

Test #1

Part 1: Answer all questions in this part. No partial credit will be allowed. For each question, bubble your answers on the scantron, the numeral preceding the word or expression that best completes the statement or answers the question.

1. Which property is illustrated by the equation $ax + ay = a(x + y)$?

→ a times x + a times y

- (1) associative
- (2) commutative
- (3) distributive → multiply to undo parentheses
- (4) identity

(1) $4x^3 - 6x^4$

(2) $2 - 4x$

(3) $5x + 8 - 3x^2$

(4) $4x^4 - 2$ → largest exponent first

3. The expression $(x^2 - 5x - 2) - (-6x^2 - 7x - 3)$ is equivalent to

$x^2 - 5x - 2 + 6x^2 + 7x + 3 = 7x^2 + 2x + 1$

(1) $7x^2 - 12x - 5$

(2) $7x^2 - 2x + 1$

(3) $7x^2 + 2x + 1$

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

5. $(8x^2 - x + 4) + (x - 5)$ is

$8x^2 - x + 4 + x - 5 = 8x^2 - 2x - 1$

(1) $8x^2 + 9$

(2) $8x^2 - 1$

(3) $8x^2 - 2x + 9$

(4) $8x^2 - 2x - 1$

7. Which best describes $2 - 3x^2$?

- (1) quadratic binomial → quadratic
- (2) quadratic monomial
- (3) linear binomial → 2 terms
- (4) linear monomial

9. Which expression represents $(3x^2y^4)(4xy^3)$ in simplest form?

$(3)(4) = 12$
 $(x^2)(x) = x^3$
 $(y^4)(y^3) = y^7$

(1) $12x^3y^8$

(2) $12x^2y^6$

(3) $12x^3y^8$

(4) $12x^3y^6$

11. Fred is given a rectangular piece of paper.

If the length of Fred's piece of paper is represented by $2x - 6$ and the width is represented by $3x - 5$, then the paper has a total area represented by

$(2x - 6)(3x - 5) = 6x^2 - 10x - 18x + 30 = 6x^2 - 28x + 30$

(1) $5x - 11$

(2) $10x - 22$

(3) $6x^2 - 28x + 30$

(4) $6x^2 - 6x - 11$

4. The expression $2x^2 - x^2$ is equivalent to

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

(1) x^0

(2) 2

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

(4) $-2x^4$

6. What is the product of $(3x + 2)$ and $(x - 7)$?

$$\begin{array}{r} 3x^2 - 21x + 2x - 14 \\ \hline 3x^2 - 19x - 14 \end{array}$$

(1) $3x^2 - 14$

(2) $3x^2 - 5x - 14$

(3) $3x^2 - 19x - 14$

(4) $3x^2 - 23x - 14$

8. Which trinomial is equivalent to $3(x - 2)^2 - 2(x - 1)$?

$$\begin{aligned} 3(x-2)(x-2) - 2(x-1) \\ 3(x^2 - 4x + 4) - 2x + 2 \\ 3x^2 - 12x + 12 - 2x + 2 \\ 3x^2 - 14x + 14 \end{aligned}$$

(1) $3x^2 - 2x - 10$

(2) $3x^2 - 14x + 10$

(3) $3x^2 - 2x - 14$

(4) $3x^2 - 14x + 14$

10. Which expression is a factor of $n^2 + 3n - 54$?

$$\begin{array}{r} -54 \\ 9 \quad -6 \\ \hline (n-6)(n+9) \end{array}$$

(1) $n + 6$

(2) $n^2 + 9$

(3) $n - 9$

(4) $n + 9$

12. Four expressions are shown below.

- I $2(2x^2 - 2x - 60)$
- II $4(x^2 - x - 30)$
- III $4(x + 6)(x - 5)$
- IV $4x(x - 1) - 120$

The expression $4x^2 - 4x - 120$ is equivalent to

- (1) I and II, only
 - (2) I, II, and IV
 - (3) II and IV, only
 - (4) II, III, and IV
- Handwritten work:*
I $2(2x^2 - 2x - 60) = 4x^2 - 4x - 120$
II $4(x^2 - x - 30) = 4x^2 - 4x - 120$
III $4(x+6)(x-5) = 4(x^2 + x - 30) = 4x^2 + 4x - 120$
IV $4x(x-1) - 120 = 4x^2 - 4x - 120$

Part 2: Answer all questions in this part. Clearly indicate the necessary steps, including appropriate formula substitutions, diagrams, graphs, charts, etc. Complete all questions in this part; a correct numerical answer with no work shown will receive only 1 credit. Place a star here

13. Simplify and express your answer in standard form.

$$\begin{aligned}
 & -(3x+3)^2 \\
 & -(3x+3)(3x+3) \\
 & \begin{array}{|c|c|} \hline 3x & 3x \\ \hline 9x & 9x \\ \hline \end{array} \\
 & -(9x^2 + 18x + 9) \\
 & = -9x^2 - 18x - 9
 \end{aligned}$$

15. Factor the following trinomials:

a. $x^2 + 10x + 9$

$$\begin{array}{l}
 \cancel{9} / \cancel{10} \\
 \cancel{1} / \cancel{9}
 \end{array}
 \quad (x+1)(x+9)$$

b. $x^2 + 6x + 8$

$$\begin{array}{l}
 \cancel{8} / \cancel{6} \\
 \cancel{4} / \cancel{2}
 \end{array}
 \quad (x+2)(x+4)$$

17. Express the product of $-2x^2 + 3x - 4$ and $x + 8$ in standard form.

$$\begin{array}{|c|c|} \hline -2x^2 & +3x & -4 \\ \hline x & -2x^3 & 3x^2 & -4x \\ \hline +8 & -16x^2 & 24x & -32 \\ \hline \end{array}$$

$$= -2x^3 - 13x^2 + 20x - 32$$

Part 3: Answer all questions in this part. Each correct answer will receive 8 credits. Clearly indicate the necessary steps, including appropriate formula substitutions, diagrams, graphs, charts, etc. For all questions in this part, a correct numerical answer with no work shown will receive only 1 credit.

19. Describe and correct the error in finding the factors.

~~$x^2 + 14x + 49 = (x+4)(x+12)$~~

The mistake in the work above is that 4 & 12

don't add up to 14.

Show the correct work here:

$$\begin{array}{l}
 \cancel{48} / \cancel{14} \\
 \cancel{6} / \cancel{8}
 \end{array}
 \quad (x+6)(x+8)$$

for 5 extra points!

14. Subtract $5x^2 + 2x - 11$ from $3x^2 + 8x - 7$. Express the result in standard form.

$$\begin{aligned}
 & (3x^2 + 8x - 7) - (5x^2 + 2x - 11) \\
 & \underline{3x^2 + 8x - 7} \\
 & \underline{-5x^2 - 2x + 11} \\
 & = -2x^2 + 6x + 4
 \end{aligned}$$

order!

16. Factor the following trinomials:

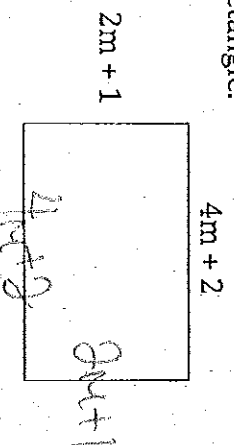
a. $x^2 - x - 2$

$$\begin{array}{l}
 \cancel{-2} / \cancel{-1} \\
 \cancel{-1} / \cancel{1}
 \end{array}
 \quad (x-2)(x+1)$$

b. $x^2 + 7x - 30$

$$\begin{array}{l}
 \cancel{-30} / \cancel{10} \\
 \cancel{-3} / \cancel{1}
 \end{array}
 \quad (x+10)(x-3)$$

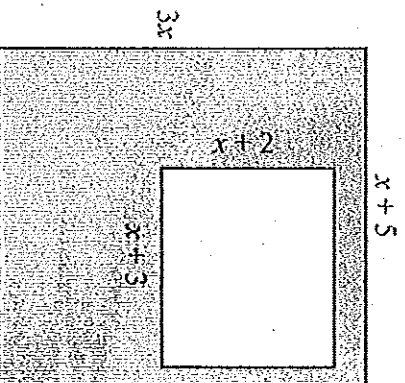
18. The perimeter of a rectangle is the sum of the lengths of its sides. Write a simplified expression for the perimeter of this rectangle.



$$\begin{aligned}
 & 2(2m+1) + 2(4m+2) \\
 & = 4m+2 + 8m+4 \\
 & = 12m+6
 \end{aligned}$$

add

20. Determine the area of the shaded region. Express your answer in simplest form.



Big Area
- Small Area

Shaded Area

Big: $3x(x+5)$ Small: $(x+2)(x+3)$

$$\begin{aligned}
 & 3x^2 + 15x \\
 & \left. \begin{array}{l} 3x^2 + 15x \\ x^2 + 2x + 3x + 6 \\ x^2 + 5x + 6 \end{array} \right\}
 \end{aligned}$$

$$(3x^2 + 15x) - (x^2 + 5x + 6)$$