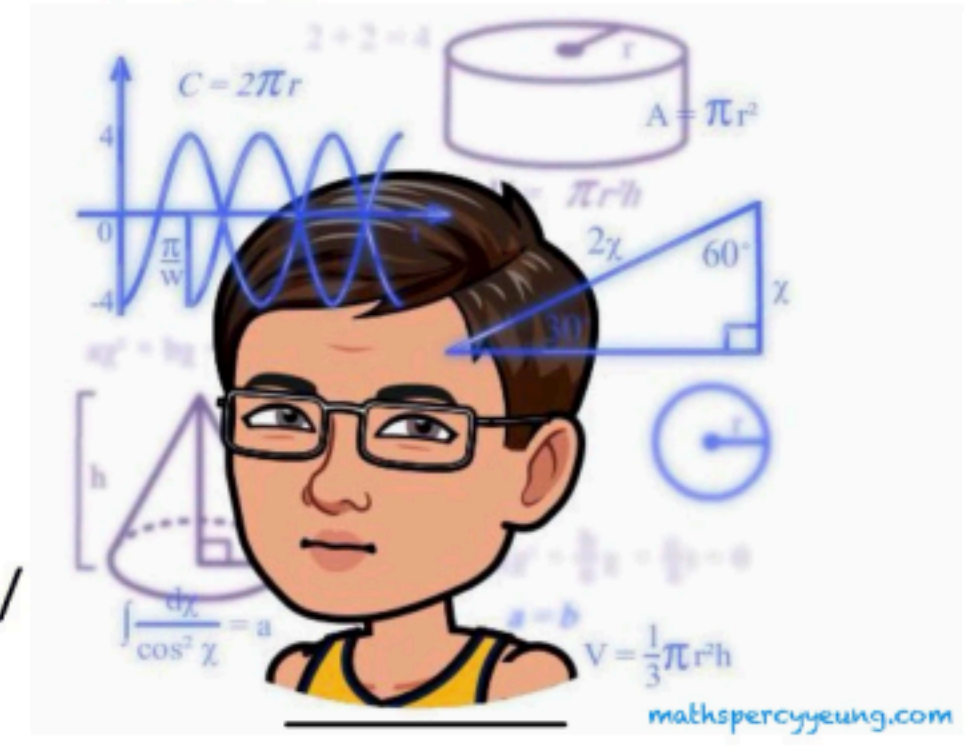


中四級 數學科 Secondary 4 Mathematics 暑期功課 Summer Holiday Homework

姓名 Name : _____ 班別 : 4 A / B /



1 整數指數定律 Indices

整數指數定律 Law of Positive Integral Indices:

- $a^m \times a^n = a^{m+n}$
- $a^m \div a^n = \frac{a^m}{a^n} = a^{m-n}$
- $(a^m)^n = a^{m \times n} = a^{mn}$
- $a^{-n} = \frac{1}{a^n}$
- $a^0 = 1$
- $(ab)^m = a^m b^m$
- $\left(\frac{a}{b}\right)^m = \frac{a^m}{b^m}$, where $b \neq 0$
- $a^{\frac{1}{n}} = \sqrt[n]{a}$
- $a^{\frac{m}{n}} = \sqrt[n]{a^m}$

化簡下列各題，並以正指數表達答案。 Simplify the following and express your answer with positive indices.

1. $\frac{a^4 a^5}{b^{-4}}$

2. $\frac{x^6 y^{-3}}{x^2}$

3. $\frac{x^{-5}}{x^3 y^{-4}}$

4. $\frac{x^2 y^{-2}}{x^{-3}}$

5. $\frac{x^{-2} y^3}{x^2 y}$

6. $\frac{x^{-6} y^3}{x^{-3} y^5}$

7. $\frac{a^5 b^{-4}}{a^{-5} b^6}$

8. $\frac{(m^5 n^3)^{-4}}{n^8}$

$$9. m^5 \left(\frac{n^2}{m^3} \right)^5$$

$$10. x^4 \left(\frac{x^6}{y^{-1}} \right)^3$$

$$11. \frac{y^5}{(x^2 y^{-2})^3}$$

$$12. \frac{(xy^{-3})^2}{y^4}$$

$$13. \frac{x^{10} y^{12}}{(x^3 y)^4}$$

$$14. \frac{(x^2 y^3)^2}{x^5 y^{-4}}$$

$$15. \frac{(xy^{-2})^{-2}}{x^3 y^5}$$

$$16. \frac{x^{-1} y^4}{(x^2 y^{-3})^{-2}}$$

$$17. \frac{(x^5 y^{-5})^2}{(x^3 y^{-2})^4}$$

$$18. \frac{(x^{-2} y^3)^3}{(x^{-4} y^2)^{-2}}$$

$$19. \frac{a^5 b}{(a^2 b^{-4})^3}$$

$$20. \frac{(x^4 y^3)^{-2}}{xy^{-5}}$$

2. 多項式的因式分解 Factorization of Polynomials

1. 因式分解 Factorize

- (a) $x^2y + 3xy^2$,
- (b) $x^2y + 3xy^2 + 2x + 6y$.

2. 因式分解 Factorize

- (a) $6m^2n - 4mn^2$,
- (b) $6m^2n - 4mn^2 - 9m + 6n$.

3. 因式分解 Factorize

- (a) $4 - a^2$,
- (b) $4 - a^2 + 2b - ab$.

4. 因式分解 Factorize

- (a) $16m^2 - 9$,
- (b) $-4mn + 3n + 16m^2 - 9$.

5. 因式分解 Factorize

- (a) $4 + 4x + x^2$,
- (b) $4 + 4x + x^2 - 2y - xy$

6. 因式分解 Factorize

- (a) $p^2 - 10p + 25$,
- (b) $pq^2 - 5q^2 + p^2 - 10p + 25$.

7. 因式分解 Factorize

- (a) $6 + 5a + a^2$,
- (b) $6 + 5a + a^2 + 3b^2 + ab^2$.

8. 因式分解 Factorize

- (a) $2m^2 - m - 3$,
- (b) $2mn^2 + 2n^2 + 2m^2 - m - 3$.

9. 因式分解 Factorize

- (a) $9x^2 - 4y^2$,
- (b) $9x^2 - 4y^2 + 9x + 6y$.

10. 因式分解 Factorize

- (a) $25r^2 - 16s^2$,
- (b) $25r^2 - 16s^2 - 20r + 16s$.

日. 因式分解 Factorize

- (a) $a^2 - 8ab + 16b^2$,
- (b) $a^2 - 8ab + 16b^2 + 5a - 20b$.

12. 因式分解 Factorize

- (a) $4x^2 + 12xy + 9y^2$,
- (b) $4x^2 + 12xy + 9y^2 - 8x - 12y$.

13. 因式分解 Factorize

- (a) $4a - 10b$,
- (b) $2a^2 - 3ab - 5b^2$,
- (c) $4a - 10b - 2a^2 + 3ab + 5b^2$.

14. 因式分解 Factorize

- (a) $5p^2 - pq - 4q^2$,
- (b) $5p^2 - pq - 4q^2 - p + q$.

15. 因式分解 Factorize

- (a) $6m^2 - 13mn + 6n^2$,
- (b) $6m^2 - 13mn + 6n^2 - 9m + 6n$.

16. 因式分解 Factorize

- (a) $r^2 + 12r + 36$,
- (b) $r^2 + 12r + 36 - s^2$.

17. 因式分解 Factorize

- (a) $p^2 + 14pq + 49q^2$,
- (b) $p^2 + 14pq + 49q^2 - 4r^2$.

18. 因式分解 Factorize

- (a) $25x^2 - 40xy + 16y^2$,
- (b) $25x^2 - 40xy + 16y^2 - 9z^2$.

19. 因式分解 Factorize

- (a) $x^3 + x^2y + 5x^2$,
- (b) $x^3 + x^2y + 5x^2 - x - y - 5$.

20. 因式分解 Factorize

- (a) $a^3 + 3a^2b - 4a^2$,
- (b) $a^3 + 3a^2b - 4a^2 - a - 3b + 4$.

3. 公式及代数分式 Algebraic Fraction and Formulae

1. 把 m 成為公式的主項 Make m the subject of the formula $\frac{5n-4m}{3}=2$.
2. 把 p 成為公式的主項 Make p the subject of the formula $2p+3=4(p-q)$.
3. 把 a 成為公式的主項 Make a the subject of the formula $\frac{4a+b}{2}=b-3$.
4. 把 y 成為公式的主項 Make y the subject of the formula $2-y=\frac{x-6y}{4}$.
5. 把 b 成為公式的主項 Make b the subject of the formula $a+b=a(b+5)$.
6. 把 k 成為公式的主項 Make k the subject of the formula $h(k+6)=3h-k$.

7. 把 x 成為公式的主項 Make x the subject of the formula $2Px = (3Qx - 1)R$.

8. 把 b 成為公式的主項 Make b the subject of the formula $\frac{3a + 2b - 8}{b} = 7$.

9. 把 h 成為公式的主項 Make h the subject of the formula $\frac{9 - 5h - 4k}{h} = 2$.

10. 把 x 成為公式的主項 Make x the subject of the formula $y = \frac{4}{3 - x}$.

11. 把 a 成為公式的主項 Make a the subject of the formula $\frac{b + 1}{a + 4} = 2b$.

12. 把 t 成為公式的主項 Make t the subject of the formula $\frac{1+2s}{2-t} = 5s$.

13. 把 x 成為公式的主項 Make x the subject of the formula $\frac{4x+y}{1-x} = 3y$.

14. 把 q 成為公式的主項 Make q the subject of the formula $\frac{7}{p} - \frac{1}{q} = 3$.

15. 把 k 成為公式的主項 Make k the subject of the formula $\frac{1}{2h} + \frac{2}{k} = 1$.

16. 把 k 成為公式的主項 Make k the subject of the formula $\frac{1}{8h} - \frac{1}{4k} = \frac{1}{2}$.

17. 把 x 成為公式的主項 Make x the subject of the formula $\frac{y}{5} = \frac{3x-2}{6}$.

18. 把 a 成為公式的主項 Make a the subject of the formula $a + 6b = 2(6 - a)$.

19. 把 b 成為公式的主項 Make b the subject of the formula $\frac{3a-2}{a+2b} = 2$.

20. 把 d 成為公式的主項 Make d the subject of the formula $10(3c + 4d) = 5(c + 2d + 3)$.

4. 一元一次方程 Simple equations

解以下方程 Solve each of the following equations.

1. $-3g + 4g = 7$

2. $18 - f = 2f$

$$3. \quad 5x + 14 = x + 2$$

$$4. \quad 6y - 11 = 16 - 3y$$

$$5. \quad 2(5 + 3q) = q$$

$$6. \quad 4(y - 1) + 9 = 6y$$

$$7. \quad -3(5a + 2) = 1 - a$$

$$8. \quad -5(2 - b) = 7b - 4$$

$$9. \quad \frac{8x - 12}{3} = 3x$$

$$10. \quad \frac{x}{4} - \frac{x}{8} = 2$$

$$11. \quad \frac{3n}{2} - 14 = 5n$$

$$12. \quad \frac{7x}{2} - 9 = \frac{2x}{7}$$

$$13. \ 3.5(p-2) = 3p + 1$$

$$14. \ 3(4m+3) - 5(2m-2) = -1$$

$$15. \ 2[n - 2(5 - n)] = 7$$

$$16. \ 5[4(3 - a) - (3 - a)] = -10$$

$$17. \ \frac{-b+8}{4} = \frac{7+b}{2}$$

$$18. \ \frac{2(r+1)}{3} = \frac{5t-2}{4}$$

$$19. \ \frac{x+1}{3} - 0.4 = -\frac{x}{15}$$

$$20. \ \frac{3v-2}{2} = \frac{4v+1}{6} - \frac{1}{8}$$