Section One: Circle the correct solution.

(handwritten) 12, 1
3, 4
-6 +2

1.   For the expression $x^2 - \boxed{?}x - 12$ to be factorable, give the value for $\boxed{?}$.

   (A)   2   (B)   3   (C)   4   (D)   6

2.   A polynomial is represented by the tiles shown below. What are the factors of the polynomial? (Consider the shaded tiles positive!!)

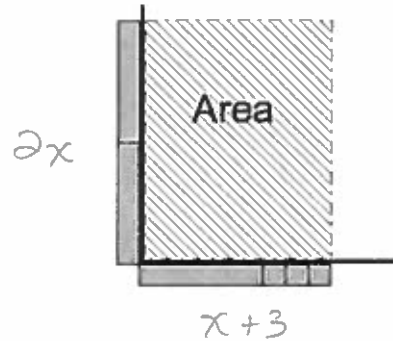   (A) $(x+3)(x-2)$

   (B) $(x+3)(x+2)$

   (C) $(x-3)(x-2)$

   (D) $(x-3)(x+2)$

(handwritten near figure: x +2, x, -3)
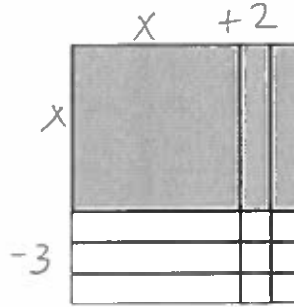
3.   Two students set up some algebra tiles to help model a product. Which expression represents the modeled area?(Shaded tiles are positive)

   (A) $x^2 + 6x$ *(handwritten)* $2x(x+3)$

   (B) $2x^2 + 3x$ *(handwritten)* $2x^2 + 6x$ $2x$

   (C) $x^2 + 3x$

   (D) $2x^2 + 6x$

(handwritten) $x + 3$

4.   Multiply: $(2x-3)(3x+4)$.   *(handwritten)* $= 6x^2 + 8x - 9x - 12 = 6x^2 - x - 12$

   (A) $6x^2 - x - 12$ (B) $6x^2 - 12$

   (C) $6x^2 - 17x - 12$ (D) $6x^2 + 2x - 12$

5.   A rectangle has dimensions $(2x - 3)$ and $(3x + 1)$. Find the area of the rectangle.

   (handwritten) $(2x-3)(3x+1)$
   $= 6x^2 + 2x - 9x - 3$
   $= 6x^2 - 7x - 3$

   (A) $5x - 2$ (B) $6x^2 - 7x - 3$

   (C) $6x^2 + 7x - 3$ (D) $5x^2 - 7x - 3$

6.   Which is the product of $(x + 3)$ and $(3x - 2)$?   *(handwritten)* $(x+3)(3x-2)$

   (handwritten) $3x^2 - 2x + 9x - 6$
   $3x^2 + 7x - 6$

   (A) $3x^2 - 6$ (B) $4x^2 - 6$

   (C) $3x^2 + 7x - 6$ (D) $4x^2 + 7x - 6$

7.   The area of a rectangle is $x^2 - 2x - 24$. What are the dimensions?

   (handwritten) $= (x-6)(x+4)$

   (A) $(x + 4)$ by $(x - 6)$ (B) $(x - 4)$ by $(x + 6)$

   (C) $(x + 4)$ by $(x + 6)$ (D) $(x - 4)$ by $(x - 6)$

8. Factor completely: $4x^2 - 25$ $(2x-5)(2x+5)$
   (A) $(4x - 25)(4x + 25)$
   (B) $(2x - 5)(2x - 5)$
   (C) $(2x - 5)(2x + 5)$
   (D) $(2x + 5)(2x + 5)$

9. Factor completely: $2x^2 + 4x - 6$ $2(x^2 + 2x - 3)$
   (A) $(x + 3)(x - 1)$
   (B) $(2x - 2)(x + 3)$ $2(x+3)(x-1)$
   (C) $2(x^2 + 2x - 3)$
   (D) $2(x - 1)(x + 3)$

10. Expand and simplify: $(x + 2)(2x^2 - x + 5)$ $= 2x^3 - x^2 + 5x$
    (A) $2x^3 + 3x^2 + 3x + 10$ $+4x^2 - 2x + 10$
    (B) $2x^3 - x^2 + 5x + 10$ _____
    (C) $2x^3 + 5x^2 + 7x + 10$ $2x^3 + 3x^2 + 3x + 10$
    (D) $2x^3 + 3x^2 + 7x + 10$

Section Two: Answer all questions. You MUST show your work to get full credit.

1. Expand and simplify using the method of your choice. $1. A. (2x^2 + 6x - x - 3) - (6x^2 + 15x + 4x + 10)$
   (A) $(2x - 1)(x + 3) - (3x + 2)(2x + 5)$ $(2x^2 + 5x - 3) - (6x^2 + 19x + 10)$
                                                   $2x^2 + 5x - 3 - 6x^2 - 19x - 10$
   (B) $(x^2 - 2x + 5)(2x^2 + 4x - 1)$ $\boxed{-4x^2 - 14x - 13}$

                                        $1B. \ 2x^4 + 4x^3 - x^2$
2. Factor fully each of the following expressions: $- 4x^3 - 8x^2 + 2x$
   (A) $x^2 - 5x - 14$ $+ 10x^2 + 20x - 5$
   $\boxed{(x - 7)(x + 2)}$ _____
   (B) $8x^2 + 10x - 3$ $= 8x^2 + 12x - 2x - 3$ $\boxed{2x^4 + x^2 + 22x - 5}$
                $= 4x(2x + 3) - 1(2x + 3)$
                $\boxed{= (4x - 1)(2x + 3)}$
   (C) $6x^2 - xy - 2y^2$
   $6x^2 - 4xy + 3xy - 2y^2 = 2x(3x - 2y) + y(3x - 2y)$
                           $= \boxed{(2x + y)(3x - y)}$
   (D) $81x^4 - 16y^4$
   $(9x^2 - 4y^2)(9x^2 + 4y^2) = (3x - 2y)(3x + 2y)(9x^2 + 4y^2)$

3. The shaded region represents a picture frame. Find an expression for

   the area of the shaded region in simplest form. $A_{SHADED} = A_{LG} - A_{SM}$
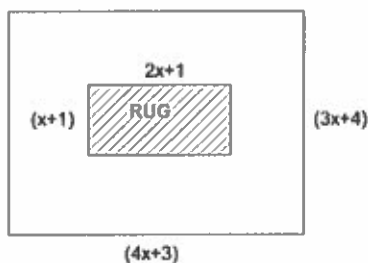
   2x+1
   (x+1) RUG   (3x+4)

   (4x+3)

$A_{LG} = L \times w$ $A_{SM} = L \times w$
      $= (3x + 4)(4x + 3)$ $= (x + 1)(2x + 1)$
      $= 12x^2 + 9x + 16x + 12$ $= 2x^2 + x + 2x + 1$
      $= 12x^2 + 25x + 12$ $= 2x^2 + 3x + 1$

$A_{SHADED} = (12x^2 + 25x + 12) - (2x^2 + 3x + 1)$
           $= 12x^2 + 25x + 12 - 2x^2 - 3x - 1$
           $= \boxed{10x^2 + 22x + 11}$