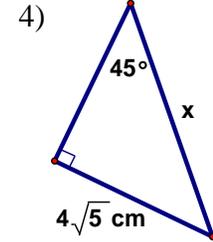
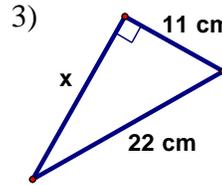
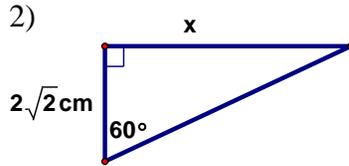
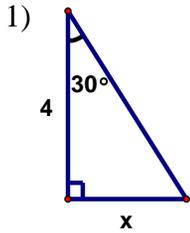




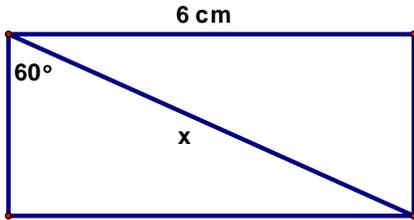
MATHEMATICS

I) Calculate each of the following: 1) $2.\overline{32} - \frac{5}{99}$ 2) $(2.\overline{6} + 1.\overline{3})^2$ 3) $0.\overline{32} \div \frac{16}{11}$

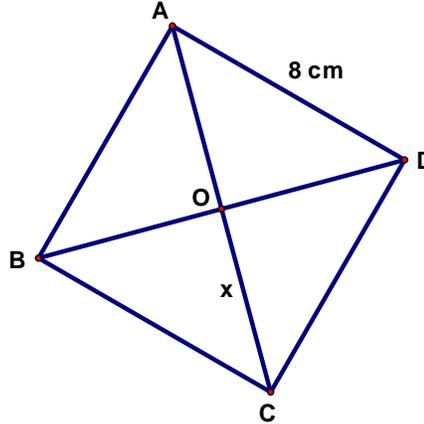
II) Find the value of x in each figure: Exact, then to the nearest 10^{-2} :



5) **Rectangle**



6) **Square** (OC = x)



III) 1) Evaluate: $M = \frac{a^2}{3} - \frac{4}{3}$; $a = \sqrt{3} - 1$. Present the final answer in the form $b\sqrt{3}$, where $b \in \mathbb{Q}$.

2) Evaluate: $N = [\sqrt{2}(2\sqrt{5} + 1)]^2$. Present the final answer in the form $a + b\sqrt{5}$, where a and b are natural numbers.

IV) 1) a) Compare 7 and $5\sqrt{2}$ by squaring.

b) Deduce the simplified form of: $\sqrt{(7 - 5\sqrt{2})^2}$.

2) a) Expand and reduce: $(4\sqrt{2} - 6)^2$.

b) Deduce the simplified form of: $\sqrt{68 - 48\sqrt{2}}$.

c) One side of a square measures: $(6 - 4\sqrt{2})$ cm. What is the area of this square?

V) Write in the form $a + b\sqrt{3}$:

1) $(2 - \sqrt{27})(4 + \sqrt{3})$

2) $\frac{1-\sqrt{3}}{4\sqrt{3}}$

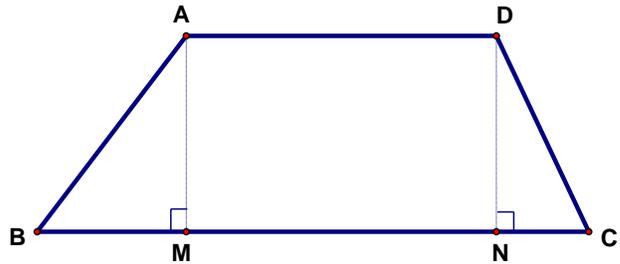
3) $\frac{2-\sqrt{3}}{\sqrt{3}+1}$

- VI)** 1) Factorize: a) $4x^2 - 10$ b) $4x^2 - 4x\sqrt{3} + 3$
 2) The area of a rectangle is: $(25 - 6x^2)cm^2$.
 Determine the dimensions of this rectangle as algebraic expressions.
 3) The area of a square is: $(1 + 6x + 9x^2)cm^2$.
 Determine the length of one side of this square as an algebraic expression.

VII) 1) Solve for "x": a) $(3x + \sqrt{3})^2 = 9$ b) $2 - (x\sqrt{2} + 1)^2 = 0$

- 2) One side of an equilateral triangle measures $4x\sqrt{3}cm$.
 Find the perimeter and area of this triangle as algebraic expressions.

- 3) ABCD is a trapezoid having bases [AD] and [BC].
 [AM] and [DN] are two heights of this trapezoid.
 BM=3cm; AM=4cm; BC=10cm; NC=1cm
 a) Calculate AB.
 b) Calculate MN.
 c) Calculate DC.
 d) Calculate the perimeter of ABCD.
 e) Calculate the area of ABCD.



- 4) MNPQ is a rhombus of center O such that MP=16 cm and NQ=12cm.
 a) Calculate the length of one side of this rhombus
 b) Calculate the area of this rhombus.

- VIII)** 1) ABCD is a rhombus such that A and C are fixed.
 How do B and D vary? (What is the geometric locus of B and D?)

- 2) ABCD is a rectangle such that B and D are fixed.
 How do A and C vary? (What is the geometric locus of A and C?)

- 3) ABC is a triangle such that [BC] is fixed. The height relative to [BC] is AH=6cm.
 a) What is the geometric locus of A?

- b) M is a point on [AB] and N is a point on [AC] such that $MN = \frac{BC}{2}$.
 What is the geometric locus of points M and N?

- IX)** 1) Determine whether each of the following numbers is rational or irrational:

a) $\sqrt{12}(3\sqrt{2})(\sqrt{8})$ b) $-\pi\sqrt{4} + 2\pi$ c) $1.\overline{52} + \frac{2}{99}$

- 2) Determine whether each of the following is true or false:

a) If $x^2 = y^2$, then $x = y$. b) If $a - b = 0$, then $a = b$
 c) If $x < y$, then $x^2 < y^2$ d) $\sqrt{(m - n)^2} = m - n$

- 3) If $A^2 = 4 + 2\sqrt{3}$; $B^2 = 4 - 2\sqrt{3}$ and $A \times B = -2$, deduce $(A - B)^2$ and $(A + B)^2$.