SKH St. Simon's Lui Ming Choi Secondary School
Form 3 Mathematics
More about Factorization of Polynomials
Summer Homework Worksheet

Name: _____ Class: _____ ( ) Date: _____ Mark: _____

1. Factorize the following polynomials

(a) $x^2 - 36$

(b) $p^2 - 25q^2$

(c) $(k - b)^2 - 49$

(d) $(2a + b)^2 - (a - b)^2$

(e) $108 - 3a^2$

(f) $9 - m^2 - 3k - km$

2. Factorize the following polynomials

(a) $y^2 - 8y + 16$

(b) $49x^2 + 14x + 1$

(c) $16m^2 - 8mn + n^2$

(d) $-45x^2 + 60xy - 20y^2$

(e) *$(x + 4)^2 - 10(x + 4) + 25$

3.

(a) Factorize $r^2 + 14rs + 49s^2$

(b) *Hence, factorize $r^2 + 14rs + 49s^2 - 81$

4. Factorize the following polynomials

(a) $x^2 + 10x + 21$

(b) $x^2 - 12x + 20$

(c) $x^2 + 3x - 28$

(d) $36 - 5x - x^2$

(e) $x^2 + 12xy + 32y^2$

(f) $8x^2 - 18x - 5$

(g) $-15x^2 + 24 - 18x$

(h) $5x^2 + 29xy - 6y^2$

5.

(a) Factorize the following expressions.

i. $5y^2 + 6y + 1$

ii. $15y^2 - 7y - 2$

(b) *Hence factorize $(40y^2 + 48y + 8) - (15y^3 - 7y^2 - 2y)$.

6. Factorize

(a) $216k^3 + 1$

(b) $a^3 - 125b^3$

(c) $512x^3 - 125y^3$

7. Factorize

(a) $432 + 2x^3$

(b) $24x^4 - 81xy^3$

8. *Factorize

(a) $8a^3 + \frac{1}{64}$

(b) $(3x + 7)^3 - 8x^3$

SKH St. Simon's Lui Ming Choi Secondary School
Form 3 Mathematics Holiday Assignment
Chapter 2 Laws of Indices

Name: _____ Class: _____ ( ) Date: _____ Mark: _____

1. Find the values of the following expressions and give the answers in integers or fractions.

(a) $\left(\frac{1}{7^3}\right)^0 \times 3^{-3}$ (b) $-4^{-2} \times (-5)^{-2}$ (c) $\left(\frac{1}{2}\right)^{-5}$

2. Simplify the following expressions (where $x, y \neq 0$) and express the answers with positive indices.

(a) $(x^{-3})^5$

(b) $2(2y)^{-4}$

(c) $(-3x^{-1}y)^2$

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

(e) $\left(-\frac{5x^0}{xy^{-3}}\right)^{-1}$

3. Express each of the following numbers in scientific notation.

(a) 9 480 000 000 (b) 0.000 026 1

4. Round off the following numbers to 3 significant figures and express the results in scientific notation.

(a) 141 592 653 (b) 0.000 375 105

5. Express the following numbers as integers or decimals.

(a) 8.4×10^{5} (b) -6.18×10^{-3} (c) 2.08×10^{-4}

6. *Without using a calculator, evaluate the following expressions and express the answers in scientific notation.

(a) 24 000 000 000 + 8 000 000 000 (b) 0.000 000 16 – 0.000 000 043

(c) $(3.1 \times 10^{-2}) \times (5 \times 10^{6})$ (d) $(9 \times 10^{5}) \div (4.5 \times 10^{-3})$

7. Consider the denary number 20 470.

(a) Write down the place value of each digit in the number.

(b) Hence, express 20 470 in the expanded form.

(a)

Digit	2	0	4	7	0
Place value					

8. Represent the expression $2^5 + 2^4 + 2^3 + 1$ as a binary number.

9. Convert the following numbers into denary numbers.

(a) 110101_2 (b) 1000011_2

10. Convert 41_{10} into a binary number.

11. Evaluate $4^{-3} \times 9^{0}$.

A. 0

B. $\frac{1}{64}$

C. $\frac{9}{64}$

D. 576

12. Simplify $\frac{2(ab)^{-5}}{a^{3}b^{-7}}$.

A. $\frac{b^{2}}{32a^{8}}$

B. $\frac{a^{2}}{32b^{2}}$

C. $\frac{2b^{2}}{a^{2}}$

D. $\frac{2b^{2}}{a^{8}}$

13. Simplify $\left(\frac{m^{-3}n^{5}}{n^{-2}}\right)^{4}$.

A. mn^{7}

B. $\frac{m^{12}}{n^{18}}$

C. $\frac{n^{22}}{m^{12}}$

D. $\frac{n^{28}}{m^{12}}$

14. Which of the following numbers are in scientific notation?

I. -0.051×10^{8}

II. 6×10^{4}

III. 7.332×10^{-9}

A. I and II only

B. I and III only

C. II and III only

D. I, II and III

15. $5 \times 2^7 + 18 \times 2^4 - 2^4 + 4 =$

A. 10010100_2

B. 1010010100_2

C. 1110010100_2

D. 1110110100_2

16. Which of the following numbers has the smallest value?

A. 10100_{10}

B. 1234_{10}

C. 11110010100_2

D. 11001011011_2

Bonus Points

17. How many zeros are there in the value of the expression $5^{-111} \times 8^{333} \times 25^{555}$?

SKH St. Simon's Lui Ming Choi Secondary School
Form 3 Mathematics Summer Homework
Chapter 8 Coordinate Geometry of Straight Lines

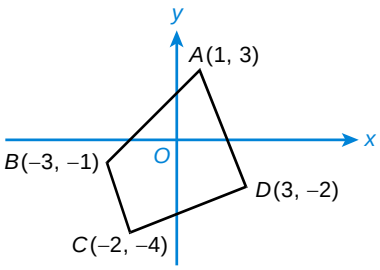
Name: _____ Class: _____( ) Date: _____

1. For each of the following, find the distance between A and B. (Give your answers correct to 3 significant figures if necessary.)

   (a) $A(4, -5)$, $B(13, 7)$

   (b) $A(2, -7)$, $B(-3, 4)$

2. Find the perimeter of quadrilateral $ABCD$ in the figure. (Give your answer correct to 3 significant figures.)



3. **It is known that the vertices of ΔPQR are $P(-5, 2)$, $Q(2, 1)$ and $R(-2, -2)$. Prove that PQR is an isosceles right-angled triangle.

4. The vertices of quadrilateral $PQRS$ are $P(-6, 9)$, $Q(2, 9)$, $R(5, 0)$ and $S(-6, -7)$.
   (a) Find the slope of each side of quadrilateral $PQRS$.
   (b) Find the slope of each diagonal of quadrilateral $PQRS$.

5. If the slope of the straight line passing through points $E(9, -3)$ and $F(k, 2k)$ is -5, find the value of k.

6. Four points $P(-3, -8)$, $Q(1, 4)$, $R(3, 10)$ and $S(9, k)$ are given.
   (a) Prove that P, Q and R are collinear.
   (b) If P, Q and S are collinear, find the value of k.

7. **Find the coordinates of the point of intersection of the straight line passing through points $E(-4, -18)$ and $F(6, -3)$ and each of the following coordinate axes.

   (a) The x-axis

   (b) The y-axis

8. Four points $A(1, 2)$, $B(4, 4)$, $C(5, -1)$ and $D(8, 1)$ are given. Prove that $AB \parallel CD$.

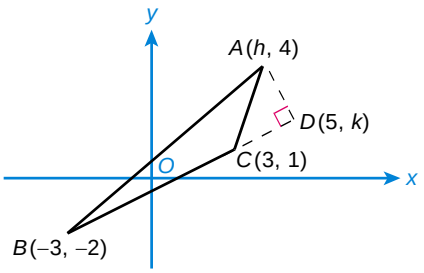
9. The vertices of quadrilateral $PQRS$ are $P(-6, 8)$, $Q(6, 2)$, $R(4, -4)$ and $S(-8, 2)$. Prove that $PQRS$ is a parallelogram.

10. Four points $A(5, 3)$, $B(-3, -1)$, $C(2, 4)$ and $D(h, h)$ are given. Find the value of h if $AB \parallel CD$.

11. **In the figure, $AD \perp CD$ and BCD is a straight line.

(a) Find the slope of CD.

(b) Find the values of h and k.



12. If R is the mid-point of $E(-4, -7)$ and $F(-6, -1)$, find the coordinates of R.

13. Three points $A(2, -18)$, $P(-4, -6)$ and $B(3h-1,\ k)$ are given. If APB is a straight line and $AP:PB = 1:1$, find the values of h and k.

14. **Two points $A(2,\ a-1)$ and $B(7,\ 13)$ are given. If $P(a,\ b)$ divides line segment AB into two parts in the ratio of $2:3$, find the coordinates of P.

15. **Two points $A(-8,\ 4)$ and $B(3,\ 12)$ are given. If $P(h,\ 9)$ is a point on line segment AB, find $AP:PB$.