

Algebra test

Maths 3c

The questions marked as “bonus questions” are optional and will count if they are correct but not if they are wrong or unanswered.

Name: _____

1. Simplify the following expressions.

$$(1/0/0) \quad \frac{4a}{6a^3}$$

$$(0/1/0) \quad \frac{x^3 + 4x}{x}$$

$$(1/0/0) \quad (x + 4)^2 - (x - 2)^2 - 12$$

$$(0/1/0) \quad \frac{-3t + t^3}{4t}$$

$$(0/1/0) \quad \frac{x^2 + 2x - 15}{2x - 6}$$

$$(1/0/0) \quad \frac{6x^3y}{5x^2y^3}$$

$$(0/1/0) \quad \frac{x + x}{y + y}$$

$$(0/1/1) \quad \frac{x^2 + 4x + 3}{2 - 2x}$$

2. Write a polynomial that:

a) Has three terms (1/0/0)

b) Has two terms, one of them with two factors (0/1/0)

c) Has only one term with four factors (0/1/0)

d) Has four terms, one of them with three factors and one of them with four (0/1/0)

3. Turn these factorized polynomials into their ordered form.

(1/0/0) $x(3 - x)$

(0/1/0) $(z + 4)(z - 5)(z + 1)$

(0/1/1) $(x - 3)^2(x + 4)(x + 2)$

(0/0/1) $(-m + 0)(m + 3)(m - 3)(m - 5)$

4. Solve the following polynomial equations

$$x^2 = 3x \quad (1/0/0)$$

$$x^2 - 5x + 6 = 0 \quad (0/1/0)$$

$$\frac{x^2 - 2x}{3x + 6} = 1 \quad (0/1/0)$$

$$x^2 - 2x = 15 \quad (0/1/0)$$

$$x^3 + 7x^2 + 16x + 12 = 0 \quad (0/0/1)$$

5. Bonus question: find the mistake. (0/1/0)

$$\begin{aligned}\frac{9-x}{4} + \frac{5+x}{2} - \frac{3x-4}{8} &= x-1 + \frac{x}{8} \\ \frac{18-2x}{8} + \frac{20+4x}{8} - \frac{3x-4}{8} &= \frac{8x-8}{8} + \frac{x}{8} \\ \frac{18-2x+20+4x-3x-4}{8} &= \frac{8x-8+x}{8} \\ 18-2x+20+4x-3x-4 &= 8x-8+x \\ -x+34 &= 9x-8 \\ 42 &= 10x \\ x &= \frac{42}{10} = \frac{21}{5}\end{aligned}$$

6. Represent in real number line.

$$|x-4| > 3 \quad (1/0/0)$$

$$|x+5| > 2 \quad (0/1/0)$$

$$|2-x| \geq 4 \quad (0/1/0)$$

7. Solve

$$|x| = 4 \quad (1/0/0)$$

$$|x-6| = 2 \quad (1/0/0)$$

$$|x + 5| = 3x + 1 \quad (0/1/0)$$

$$|3x - 5| < 4 \quad (0/1/1)$$

$$\frac{3 - 2x}{2x - 3} = -1 \quad (0/0/1)$$

8. Factorize

$$x^2 - 4x \quad (1/0/0)$$

$$x^2 + 3x - 4 \quad (0/1/0)$$

$$x^2 + 7x + 10 \quad (0/1/0)$$

$$x^3 + 2x^2 - x - 2 \quad (0/0/1)$$

$$3x^3 + 6x^2 - 15x - 18 \quad (0/0/1)$$

$$x^5 + 6x^4 - x^3 - 38x^2 + 32 \quad (0/0/2)$$

9. Bonus question: solve the following inequality.

$$x^4 - 2x^3 - 11x^2 + 12x + 36 > 0 \quad (0/0/1)$$