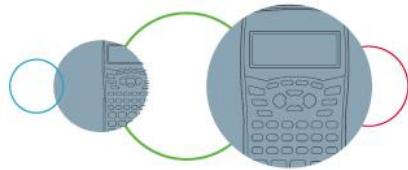


SHARP

Worksheet 2 – Algebra: Multiplying and Factorising Expressions

Grade 10 Mathematics

1. Identify whether the following expressions are monomial, binomial, trinomial or polynomial:
 - a) $2x^2 + 3$
 - b) $2x^2 \times 3$
 - c) $2x^2 + 3x + 1$
 - d) $2x^2 + 3x^3 - x + 4$
 - e) $x^2 - 5x + 6$
 - f) $4(3x^2 + 3)$
 - g) $7x$
 - h) $\frac{7x^2+4}{x}$
 - i) $x^3 - 2x^2 + 3x - 4$
 - j) $2x^2 + 11x - 12$
2. Multiply out and then simplify the following:
 - a) $(x + y)(x - y)$
 - b) $(x + y)^2$
 - c) $(x + y)(x^2 + 2xy + y^2)$
 - d) $\left(\frac{1}{2}x + \frac{1}{3}y\right)(2x + 3y)$
 - e) $(x + y)(x^2 - xy + y^2)$
 - f) $(2a + b)(2b + a)$
 - g) $(4a - 5b)(4a + 5b)$
 - h) $(a + 2b)(3a^2 - 4ab + 5b^2)$
 - i) $(4a - 5b)(16a + 20ab + 25b^2)$
 - j) $(3a + 4b)^2$
 - k) $\left(\frac{2}{3}x - \frac{3}{4}y\right)\left(\frac{3}{2}x + \frac{4}{3}y\right)$
 - l) $(6c + 9d)(6c - 9d)$
 - m) $(3x + 5y)(3x + 5y)$
 - n) $(2c - 5d)(3cd + 4d^2 - 6c^2)$
 - o) $\left(\frac{1}{4}g + \frac{2}{3}\right)(16g - 9)$
 - p) $(2c - 5d)(4c^2 + 10cd + 25d^2)$
 - q) $(3h - 5d)^2$
 - r) $(2x - 3y)(2x + 3y)$
 - s) $(7d + 3e)(49d^2 - 21de + 9e^2)$
 - t) $3\left(\frac{5}{6}x - \frac{1}{2}y\right)\left(3x + \frac{1}{4}y\right)$
3. Factorise the following by finding the common factor:
 - a) $3x^2 + 6y^2$
 - b) $3x^3 + 6xy^2$
 - c) $3a^2b - 4ab^2 + 12ab$
 - d) $11abc^2 - 22a^2b + 33ab^2d$
 - e) $\frac{3}{2}x^2 + \frac{5}{2}xy - \frac{1}{2}y^2$
 - f) $12a^3b^2c - 16a^2b^2 + 24a^4b^5c^3$
 - g) $13a^4b - 26ba^3 + 39a^2b^2$
 - h) $35a + 7ab - 21a^2b + 14abc$
 - i) $4abc + 16ab - 20bc + 24ac$
 - j) $3a(a + b) - 4b(a + b)$
4. Factorise the following expressions:
 - a) $x^2 - y^2$
 - b) $36x^2 - 49$
 - c) $81a^2 - 16b^2$
 - d) $a^4 - b^4$



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|----|--------------------|----|--------------------|
| e) | $64a^4 - b^4$ | f) | $9 + 36c^2$ |
| g) | $(a + b)^2 - c^2$ | h) | $50x^3 - 18xy^2$ |
| i) | $12a^3b - 300ab^3$ | j) | $d^2 - (3a + b)^2$ |

5. Factorise the following perfect square trinomials:

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|----|----------------------|----|-------------------------|
| a) | $a^2 + 4a + 4$ | b) | $9a^2 - 30ab + 25b^2$ |
| c) | $x^2 - 24x + 144$ | d) | $d^2 + d + \frac{1}{4}$ |
| e) | $x^2 + 10x + 25$ | f) | $x^2 - 12x + 36$ |
| g) | $x^2 - 18xy + 81y^2$ | h) | $x^2 + 16xy + 64y^2$ |
| i) | $9a^2 + 12ab + 4b^2$ | j) | $25c^2 - 60cd + 36d^2$ |

6. Factorise the following trinomials:

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|----|---------------------------|----|-------------------------------------|
| a) | $a^2 + a - 20$ | b) | $x^2 + 6x + 8$ |
| c) | $y^2 - 9y + 8$ | d) | $b^2 + 8ab + 15a^2$ |
| e) | $a^2 + 9ab - 22b^2$ | f) | $x^2 + 2xy - 3y^2$ |
| g) | $x^2 + 1\frac{1}{2}x - 1$ | h) | $y^2 + 11y + 24$ |
| i) | $x^2 - 14x + 48$ | j) | $a^2 + 2\frac{2}{3}a + \frac{4}{3}$ |

7. Factorise the following by grouping:

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|----|--|----|---------------------------------|
| a) | $ac + bd + ad + bc$ | b) | $2a^3 + 6ab + a^2b + 3b^2$ |
| c) | $a^3c - 12b^2d - 4abc + 3a^2bd$ | d) | $a^2c^2 - 2bc^2 + 3a^2d - 6bd$ |
| e) | $30b^2d^4 - 6b^2c^3 - 15ad^4 + 3ac^3$ | f) | $2bde + 6ab - 14cde - 42ac$ |
| g) | $2x^3y - 6xy^3 - 3y^4 + x^2y^2$ | h) | $28xy^2 - 21y^3 + 8x^3 - 6x^2y$ |
| i) | $5c^3d^2hg^2 - 5c^4d^2e - 5cdefg^2h + 5c^2de^2f$ | | |
| j) | $7a^3c^3 + 7b^2c^3 + 7a^3cde + 7b^2cde$ | | |

8. Factorise the following cubes:

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|----|-------------------|----|--------------------|----|-----------------|
| a) | $x^3 + y^3$ | b) | $x^3 - y^3$ | c) | $8a^3 - 27y^3$ |
| d) | $64b^6 + 125$ | e) | $2ab^4 - 16a^4b$ | f) | $81x^3 + 24y^3$ |
| g) | $(a + b)^3 + c^3$ | h) | $c^3 - (a + 2b)^3$ | i) | $250 - 54x^3$ |

