Lycée Des Arts

Name: .....

Class : ***Grade 8*** Section: … Date :.....

Exam in: ***Math***

Midterm

إرشادات عامة: 1. أكتب بخط واضح ومقروء.

2. عدد الأسئلة 6.

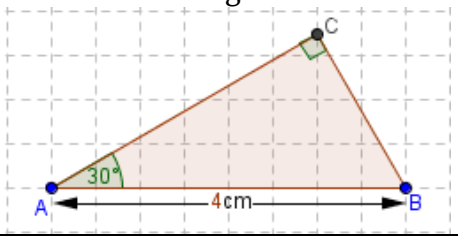
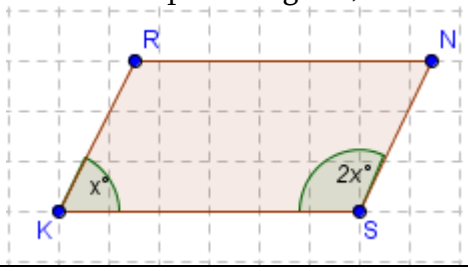
3. يمكنك البدء في أي سؤال تريد.

4. عدم استخدام الآلة الحاسبة.

5. العلامة القصوى 30.

1st exercise: (4 pts)

Choose with **justification** the correct answer:

No.	Questions	Answers		
		a	b	c
1.	The area of triangle ABC is 	$2\sqrt{3}cm^2$	$4\sqrt{3}cm^2$	$12cm^2$
2.	If $E=\frac{3^{13}-3^{12}}{2}$, then E =	$\frac{3}{2}$	0	3^{12}
3.	If *RNSK* is a parallelogram, then x^o= 	60°	80°	120°
4.	If $4^2\times 2^{x+1}\times 2^3=8^5$, then x=	23	-1	7

2nd exercise: (4pts)

Consider the following numbers:

$$A=\frac{1}{5}-\left(\frac{2}{5}\right)^2 \; ; \; B=\left(2-\sqrt{5}\right)^2+2\left(8+\sqrt{20}\right) \; ; \; C=-\frac{1.25\times 8\times 10^7\times 10^{-4}}{4\times 10^2}.$$

By writing all the steps of calculations:

1) Write A in the form of an irreducible fraction then in scientific notation. (1pt)
2) a. Show that B is a natural number. (1pt)
   b. Show that C is an integer. (1pt)
3) Show that among A, B, and C, there are two opposite numbers and two reciprocal numbers. **Justify**.(1pt)

3rd exercise: (3pts)

Given the following numbers:

$$X = 2\sqrt{75} + 3\sqrt{48} + 2\sqrt{27} - 2\sqrt{363} \quad \& \quad Y = \left(2 + 3\sqrt{2}\right)^2 + \left(2\sqrt{2} - 3\right)\left(2\sqrt{2} + 3\right).$$

1) Write X in the form $a\sqrt{3}$ and Y in the form $b + c\sqrt{2}$ where a, b, and c are integers to be determined. (2pts)
2) Rationalize the denominator of $\frac{A}{B}$. (1pt)

4th exercise: (6pts)

Consider the following polynomial:

$$N(x) = 4x^2 - (2x - 3)^2 - 2(x - 1)(3 - 2x) - 9.$$

1) Develop N(x). (¾ pt)
2) Prove that $N(x)$ can be written in the form $N(x) = 2(2x - 3)(x + 2)$ in two different ways.(1½ pts)
3) Calculate the numerical value of $N(-2)$. What can you say about $x = -2$? **Justify**. (½ pts)
4) Let $R(x) = (2m + 1)x^2 - 3mx - 4.$
   a. Find the value of m, if -1 is a root of $R(x)$. (½ pt)
   b. Write the expression $R(x)$ as a product of two factors, in case $m = 0$, then solve the following equations:
      i) R(x) = -2 ii) R(x) = (2x + 4) (¼ . ½ , ¾ pts)
5) a. If $K(x) = \frac{R(x)}{N(x)}$, then find the values of x for which $K(x)$ is defined. (½ pt)

   b. Solve the equation $K(x) = \frac{3}{2}$. (¾ pt)

5th exercise: (5pts)

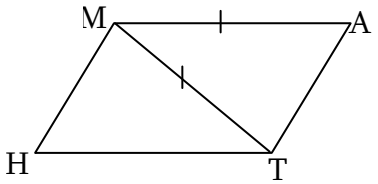
Consider a parallelogram *ABCD* such that *AC* = *AB* and let *M* be the midpoint of [*BC*].

1) Draw a figure. (½ pt)
2) Show that $(AM) \perp (BC)$. (½ pt)
3) Plot *E*, the symmetric of *A* with respect to *M*. What is the nature of quadrilateral *ABEC*? (1pt)
4) Show that *the points D*, *C* and *E* are collinear and that *C* is the midpoint of [*DE*]. (2pts)
5) Show that triangle DAE is right at A. (1pt)

6th exercise: (8pts)

Consider an isosceles triangle AMT at vertex M. H is the fourth vertex of the parallelogram MATH. Let [My) be the bisector of $A\hat{M}T$ that cuts [AT] at O, & let R be the symmetric of M with respect to O.

1. Reproduce the figure and complete it. (1 ½ pts)
2. a. What does the straight-line (MO) represent for [AT]? **Justify**. (1pt)
   b. Determine the nature of quadrilateral MART. (1 ½ pts)
   c. Show that MH = 2TO. (1pt)
3. Let I be the midpoint of [MH]. Show that TOMI is a rectangle. (1 ½ pts)
4. How should the nature triangle AMT be changed so that MART becomes a square? Explain your answer. (1 ½ pts)



Good Work