This is a Class 1 exam

Lebanon Evangelical School
for Boys and Girls
Loueizeh - Baabda

Stage Exam 04

12FEB2024

Do NOT write in this box. Your MARK will be placed here.

Subject :	Maths
Class :	8A, 8B, 8C and 8E
Teacher :	Mrs. Rima Al Banna
Duration :	1 hour

1.Write all of your solutions neatly on a separate paper unless stated otherwise.
2. Show all of your work.
3. Calculators are not allowed.

Your name :		*Time taken to complete exam*
Your Class :		
Exam Room :		
How many sheets, including cover sheet :		

- Do not open this paper until the teacher in charge instructs you to do so.
- The most important thing to remember in taking an exam is NEVER PANIC.
- If you are caught cheating in this exam, you will be awarded zero for ALL exams that are taken on this day.

Exercise: 1 [7pts]

Factorize the following expressions:

$A=(x+7)(3x-2)+(9x^2-12x+4)$

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

$C=3a^2c^2+bd+3abc+acd$

Exercise: 2 [6pts]

Given the expression: $E(x)=(4x^2-1)+(2x+1)^2+x(2x+1)$

1) Expand and reduce $E(x)$.
2) Factorize $E(x)$.
3) Calculate $E\left(\frac{-1}{2}\right)$

Exercise: 3 [3pts]

$E(x)=(-2x+5)^2+(2x+5)^2$

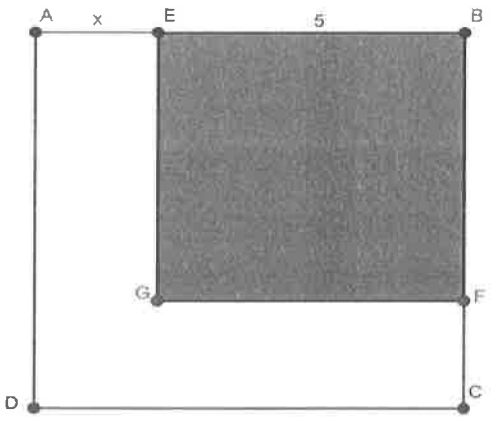
a) Develop and reduce E(x).

b) Calculate $E\left(\frac{1}{2}\right)$

Exercise: 4 [5pts]

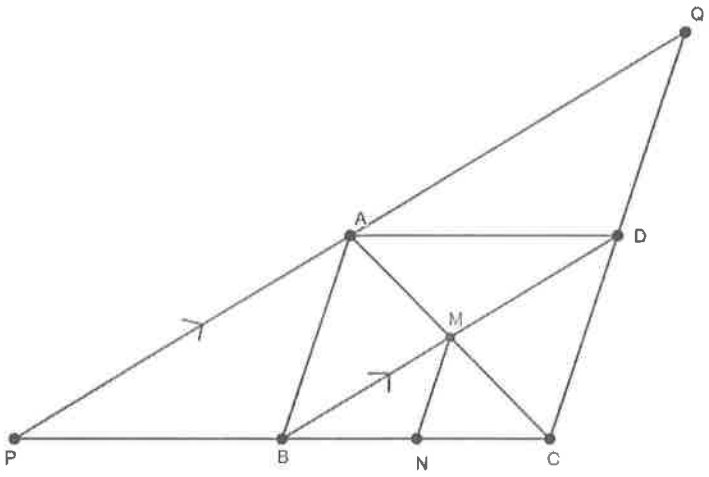
In the adjacent figure ABCD and BEGF are two squares such that: BE=5 and AE= x.

1) Calculate in terms of x the length of [AB].
2) Calculate in terms x the area of square ABCD.
3) Calculate the area of square EBFG.
4) Calculate in terms of x the area of the unshaded part. Reduce your answer.
5) Calculate the area of the unshaded part for x=3.



Exercise: 5 [9pts]

ABC is a triangle. M and N are the midpoints of the sides [AC] and [BC] respectively. The line (AP) is parallel to line (BM) and intersects line (BC) in point P.



1) Show that B is the midpoint of [PC].
2) Line (CQ) is parallel to (AB) and intersects line (AP) in point Q. Show that A is the midpoint of [PQ].
3) D is the midpoint of [CQ].
   a) Prove that AMDQ is a trapezoid.
   b) Prove that $BM = \frac{PQ}{4}$

Solution of SE04 Class I

Maths _ ABCE

Exercise: 1

$A = (x+7)(3x-2) + (9x^2 - 12x + 4)$ (each ✓ is a $\frac{1}{4}$)

$A = (x+7)(3x-2) + (3x-2)^2$

$A = (3x-2)(x+7+3x-2)$ ②

$A = (3x-2)(4x+5)$.

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

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

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

$B = (5x-1)(2x-6)$ ③

$B = 2(5x-1)(x-3)$

$C = 3a^2c^2 + bd + 3abc + acd$

$C = 3a^2c^2 + 3abc + bd + acd$

$C = 3ac(ac+b) + d(b+ac)$ ②

$C = (ac+b)(3ac+d)$.

Exercise: 2

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

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

$E(x) = 10x^2 + 5x$

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

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

$E(x) = (2x+1)(2x-1+2x+1+x)$

$E(x) = (2x+1)(5x)$. ②$\frac{1}{2}$

OR

$E(x) = 10x^2 + 5x$

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

②$\frac{1}{2}$

each ✓ is a half if this method was used.

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

$E\left(\frac{-1}{2}\right) = \left(2\left(\frac{-1}{2}\right)+1\right)\left(5\left(\frac{-1}{2}\right)\right)$

$E\left(\frac{-1}{2}\right) = (-1+1)\left(-\frac{5}{2}\right)$ (1 ½)

$E\left(\frac{-1}{2}\right) = 0\left(-\frac{5}{2}\right) = 0$

Exercise: 3.

a) $E(x) = (-2x+5)^2 + (2x+5)^2$

$E(x) = (2x-5)^2 + (2x+5)^2$ (2)

$E(x) = 4x^2 - 20x + 25 + 4x^2 + 20x + 25$

$E(x) = 8x^2 + 50$

b) $E(x) = 8x^2 + 50$ (1)

$E\left(\frac{1}{2}\right) = 8\left(\frac{1}{2}\right)^2 + 50 = 8\left(\frac{1}{4}\right) + 50 = 2 + 50 = 52.$

Exercise: 4

1) $AB = AE + EB = x + 5$ (5)

2) Area of square ABCD = side^2 = AB^2 = $(x+5)^2$

3) Area of square EBFG = side^2 = EB^2 = 5^2 = 25.

4) Area of the unshaded part = Area of square $_{ABCD}$ − Area of EBFG

$= (x+5)^2 - 25 = x^2 + 10x + 25 - 25 = x^2 + 10x.$

5) for $x = 3$ the area of the unshaded part = $3^2 + 10(3) = 9 + 30$

$= 39$

Exercise: 5

1) In Δ APC we have:

M is the midpoint of [AC] (given).

(BM) // (AP) (given) (2)

then B is the midpoint of [PC] (converse of midsegment theorem)

2) In ΔPCQ we have:
- B is the midpt. of [PC] (proven)
- (BA) // (CQ) (given).

then A is the midpoint of [PQ] (converse of midsegment theorem) ②

3) a) In ΔACQ we have:
- M is the midpoint of [AC] (given)
- D is the midpoint of [CQ] (given)

then (MD) // (AQ) (midsegment theorem). ③
since (MD) // (AQ) (proven) then AMDQ is a trapezoid for having 2 parallel sides.

b) In ΔPAC we have:
- B is the midpoint of [PC] (proven)
- M is the midpoint of [AC] (given)

then $BM = \frac{PA}{2}$ (midsegment theorem) ②

but $PA = \frac{PQ}{2}$ (A is the midpoint of [PQ])

so $BM = \frac{\frac{PQ}{2}}{2} = \frac{PQ}{2} \times \frac{1}{2} = \frac{PQ}{4}$ (by substitution).