

Polynomial Quiz

Simple questions

1. Fill in the following table:

Expression	Number of Variables	Number of Terms	Type of Polynomial	Degree of Polynomial
$3a^4 - 2a^3 - a$	1	3	trinomial	4
$2m^2 - 3mn - 2n$	2	3	trinomial	3
$x^4y^3z - xyz$	3	2	binomial	8
$abcd$	4	1	monomial	4

2. An expression which contains variables is NOT considered a polynomial if the exponents on the variables are

_____ fractions _____ or _____ negatives _____ or _____ decimals _____.

3. Simplify the following expressions:

i) $4y - 3x + 2z + 3y - x$

$7y-4x+2z$ (combine like terms)

ii) $3(2a - 3b)$

6a-9b (distribution)

More complex questions

4. Simplify the following expressions:

i) $5x - 2(3 - (2x + 5)) + 2x$

$5x - 2(3 - 2x - 5) + 2x$ (distribute the negative in the innermost bracket)

$5x - 2(-2 - 2x) + 2x$ (combine like terms within the brackets)

$5x + 4 + 4x + 2x$ (distribute the negative in the bracket)

$11x + 4$ (combine like terms)

ii) $(2m - 7)(3m - 4)$

$6m^2 - 8m - 21m + 28$ (the FOIL method, but use any method)

$6m^2 - 29m + 28$ (combine like terms)

iii) $(a - b)^2$

$(a-b)(a-b)$ (best to write it out so you don't forget to do all the distribution)

$a^2 - 2ab + b^2$ (special product, but you can use any method)

Challenging questions

5. Simplify the following expressions:

____i) $(3x - y)(2x^2 + 2xy + y^2)$

$6x^3 + 6x^2y + 3xy^2 - 2x^2y - 2xy^2 - y^3$ (Distribute the first term from the binomial and then the second term of the binomial, or whatever order works best for you)

$6x^3 + 6x^2y - 2x^2y + 3xy^2 - 2xy^2 - y^3$ (do this step of putting it in order if that helps)

$6x^3 + 4x^2y + xy^2 - y^3$ (Combine like terms)

ii) $(a - b)(a + b) + (a - 2b)(2a + 2b) - ab$

$a^2 - b^2 + (2a^2 + 2ab - 4ab - 4b^2) - ab$ (special product and FOIL)

$a^2 - b^2 + 2a^2 - 2ab - 4b^2 - ab$ (Combine like terms in brackets)

$3a^2 - 3ab - 5b^2$ (Combine like terms in brackets)

iii) $(2m + n)(m + n)(3m + 2n)$

$(2m + n)(3m^2 + 2mn + 3mn + 2n^2)$ (Multiply two binomials)

$(2m + n)(3m^2 + 5mn + 2n^2)$ (Combine like terms)

$6m^3 + 10m^2n + 4mn^2 + 3m^2n + 5mn^2 + 2n^3$ (Distribute the binomial)

$$6m^3 + 13m^2n + 9mn^2 + 2n^3 \text{ (Combine like terms)}$$

OR

$$(2m^2 + 2mn + mn + n^2)(3m + 2n) \text{ (Multiply two binomials)}$$

$$(2m^2 + 3mn + n^2)(3m + 2n) \text{ (Combine like terms)}$$

$$6m^3 + 4m^2n + 9m^2n + 6mn^2 + 3mn^2 + 2n^3 \text{ (Distribute the trinomial)}$$

$$6m^3 + 13m^2n + 9mn^2 + 2n^3 \text{ (Combine like terms)}$$

Unfamiliar situation

6. What volume of recyclable sustainable packaging is needed to cushion this gift in its packing box?



Orb with sea image by [Mitchell Gaiser](#) on Unsplash, [Brandable Box](#) on Unsplash

The orb is $6n$ in diameter and the box is $7n + 2t$ wide and the same long and $7n + 3t$ tall. (Measurements are n = fingerwidth and t = thumbwidth). Remember that the formula for volume of a rectangular prism is lwh and the formula for a sphere is $\frac{4}{3}\pi r^3$.

Use 3.14 for π at the last point you can in your solution.

Box - orb = packaging material

$$(7n+2t)(7n+2t)(7n+3t) - \frac{4}{3}\pi(3n)^3$$

$$(49n^2 + 28nt + 4t^2)(7n + 3t) - \frac{4}{3}\pi 27n^3$$

$$(343n^3 + 147n^2t + 196n^2t + 84nt^2 + 28nt^2 + 12t^3) - 36\pi n^3$$

$$343n^3 + 343n^2t + 112nt^2 + 12t^3 - 113.04n^3$$

$$229.96n^3 + 343n^2t + 112nt^2 + 12t^3$$

Now you need to measure your finger and thumb to figure out the actual amount, not in a polynomial.

Deciding on your level.

- Your level coincides with whatever level you have everything correct.
- If you made a simple arithmetic error ($2 \cdot 3 = 5$ or $2 + 3 = 6$) occasionally, don't worry about it but be sure to check for those types of errors in the future
- If you made the same error 3 times, then that is a concern and you drop down a level
- If you did not reach into the challenging level, go back and practice some more with polynomials
- In the last question, if you forgot to use $3n$ as the radius (half the diameter), your answer would be $343n^3 + 343n^2t + 112nt^2 + 12t^3 - 904.32n^3$ and therefore $- 561.32n^3 + 343n^2t + 112nt^2 + 12t^3$ which doesn't make sense as it is a negative overall amount.