the line(AB).
   c. Calculate m so that the point E belongs to the line(AB).

Question VI- (6 points)

Consider a semi circle of center O, radius R and diameter [AB].

and by M any point of the arc $\overset{\frown}{CB}$ Designate by C the midpoint of the arc $\overset{\frown}{AB}$

in I. $C\hat{O}M$ The segment [AM] cuts [OC] in D and the bisector of the angle

1) Draw the figure.
2)
   a. Calculate the measure of [CA] in terms of R.
   b. Calculate the angle $C\hat{M}A$
   c. Show that the straight line (OI) is the perpendicular bisector of [CM].
   d. Prove that CIM is right isosceles triangle.
3) M varies on the arc $\overset{\frown}{CB}$. Prove that the locus of the point I is a fixed circle and determine its center and radius.
4)
   a. Prove that the two triangles AOD and AMB are similar.
   b. Deduce that AD╳ AM = 2R².

Good work