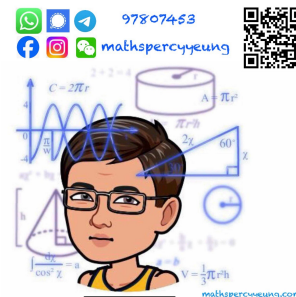


## Ch 11. Manipulation of Simple Polynomials

Set 1 Q

Simplify the following expressions.

- (a)  $b^5 \times b^{13}$   
(b)  $\frac{25m^{12}}{-5m^4}$   
(c)  $(4x^2)(3x^7) \div (6x^3)$



Determine the degrees of the following polynomials.

- (a)  $5x^4 - 8x^2y^3 + 7xy - 4$   
(b)  $6x^3y^4 - 5xy - 8x^4$

Simplify the following expressions.

- (a)  $7x + 5x^2 - 2x + x^2$   
(b)  $5 - 3x^2 + 2x + 6x^2 - 9x + 1$   
(c)  $9xyz - 4xy + 11xzy - 6xz + 12yx$

Write down the constant term and the coefficients of the other terms of the polynomial  $8x^3 + 2x^2 - 5$ .

For the polynomial  $-8a^2 + 5a - 3a^3 - 5$ ,

- (a) write down the degree of the polynomial,
- (b) arrange the terms in both descending powers and ascending powers of  $a$  respectively.

Simplify the following expressions.

- (a)  $(4r - s) + (3r - 11s)$
- (b)  $(-2x - 6y + z) - (4x + 2y - 3z)$

Simplify the following expressions and arrange the terms in descending powers of the variables.

(a)  $(6x^2 - 2x + 1) + (-4x^2 + 2x - 5)$

(b)  $(5 - 8y + 7y^2 - y^3) - (6 - 4y^2 + 2y^3)$

Simplify  $(6m^3 - 4m^2n + 2mn^2 + 3) - (-2m^3 - 7mn^2 - 9)$ .

Simplify  $(5a^2 - 6ab - 5) - (3b^2 - 7ab + 10) + (4a^2 + 8b^2 - 2ab)$ .

Expand the following expressions by using the distributive law of multiplication.

(a)  $5(x - 2y)$

(b)  $(4r - 3s)(-2t)$

(c)  $\frac{m}{5}(20 - 15mn + 5m^2)$

Expand the following expressions.

(a)  $(3m + 5)(7 - 2m)$

(b)  $(3p - 4q)^2$

Find the product of  $2a^2 - 3a - 5$  and  $4 - 3a^2$ , and arrange the terms in descending powers of  $a$ .

Given the polynomial  $4m - 8 + 7m^5 - \frac{1}{2}m^2 - 6m^3$ ,

- (a) write down the degree and the constant term of the polynomial,
- (b) arrange the terms of the polynomial in descending powers of  $m$ ,
- (c) find the value of the polynomial when  $m = 2$ .

Given  $A = x^3 - 5x^2y + 3xy^2 - 4y^3$ ,  $B = 4x^3 + 3x^2y - 5xy^2 - y^3$  and  $C = -3x^3 + 4x^2y - 5xy^2 + 3y^3$ ,

(a) find  $B + (A - C)$ ,

(b) find  $B - (A + C)$ .

Expand the following expressions by using the distributive law of multiplication.

(a)  $(7a - 4b + 9)(-2x)$

(b)  $x(3y - 2x) - 4y(5 - x)$

## *Ch 11. Manipulation of Simple Polynomials*

### Set 2 Q

Find the values of the following expressions.

(a)  $(+3) - (+6)$

(b)  $(-2) - (-4)$

Find the values of the following expressions.

(a)  $(+9) - (+3) + (-2)$

(b)  $(-10) + (-4) - (-1)$

Find the values of the following expressions.

(a)  $(-3) \times (+7)$

(b)  $(-5) \times (-6)$

Find the values of the following expressions.

(a)  $\frac{(-6)}{(-9)}$

(b)  $(+8) \div (-2)$

Find the values of the following expressions.

(a)  $(-5) \times (-3) \times (-8)$

(b)  $(-3) \times (+2) \div (-4)$

Find the values of the following expressions.

(a)  $(+4) \times (+5) - (+7) \times (-3)$

(b)  $(-1) \times (+9) + (-16) \div (-2)$

Simplify the following expressions.

(a)  $x + 2x + 3x$

(b)  $-z \times y \times z \times 4$

Simplify the following expressions.

(a)  $4a \times (-3a)$

(b)  $-48b \div 6ab$

Simplify the following expressions.

(a)  $b - a \times c + 2b$

(b)  $a \times a \times a \times 9 + b \times b \times c \times c^2$

Represent the following word phrases by algebraic expressions.

(a) Add the product of  $b$  and  $7c$  to  $a$ .

(b) Half of the sum of  $-3x$  and  $y$ .

Represent the following word phrases by algebraic expressions.

(a) Multiply the square of  $r$  by  $-6$ .

(b) Divide  $q$  by  $5$  and then subtract the quotient from  $p$ .

By the method of substitution, find the value of the algebraic expression  $x^3 - x$  in each of the following cases.

(a)  $x = 2$

(b)  $x = -1$

By the method of substitution, find the value of the algebraic expression  $xy + y^2$  in each of the following cases.

(a)  $x = 1, y = 3$

(b)  $x = -2, y = -1$



In each of the following, use the index notation to express the expression.

(a)  $7 \times 7 \times 7$

(b)  $2 \times 2 \times 2 \times 2 \times 2$

In each of the following, use the index notation to express the expression.

(a)  $3 \times 3 \times 7 \times 7 \times 7$

(b)  $5 \times 5 \times 2 \times 5 \times 2 \times 2 \times 5$

In each of the following, use the index notation to express the expression.

(a)  $y \times y \times y$

(b)  $z \times z \times z \times z \times z \times z$

In each of the following, use the index notation to express the expression.

(a)  $8a \times a \times b \times 8b$

(b)  $c \times 3c \times 3c \times c \times 9d$

Find the values of the following expressions without using a calculator.

(a)  $3^4$

(b)  $2^5$

Find the values of the following expressions without using a calculator.

(a)  $2^3 \times 7^2$

(b)  $5^2 \times 4^2$

Find the values of the following expressions.

(a)  $(-4) + (+6)$

(b)  $(+5) + (-7)$

## *Ch 11. Manipulation of Simple Polynomials*

### **Set 3 Q**

Find the value of the expression  $3^{50} \div 3^{47}$  without using a calculator.

Complete the following operation.

$$\begin{array}{r} -6a - 4b \\ -) \underline{2a + 6b} \end{array}$$

Complete the following operation.

$$\begin{array}{r} x^2 - 3x + 5 \\ +) \underline{-2x^2 \quad - 6} \end{array}$$

Complete the following operation.

$$\begin{array}{r} 3r^2 + rs \\ -) \underline{r^2 + 2rs - 3} \end{array}$$

Simplify  $(3c - 4d) + (5d - 2c)$ .

Simplify  $(2b^2 - 7) - (b^2 + 5)$ .

Simplify  $(5a + b - 3) - (3a - 2b + 1)$ .

Simplify  $(6m - 4 + 2n) - (2m - n + 8)$ .

Simplify  $(c^2 + 2c) - (5c - c^2)$ .

Simplify  $(x + 2y) - (3x - 7z) + (6z - 2y)$ .

Expand  $5(2m - 3n)$ .

Expand  $(2a + 3)(-4a)$ .

Expand  $3p(2p^2 - p + 5)$ .

Expand  $(n + 7)(n - 3)$ .

Expand  $(5a - 1)(3 + a)$  and arrange the terms in descending powers of  $a$ .

Expand  $(2x - 3)(3x + 7)$ .

Expand  $(n - 2)(4n - 5)$  by the method of long multiplication.

Expand  $(2m - 7n)(5m + 3n)$  by the method of long multiplication.

Expand  $3(4d + 1) + 5(3 - 2d)$ .

Expand  $x(4x + 3) - x(2x - 5)$ .

Expand  $(3y + 4z)(2z - 7y)$ .

Expand  $(3x + 2y)^2$ .

Find the value of the expression  $\frac{2^{27} \times 5^{18}}{5^{17} \times 2^{25}}$  without using a calculator.

Find the value of the expression  $(2^2 \times 2^4) \div (4^{52} \div 4^{49})$  without using a calculator.

Simplify  $2m^3 \times m^6$ .

Simplify  $(0.5k^4)(8k^2)$ .

Simplify  $-4d^9 \times 3d^2 \times d^3$ .

Simplify  $\frac{15y^6}{3y^2}$ .

Simplify  $n^8 \div 5n^5$ .

Simplify  $54a^8 \div (-9a^3)$ .

Simplify  $\frac{r^8 \times r^5}{4r^4}$ .

Simplify  $\frac{2h^3 \times 3h^9}{24h^6}$ .

Simplify  $6y^{12} \div y^3 \div (-y^4)$ .

Write down the coefficients and the degrees of the following monomials.

- (a)  $17a^3$   
 (b)  $-m^5n^7r^2$

Write down the coefficients and the degrees of the following monomials.

- (a)  $-3ab^2$   
 (b)  $0.12x^4yz^{14}$

Complete the following table.

	Polynomial	Number of terms	Coefficient of			Constant term	Degree of polynomial
			$x^3$	$x^2$	$x$		
(a)	$6x^3 - 3x^2 + 2x + 8$						
(b)	$x^3 - \frac{1}{6}x^2 + 9$						

Complete the following table.

	Polynomial	Number of terms	Coefficient of			Constant term	Degree of polynomial
			$x^3$	$x^2$	$x$		
(a)	$-x^2 + x - 0.6$						
(b)	$\frac{15}{4}x^3 - 2x$						

In each of the following pairs of terms, determine whether they are like terms or unlike terms.

(a)  $4a^3, 4b^3$

(b)  $5, -\frac{1}{5}$

In each of the following pairs of terms, determine whether they are like terms or unlike terms.

(a)  $-m^2n, mn^2$

(b)  $9xyz, \frac{3xzy}{2}$

Simplify the following expressions.

(a)  $5x - 4x + 4 - 8$

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

Simplify the following expressions.

(a)  $4m - 3 - 8m + 6$

(b)  $7xy + 2x + 5y - 3yx$



For the polynomial  $7x^2 + 5 - 8x^3 + 6x$ ,

- (a) write down the degree of the polynomial,
- (b) arrange the terms in both descending powers and ascending powers of  $x$  respectively.

For the polynomial  $3y^2 - 2 + \frac{y^4}{5} - 6y$ ,

- (a) write down the degree of the polynomial,
- (b) arrange the terms in both descending powers and ascending powers of  $y$  respectively.

Find the value of the polynomial  $7 + 5w - 3w^2$  in each of the following cases.

- (a)  $w = 2$
- (b)  $w = -1$

Find the value of the polynomial  $2y^3 + 4y^2 - y + 1$  in each of the following cases.

- (a)  $y = 1$
- (b)  $y = -3$

Complete the following operation.

$$\begin{array}{r} 3x + 12y \\ +) 2x - 8y \\ \hline \end{array}$$

*Ch 11. Manipulation of Simple Polynomials*

**Set 4 Q**

Simplify  $\frac{5^{k+2}}{5^k}$ .

Simplify  $2^{m+7} \times 2^{m-2}$ .

Simplify  $3w^7 \times 4w^2 \div (-6w^3)$ .

Simplify  $16c^{15} \div (4c^3 \times 2c^6)$ .

Simplify  $5k^{12} \div (-2k^8) \div \frac{k^3}{4}$ .

Simplify  $a^2b^4 \times (-9a^4b^7)$ .

Simplify  $-64x^5y^6 \div 8x^3y^2$ .

Simplify  $(c^2 \times d^5 \times c^8) \div (d^3 \times c^5 \times d)$ .

Simplify  $4x^7y^3 \div (x^4y^8 \div 2x^3y^5)$ .

Simplify  $32a^5b^8 \div (-2ab^3) \times \frac{5}{8}a^2b$ .

Write down the degrees and the constant terms of the following polynomials.

- (a)  $-y + 7x^2y - 13xy^2$
- (b)  $6 + 2a^2bc^3 - 5a^6b^2$

Write down the degrees and the constant terms of the following polynomials.

- (a)  $m^3 - m^4n^2 - 3n + mn^7$
- (b)  $-5 + x^4y^5 - 3z^6 + x^2y^3z^6$

Simplify  $x^3 - 2x^2 + 7 - 5x^3 + 3x^2 - 6x - 18$ .

Simplify  $6x^2y - 4xy^2 - 8xy^2 - 11x^2y$ .

Simplify  $7a^2b - 3b^2a - 2ba^2 + 8ab^2$ .

Find the value of the polynomial  $2x^2 - \frac{xy}{4} + 1$  in each of the following cases.

**(a)**  $x = 2, y = 0$

**(b)**  $x = -1, y = -2$

Find the value of the polynomial  $3y - x - yx^2$  in each of the following cases.

**(a)**  $x = 0, y = -4$

**(b)**  $x = -3, y = 2$

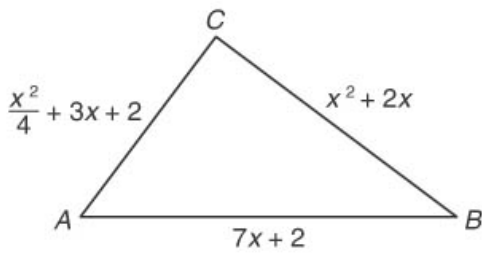
There are three jars  $A$ ,  $B$  and  $C$ . Jar  $A$  contains  $(2x^2 + 7)$  candies, jar  $B$  contains  $(21 - 2x)$  candies and jar  $C$  contains  $(x^3 - 1)$  candies. If  $x = 2$ ,

- (a) find the number of candies in each jar,
- (b) determine which jar contains the most number of candies.

In the figure,  $ABC$  is a triangle. The lengths of its sides are  $7x + 2$ ,  $x^2 + 2x$  and  $\frac{x^2}{4} + 3x + 2$ .

If  $x = 4$ ,

- (a) find the lengths of  $AB$ ,  $BC$  and  $CA$ ,
- (b) hence, name the longest side of the triangle  $ABC$ .



Simplify  $(14x^2 - 7 + 5x) - (5 - 6x - 3x^2)$  and arrange the terms in ascending powers of  $x$ .

Simplify  $3y - [5y - (3y^2 + 12y - 9)]$  and arrange the terms in descending powers of  $y$ .

Simplify  $(c^3 - 3 + 4c^2) + (9c - 5c^2 - 6) - (11 + 2c^3 - 6c)$  and arrange the terms in descending powers of  $c$ .

Simplify  $(3gh^2 + 5g^2) - (4h^2 - g^2) + (h^2 - 3gh^2)$ .

Simplify  $(2b^2a - cb) + (3a^2b + 4bc) - (ab^2 - 2ba^2)$ .

**(a)** Simplify  $(m^3 - 4m^2n + 3n^2) + (3m^2n - 2m^3 - 5n^2)$ .

**(b)** Hence, find the value of the expression in (a) when  $m = -3$  and  $n = 2$ .

- (a) Simplify  $(x^2y + 2x) - (-4 + 3xy - yx^2) - (x^3 - 3xy + 5)$ .  
(b) Hence, find the value of the expression in (a) when  $x = 2$  and  $y = -5$ .

A reading club has  $(3x^2 + 2x - 1)$  members.  $x^2 + 7x$  of them are female members.

- (a) Express the number of male members in terms of  $x$ .  
(b) Hence, find the number of male members when  $x = 3$ .

Cindy has  $(3x^2 - x)$  bookmarks, Janis has  $(2 + 4x^2)$  bookmarks and Winnie has  $(5x + 2x^2 - 3)$  bookmarks.

- (a) Express the total number of bookmarks they have in terms of  $x$ .  
(b) Hence, find the total number of bookmarks when  $x = 5$ .

Expand  $-4xy(3x^2 - xy - 5y^2)$ .

Expand  $3(2x + y)(3y - 4x)$ .

Expand  $(a^2 + 2)(-3a) - 6a(1 - 2a - a^2)$  and arrange the terms in descending powers of  $a$ .

Expand  $(1 - 2x)^2 - (3x + 2)(5 - 2x)$  and arrange the terms in descending powers of  $x$ .

Expand  $(p + 3q)(p^2 - 2pq + 8q^2)$ .

Expand  $-2(m - 5n)(m^2 + 3mn + n^2)$ .

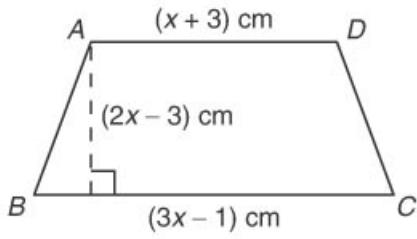
Janis buys  $(3x + 4)$  apples at  $\$ \left( \frac{x}{2} - \frac{1}{5} \right)$  each. How much should she pay?



In the figure,  $ABCD$  is a trapezium. The upper base, lower base and height of  $ABCD$  are  $(x + 3)$  cm,  $(3x - 1)$  cm and  $(2x - 3)$  cm respectively.

(a) Express the area of  $ABCD$  in terms of  $x$ .

(b) If  $x = \frac{7}{2}$ , find the area of  $ABCD$ .



# Ch 11. Manipulation of Simple Polynomials

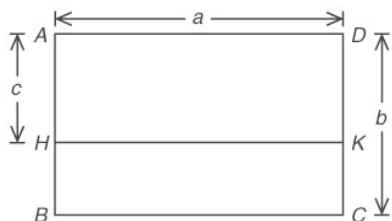
## Set 5 Q

In answering this question, you may need to apply the rules of removing brackets shown below:

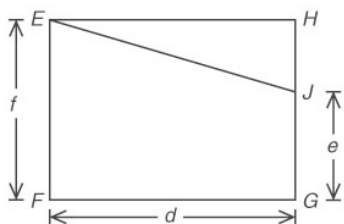
$$-(r + s) = -r - s$$

$$-(r - s) = -r + s$$

- (a) (i) In the figure,  $ABCD$  and  $HBCK$  are rectangles. By considering the area of rectangle  $HBCK$ , show that  $a(b - c) = ab - ac$ .  
 (ii) Hence, simplify  $63(x - 4)$ .



- (b) (i) In the figure,  $EFGH$  is a rectangle. By using the result of (a)(i) and considering the area of  $EFGJ$ , show that  $d(e + f) = de + df$ .  
 (ii) Hence, simplify  $65(x + 8)$ .



- (c) By using the results of (a)(ii) and (b)(ii), simplify  $65(8 + y) - 63(y - 4)$ .

- (a) (i)** Given that  $F = (x + 3)(x + 1)$ , find the value of  $F$  when  $x = -4$ .
- (ii)** Hence, if  $x^2 + ax + 3 = (x + 3)(x + 1)$ , find the value of  $a$ .
- (b)** By using the result of (a)(ii), solve  $(2x + 6)(x + 1) - 2x^2 = 0$ .

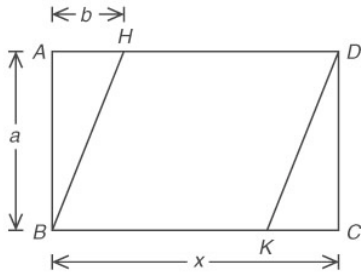
In answering this question, you may need to apply the rules of removing brackets shown below:

$$-(r + s) = -r - s$$

$$-(r - s) = -r + s$$

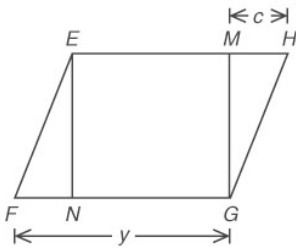
(a) (i) In the figure,  $ABCD$  is a rectangle and  $HBKD$  is a parallelogram. By considering the area of parallelogram  $HBKD$ , show that  $a(x - b) = ax - ab$ .

(ii) Hence, simplify  $6(5 - 2z)$ .



(b) (i) In the figure,  $EFGH$  is a parallelogram and  $ENGM$  is a square. By considering the area of square  $ENGM$ , show that  $(y - c)^2 = y(y - c) - c(y - c)$ .

(ii) By using the results of (a)(i) and (b)(i), simplify  $(y - 3)^2$ .



(c) By using the results of (a)(ii) and (b)(ii), simplify  $2(y - 3)^2 - 6(5 - 2y)$ .

Consider the following sequence:

7, 13, 25, 49, 97, 193, ...

- (a) Write down the 7th and the 8th terms of the sequence.
- (b) (i) If the first 4 terms are expressed as  $7 = 3a + 1$ ,  $13 = 3b + 1$ ,  $25 = 3c + 1$  and  $49 = 3d + 1$  respectively, find the values of  $a$ ,  $b$ ,  $c$  and  $d$ .  
(ii) Hence, guess the general term of the sequence.
- (c) Use the result in (b)(ii) to find the 10th and the 12th terms of the sequence.

The table below shows the number of umbrellas ( $n$ ) sold and the corresponding profit ( $\$P$ ) made by the umbrella shop.

Number of umbrellas sold ( $n$ )	200	400	600	800	1000
Profit ( $\$P$ )	3800	7800	11 800	15 800	19 800

- (a) Write down a function relating  $n$  and  $P$ .
- (b) By using the result of (a), find
  - (i) the value of  $P$  when  $n = 700$ ,
  - (ii) the number of umbrellas sold if the profit is \$8800.
- (c) It is given that the profit is over \$20 000.
  - (i) Set up an inequality to represent the situation.
  - (ii) Find the smallest possible value of  $n$ .

- (a) Simplify  $2(a + b)$ .
- (b) Mary and Candy have 45 marbles altogether, where Mary has  $n$  marbles. If Mary gives 2 marbles to Candy, the number of Candy's marbles is half of that of Mary's. Without guessing and checking, by using the result of (a), find the value of  $n$ .

- (a) Simplify  $4kx - 61 + 48k \div \frac{16}{x} + 28 + 2kx$ .
- (b) (i) By using the result of (a), solve  $64x + 48x + 32x - 33 = 15$ .  
(ii) Hence, solve  $32y + 24y + 16y - 33 = 15$ .

*Ch 11. Manipulation of Simple Polynomials*

**Set 6 MC Q**

Simplify  $(4m^2)(-2m^3)$ .

- A.  $2m^5$
- B.  $2m^6$
- C.  $-8m^5$
- D.  $-8m^6$

Simplify  $-27y^{12} \div (-3y^4)$ .

- A.  $9y^3$
- B.  $9y^8$
- C.  $-9y^3$
- D.  $-9y^8$

Simplify  $\frac{(-8a^3)(-a^2)}{2a^4}$ .

- A.  $4a$
- B.  $4a^2$
- C.  $-4a$
- D.  $-4a^2$

Simplify  $3x^{24} \div (6x^2 \times 2x^6)$ .

- A.  $x^2$
- B.  $x^{28}$
- C.  $\frac{1}{4}x^2$
- D.  $\frac{1}{4}x^{16}$

Simplify  $4a^4b \times \frac{a^3b^5}{8}$ .

- A.  $\frac{1}{2}a^7b^6$
- B.  $\frac{1}{2}a^{12}b^5$
- C.  $\frac{1}{4}a^7b^6$
- D.  $\frac{1}{4}a^{12}b^5$



Simplify  $32x^8y^9 \div x^2y^3 \div \left(-\frac{4x^2}{7}\right)$ .

- A.  $56x^2y^3$
- B.  $56x^4y^6$
- C.  $-56x^2y^3$
- D.  $-56x^4y^6$

Which of the following is a monomial?

- A.  $\frac{-m^4}{3}$
- B.  $4m - 3$
- C.  $\frac{m^3}{n}$
- D.  $m - n$

The coefficient of  $xy^2$  in the monomial  $-3xy^2$  is

- A.  $-3$ .
- B.  $-1$ .
- C.  $1$ .
- D.  $3$ .

The degree of the monomial  $-xy^2z$  is

- A.  $-1$ .
- B.  $0$ .
- C.  $2$ .
- D.  $4$ .

Which of the following is NOT a polynomial?

- A.  $\frac{2}{3}x - 1$
- B.  $\frac{x}{y} + 5$
- C.  $-7$
- D.  $\frac{x^2}{4} - \frac{y^2}{3}$

Which of the following is the constant term of the polynomial  $3x^3 + 2x^2 - 5x$ ?

- A. -5
- B. 0
- C. 2
- D. 3

The degree of the polynomial  $2a^2b + 4abc - 5a^2b^2c$  is

- A. 5.
- B. 4.
- C. 3.
- D. 2.

For the polynomial  $1 + 2ab^6 - 7a^4b^2 - 5a^2b^3$ , find the number of terms and the coefficient of the term with degree 6.

	Number of terms	The required coefficient
A.	3	2
B.	3	-7
C.	4	2
D.	4	-7

Which of the following pairs of terms are like terms?

- A.  $2a, a^2$
- B.  $3xy, \frac{1}{2}yx$
- C.  $2x^2y, 4y^2x$
- D.  $5abc, 5ab$

Which of the following is/are correct?

- I.  $4x^2 - 3y^2x + 6$  is a polynomial, but  $4x^2$  is not a polynomial.
- II.  $-3y^2x$  and  $xy^2$  are like terms.
- III. 6 is not a monomial.

- A. II only
- B. III only
- C. I and III only
- D. I, II and III

Which of the following polynomial is arranged in descending powers of  $x$ ?

- A.  $9x - 5x^3 + 2$
- B.  $3x^4 - 2x^2 + 15$
- C.  $4 - 2x + 3x^2$
- D.  $x + 2 + 5x^2$

If  $x = -2$ , the value of the polynomial  $4x^2 - 5x + 9$  is

- A. 3.
- B. 17.
- C. 35.
- D. 37.

Find the value of the polynomial  $\frac{xy}{2} - y^2$  when  $x = -1$  and  $y = -2$ .

- A. 5
- B. 3
- C. -3
- D. -5

Simplify  $8x - (3x - 5x)$ .

- A. 0
- B.  $6x$
- C.  $10x$
- D.  $16x$

Simplify  $3x^2 - 1 + 2x - 6 - 5x^2 + 4x$ .

- A.  $2x^2 + 6x - 7$
- B.  $2x^2 - 6x - 5$
- C.  $-2x^2 + 6x - 7$
- D.  $-2x^2 - 6x - 5$

Find the constant term in  $(4x^2 + 2x + 3) + (3x - 1)$  after simplification.

- A. 4
- B. 2
- C. -2
- D. -4

Simplify  $(7x^4 + 2 - 3x^2) - (1 - 2x^2 + 2x^3)$  and arrange the terms in ascending powers of  $x$ .

- A.  $7x^4 - 2x^3 - x^2 + 1$
- B.  $7x^4 - 2x^3 - 5x^2 + 3$
- C.  $1 - x^2 - 2x^3 + 7x^4$
- D.  $3 - 5x^2 - 2x^3 + 7x^4$

Simplify  $(3ba^2 + 2ab^2) - (3b^2a + a^2b)$ .

- A.  $4a^2b + ab^2$
- B.  $3a^2b - 2ab^2$
- C.  $2a^2b - ab^2$
- D.  $a^2b + 3ab^2$

Simplify  $(3x^3 + 2x^2 + x + 9) + (4 - x^3) + (x^2 - 3x)$ .

- A.  $2x^3 + 3x^2 - 2x + 13$
- B.  $3x^3 + 3x^2 + x + 13$
- C.  $2x^3 + 3x^2 + x + 4$
- D.  $3x^3 + 3x^2 - 2x + 4$

Find the coefficient of  $x$  in the expansion of  $(3x - 1)(4x + 7)$ .

- A. 25
- B. 21
- C. 17
- D. 13

Expand  $(3x - 4)^2$ .

- A.  $9x^2 - 12x - 16$
- B.  $9x^2 - 12x + 16$
- C.  $9x^2 - 24x - 16$
- D.  $9x^2 - 24x + 16$

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

- A.  $3y^2 + 2x^2 - 7xy$
- B.  $3y^2 - 2x^2 + 5xy$
- C.  $y^3 + 2x^2 - 7xy$
- D.  $y^3 - 2x^2 + 5xy$

Simplify  $p(p + q) + q(p - 2)$ .

- A.  $p^2 + q^2$
- B.  $p^2 + 2pq - 2$
- C.  $p^2 + 2pq - 2q$
- D.  $p^2 + 2pq - q^2$

Expand  $(4mn^2 - 3mn + m^4)(-2nm^2)$ .

- A.  $-8m^3n^3 + 6m^3n^2 - 2m^6n$
- B.  $-8m^2n^4 + 6m^2n^3 - 2m^5n^2$
- C.  $2m^3n^3 - 5m^3n^2 - m^6n$
- D.  $2m^2n^4 - 5m^2n^3 - m^5n^2$

Expand  $2(3 - y)(y^2 - 7 + 3y)$ .

- A.  $-2y^3 + 4y + 42$
- B.  $-2y^3 + 32y - 42$
- C.  $2y^3 + 4y + 42$
- D.  $2y^3 + 32y - 42$

Subtract  $x^2 - 1$  from the product of  $2x + 1$  and  $3x - 2$ .

- A.  $7x^2 - x - 3$
- B.  $7x^2 - 7x - 1$
- C.  $5x^2 - x - 1$
- D.  $5x^2 - 7x - 3$