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Part I: Multiple Choice. Write the correct answer in the space provided at the end of this section.

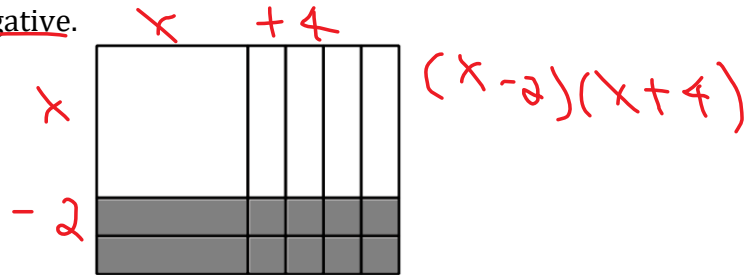
1. What is the greatest common factor for the following binomial $4x^2y + 10xy^2$

- (A) $2xy$
 (B) $2xy^2$
 (C) $4xy$
 (D) $4xy^2$

$$2xy$$

2. A polynomial is represented by the tiles shown below. What are the factors of the polynomial? Shaded tiles are negative.

- (A) $(x - 2)(x - 4)$
 (B) $(x - 2)(x + 4)$
 (C) $(x + 2)(x - 4)$
 (D) $(x + 2)(x + 4)$



3. Factor completely: $3x^2 - 6x^3$.

- (A) $x(3x - 6x^2)$
 (B) $3(x - 2x^2)$
 (C) $x^2(3 - 6x)$
 (D) $3x^2(1 - 2x)$

$$3x^2(1 - 2x)$$

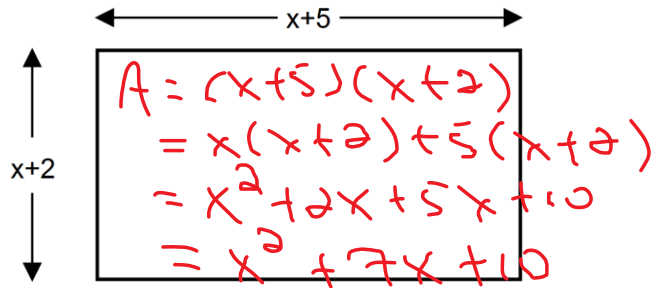
4. Expand: $(2x - 5)^2 = (2x - 5)(2x - 5)$

- (A) $4x^2 - 25$
 (B) $4x^2 - 10x + 25$
 (C) $4x^2 - 20x + 25$
 (D) $4x^2 + 20x + 25$

$$\begin{aligned} &= 2x(2x - 5) - 5(2x - 5) \\ &= 4x^2 - 10x - 10x + 25 \\ &= 4x^2 - 20x + 25 \end{aligned}$$

5. What is the area of the following rectangle?

- (A) $x^2 + 7$
 (B) $x^2 + 10$
 (C) $x^2 + 7x + 7$
 (D) $x^2 + 7x + 10$



6. Factor: $x^2 - x - 42$.

- (A) $(x - 7)(x - 6)$
 (B) $(x - 7)(x + 6)$
 (C) $(x + 7)(x - 6)$
 (D) $(x + 7)(x + 6)$

Type I: $a = 1$ product/sum

$\frac{42}{1, 42} \quad (x + 6)(x - 7)$
 $\frac{2, 21}{6, 7}$

7. Factor: $16x^2 - 49$

- (A) $(8x - 7)(8x - 7)$
 (B) $(4x - 7)(4x - 7)$
 (C) $(4x - 7)(4x + 7)$
 (D) $(8x - 7)(8x + 7)$

Difference of squares:

$(4x - 7)(4x + 7)$

8. Factor: $3x^2 + 3x - 6$

- (A) $(x - 1)(x + 2)$
 (B) $(3x - 3)(3x + 6)$
 (C) $3(x - 1)(x + 2)$
 (D) $3(x^2 + x - 2)$

$= 3(x^2 + x - 2)$ Type I: product/sum
 $3(x - 1)(x + 2)$

9. What value for b makes the following polynomial a Perfect Square Trinomial?

$25x^2 + bxy + 36y^2$

- (A) 5
 (B) 6
 (C) 30
 (D) 60

$\sqrt{25} = 5$
 $\sqrt{36} = 6$
 $2(5 \times 6) = 60$
 $b = 2\sqrt{a \cdot c}$
 $b = 2\sqrt{25 \cdot 36}$
 $b = 2\sqrt{900}$
 $b = 2(30)$
 $b = 60$

10. Which represents $(x - 6)(3x + 1)$?

(A)

$3x^2$	$-18x$
x	6

	x	-6
$3x$	$3x^2$	$-18x$
1	x	-6

(B)

<u>$3x^2$</u>	<u>$-18x$</u>
<u>x</u>	<u>-6</u>

(C)

$3x^2$	$18x$
$-x$	-6

(D)

$3x^2$	$18x$
$-x$	6

Answers to multiple choice.

1.____ 2.____ 3.____ 4.____ 5.____

6.____ 7.____ 8.____ 9.____ 10.____

25 Part II: Constructed Response. Answer each question in the space provided.
Show all workings.

3 11. Expand and simplify. *Multiply binomials first.*

$$\begin{aligned} & \text{(A) } 6(x-5)(3x+2) \\ &= 6[x(3x+2) - 5(3x+2)] \\ &= 6(3x^2 + 2x - 15x - 10) \\ &= 6(3x^2 - 13x - 10) \\ &= 18x^2 - 78x - 60 \end{aligned}$$

3 (B) $(3x-4)(2x^2-5x+7)$

$$\begin{aligned} &= 3x(2x^2-5x+7) - 4(2x^2-5x+7) \\ &= 6x^3 - 15x^2 + 21x - 8x^2 + 20x - 28 \\ &= 6x^3 - 23x^2 + 41x - 28 \end{aligned}$$

12. Factor fully each of the following expressions:

2 (A) $x^2 - 2x - 24$ *Type I: a=1 product/sum*

$$\begin{array}{l} 24 \\ \hline 1, 24 \\ 2, 12 \\ 3, 8 \\ 4, 6 \end{array} \quad (x+4)(x-6)$$

3 (B) $4x^2 - 5x - 6$ Type II: $a \neq 1, 0$ Decomposition

$$\begin{array}{l} \overline{1, 24} \\ 2, 12 \\ \textcircled{3, 8} \\ 4, 6 \end{array} = (4x^2 - 8x)(+3x - 6)$$

$$= 4x(x - 2) + 3(x - 2)$$

$$= (4x + 3)(x - 2)$$

3 (C) $6x^2 + 5xy - 6y^2$ Two variables: drop y .

$6x^2 + 5x - 6$ Type II: decomposition

$$\begin{array}{l} \overline{36} \\ 1, 36 \\ 2, 18 \\ 3, 12 \\ \textcircled{4, 9} \\ 6, 6 \end{array} (6x^2 + 9x)(-4x - 6)$$

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

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

Put y back:

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

3 (D) $125x^2 - 80y^2$

$= 5(25x^2 - 16y^2)$ Difference of Squares

$$= 5(5x - 4y)(5x + 4y)$$

2 (E) $121x^2 - 264x + 144$

$$\sqrt{121} = 11 \quad 2(11 \times 12) = 264 \quad \sqrt{144} = 12 \quad (11x - 12)(11x - 12)$$

$$= (11x - 12)^2$$

\therefore Perfect Square Trinomial

2 (F) $16x^2y^3 - 8x^3y^2 + 12x^2y^2 - 4xy$

$$= 4xy(4xy^2 - 2x^2y + 3xy - 1)$$

4 13. Determine the area of the shaded region for the following diagram.

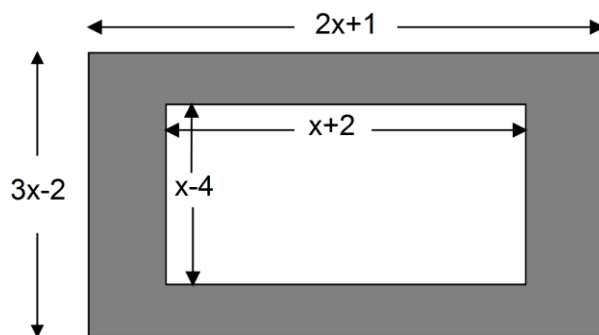
$A = l \cdot w$

$$A_{\text{Large}} = (2x+1)(3x-2)$$

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

$$= 6x^2 - 4x + 3x - 2$$

$$= 6x^2 - x - 2$$



$$A_{\text{small}} = (x+2)(x-4)$$

$$= x(x-4) + 2(x-4)$$

$$= x^2 - 4x + 2x - 8$$

$$= x^2 - 2x - 8$$

$$A_{\text{shaded}} = A_{\text{big}} - A_{\text{small}}$$

$$= 6x^2 - x - 2 - (x^2 - 2x - 8)$$

$$= 6x^2 - x - 2 - x^2 + 2x + 8$$

$$= 5x^2 + x + 6$$