

[polynomials]

1. Factor fully:

a. $bx - ac + bc - ax$

b. $27x^{18} + 1$

c. $5mn^4 - 15mn^3 - 5m^2n^3 + 15n^4$

d. $4x^4y^2 + 42x^3y^2 - 130x^2y^2$

e. $100x^2 - 80xy + 16y^2$

f. $16x^2 - \frac{8xy}{5} + \frac{y^2}{25}$

g. $x^2 - 10y + 9 - y^2 - 6x - 25$

h. $a^2b^2 - d^2e^2 + 9c^2 - 6abc$

i. $6x^3 + 6x + 8 - 17x^2$

2.

a. Divide $m^6 - m^2 + 6$ by $m^2 + 2$ using long division.

b. Divide $z^6 - 1$ by $z - 1$

c. Divide $y^3 - 2y + 3y^2 - 2$ by $y - 1$

3. Indicate the restrictions on the variable, then simplify:

$$\frac{18x^2 + 9xy - 5y^2}{3x - y}$$

4. Find the value of k if $3x^3 - 5x^2 + kx + 45$ is divisible by $x - 3$

5. Show that $x - 4$ is a factor of $2x^3 - 5x^2 - 11x - 4$

6. Determine the remainder when $y^3 + y^2 - 37y + 40$ is divided by $y + 7$. Do **not** divide.

7. Solve:

a. $3x^2 - 3x - 216 = 0$

b. $144 - 25y^2 = 0$

c. $17x = 3x^2 - 56$

d. $x^2 - 10x + 1 = 0$

e. $x^3 + 5x^2 + 7x + 3 = 0$

f. $6x^5 + 5x^4 - 27x^3 - 22x^2 + 12x + 8 = 0$

g. $27x^2 - 12 - 9x^3 + 4x = 0$

h. $5m^2 - 4m + 3m^3 - 6 = 0$