



# CAMI Mathematics: Grade 10

## GRADE 10\_CAPS Curriculum

### 10.4 Algebraic expressions (B)

#### 1. Factorization

##### 1.1 Difference between two squares

- (a)  $c^2 - h^2$
- (b)  $25p^2 - 9q^2$
- (c)  $81d^8 - 16h^{12}$
- (d)  $64a^{10} - 256f^4$
- (e)  $(x - 1)^2 - 36$

##### 1.2 Grouping

- (a)  $dj + hj + dq + hq$
- (b)  $b^2 - b(e + r) + er$
- (c)  $8b^7 - 12b^6e - 4be^6 + 6e^7$
- (d)  $a^2 - 4h^2 - 32hq - 64q^2$
- (d)  $b^2 - b(f + z) + fz$

##### 1.3 Trinomials

- (a)  $3n^2 - 11n - 4$
- (b)  $2g^2 + g - 1$
- (c)  $2q^2 - 15q + 28$
- (d)  $25q^2 - 20q - 12$
- (e)  $-16k^2 + 44k - 24$
- (f)  $-28c - 12c^2 - 16$
- (g)  $21b + 9b^2 + 12$
- (h)  $-2k^2q^3 - 6kq^3 - 4q^3$
- (i)  $b^2 - 9g^2 - 48gz - 64z^2$
- (j)  $49a^2 + 56ag + 16g^2 - 121q^6$

##### 1.4 Sum or difference between cubes

- (a)  $8a^3 - 125c^3$
- (b)  $8p^6 + 27r^{12}$
- (c)  $64n^9 - q^9$
- (d)  $2y^3 - 16x^3$
- (e)  $256 - 32k^9m^6$

##### 1.5 Factorizing fractions



## CAMI Mathematics: Grade 10

(a)  $\frac{e^5}{m^4 r^5} \div \frac{e^9}{m^2 r^9}$

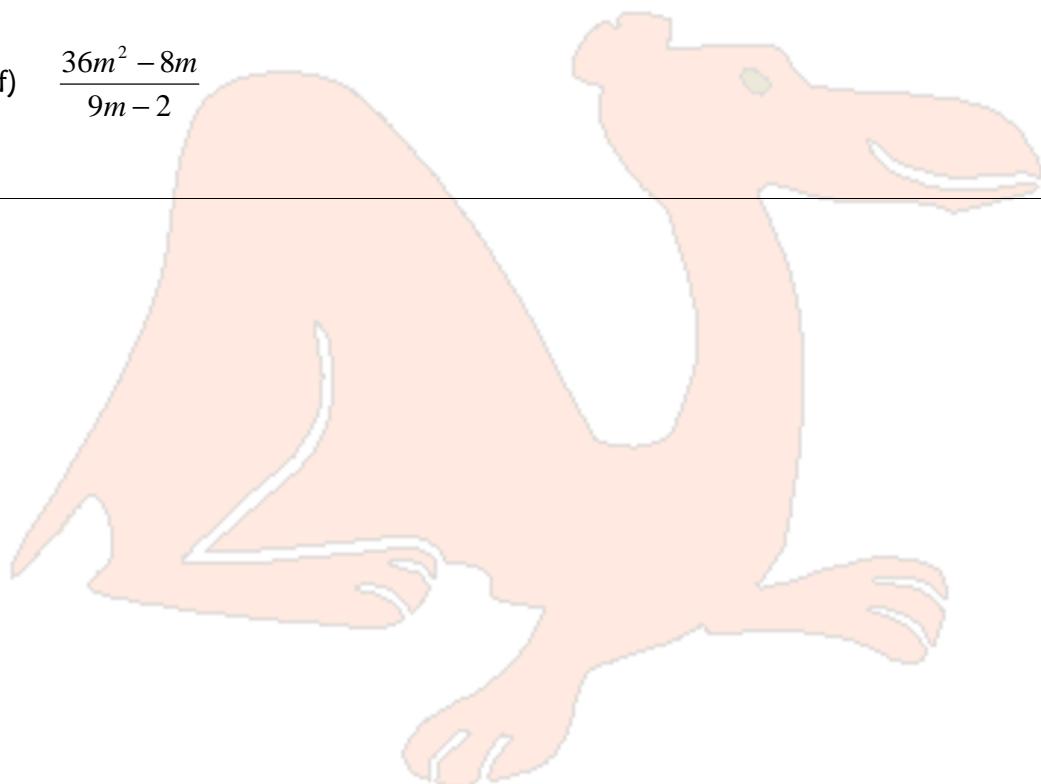
(b)  $\frac{12m^2 + 132m}{12m} \div \frac{m+11}{11}$

(c)  $\frac{t^2 - 9t}{t^2 + 3t} \div \frac{t^2 - 4t - 45}{t^2 + 9t + 18}$

(d)  $\frac{p^2 - 64}{3p - 9} \div \frac{9p - 72}{3p}$

(e)  $\frac{2mx^6}{m+x} \div \frac{7m^5x^5}{8m+8x}$

(f)  $\frac{36m^2 - 8m}{9m - 2}$





# CAMI Mathematics: Grade 10

## MEMO

### 1.1 Difference between two squares [4.5.3.1; 4.5.3.2; 4.5.3.3; 4.5.3.4; 4.5.3.5]

$$(a) c^2 - h^2 = (c + h)(c - h)$$

$$(b) 25p^2 - 9q^2 = (5p + 3q)(5p - 3q)$$

$$(c) 81d^8 - 16h^{12} = (9d^3 + 4h^6)(9d^3 - 4h^6)$$

$$(d) 64a^{10} - 256f^4 = (8a^5 + 16f^2)(8a^5 - 16f^2)$$

$$(e) (x - 1)^2 - 36 = ((x - 1) + 6)((x - 1) - 6) = (x + 5)(x - 7)$$

### 1.2 Grouping [4.5.2.1; 4.5.2.2; 4.5.2.3; 4.5.6.1]

$$(a) dj + hj + dq + hq = (dj + hj) + (dq + hq) = j(d + h) + q(d + h) = (d + h)(j + q)$$

$$(b) b^2 - b(e + r) + er = b^2 - be - br + er = (b^2 - be) + (-br + er) = b(b - e) - r(b - e) = (b - e)(b - r)$$

$$(c) 8b^7 - 12b^6e - 4be^6 + 6e^7 = (8b^7 - 12b^6e) + (-4be^6 + 6e^7) = 4b^6(2b - 3e) - 2e^6(2b - 3e) = (2b - 3e)(4b^6 - 2e^6) = 2(2b - 3e)(2b^6 - e^6)$$

$$(d) a^2 - 4h^2 - 32hq - 64q^2 = a^2 - 4(h^2 + 8hq + 16q^2) = a^2 - 4(h + 4q)^2$$



## CAMI Mathematics: Grade 10

$$\begin{aligned} &= (a + 2(h + 4q))(a - 2(h + 4q)) \\ &= (a + 2h + 8q)(a - 2h - 8q) \end{aligned}$$

$$\begin{aligned} (d) \quad &b^2 - b(f + z) + fz \\ &= b^2 - bf - bz + fz \\ &= (b^2 - bf) + (-bz + fz) \\ &= b(b - f) - z(b - z) \\ &= (b - f)(b - z) \end{aligned}$$

### 1.3 Trinomials [4.5.4.2; 4.5.4.3; 4.5.5.2; 4.5.5.3]

$$\begin{aligned} (a) \quad &3n^2 - 11n - 4 \\ &= (3n + 1)(n - 4) \end{aligned}$$

$$\begin{aligned} (b) \quad &2g^2 + g - 1 \\ &= (g + 1)(2g - 1) \end{aligned}$$

$$\begin{aligned} (c) \quad &2q^2 - 15q + 28 \\ &= (2q - 7)(q - 4) \end{aligned}$$

$$\begin{aligned} (d) \quad &25q^2 - 20q - 12 \\ &= (5q - 6)(5q + 2) \end{aligned}$$

$$\begin{aligned} (e) \quad &-16k^2 + 44k - 24 \\ &= -4(4k^2 - 11k + 6) \\ &= -4(4k - 3)(k - 2) \end{aligned}$$

$$\begin{aligned} (f) \quad &-28c - 12c^2 - 16 \\ &= -4(7c + 3c^2 + 4) \\ &= -4(3c^2 + 7c + 4) \\ &= -4(3c + 4)(c + 1) \end{aligned}$$

$$\begin{aligned} (g) \quad &21b + 9b^2 + 12 \\ &= 3(7b + 3b^2 + 4) \\ &= 3(3b^2 + 7b + 4) \\ &= 3(3b + 4)(b + 1) \end{aligned}$$

$$\begin{aligned} (h) \quad &-2k^2q^3 - 6kq^3 - 4q^3 \\ &= -2q^3(k^2 + 3k + 2) \\ &= -2q^3(k + 2)(k + 1) \end{aligned}$$

$$\begin{aligned} (i) \quad &b^2 - 9g^2 - 48gz - 64z^2 \\ &= b^2 - (9g^2 + 48gz + 64z^2) \end{aligned}$$



# CAMI Mathematics: Grade 10

$$\begin{aligned} &= b^2 - (3g + 8z)^2 \\ &= (b + (3g + 8z))(b - (3g + 8z)) \\ &= (b + 3g + 8z)(b - 3g - 8z) \end{aligned}$$

(j)  $49a^2 + 56ag + 16g^2 - 121q^6$   
 $= (7a + 4g)^2 - 121q^6$   
 $= (7a + 4g + 11q^3)(7a + 4g - 11q^3)$

## 1.4 Sum or difference between cubes [4.5.8]

(a)  $8a^3 - 125c^3$   
 $= (2a - 5c)(4a^2 + 10ac + 25c^2)$

(b)  $8p^6 + 27r^{12}$   
 $= (2p^3 + 3r^4)(4p^6 - 6p^3r^4 + 9r^8)$

(c)  $64n^9 - q^9$   
 $= (4n^3 - q^3)(16n^6 + 4n^3q^3 + q^6)$

(d)  $2y^3 - 16x^3$   
 $= 2(y^3 - 8x^3)$   
 $= 2(y - 2x)(y^2 + 2xy + 4x^2)$

(e)  $256 - 32k^9m^6$   
 $= 32(8 - k^9m^6)$   
 $= 32(8 - k^3m^6)$   
 $= 32(2 - km^2)(4 + 2km^2 + k^2m^4)$

## 1.5 Factorizing fractions [4.8.5.1; 4.8.5.2; 4.8.5.3; 4.8.5.4; 4.8.7.3; 4.8.7.1]

(a)

$$\begin{aligned} &\frac{e^5}{m^4r^5} \div \frac{e^9}{m^2r^9} \\ &= \frac{e^5}{m^4r^5} \times \frac{m^2r^9}{e^9} \\ &= \frac{r^4}{m^2e^4} \end{aligned}$$

(b)



## CAMI Mathematics: Grade 10

$$\begin{aligned}& \frac{12m^2 + 132m}{12m} \div \frac{m+11}{11} \\&= \frac{12m(m+11)}{12m} \times \frac{11}{(m+11)} \\&= 11\end{aligned}$$

(c)

$$\begin{aligned}& \frac{t^2 - 9t}{t^2 + 3t} \div \frac{t^2 - 4t - 45}{t^2 + 9t + 18} \\&= \frac{t(t-9)}{t(t+3)} \times \frac{(t+3)(t+6)}{(t-9)(t+5)} \\&= \frac{(t+6)}{(t+5)}\end{aligned}$$

(d)

$$\begin{aligned}& \frac{p^2 - 64}{3p - 9} \div \frac{9p - 72}{3p} \\&= \frac{(p+8)(p-8)}{3(p-3)} \times \frac{3p}{9(p-8)} \\&= \frac{p(p+8)}{9(p-3)}\end{aligned}$$

(e)

$$\begin{aligned}& \frac{2mx^6}{m+x} \div \frac{7m^5x^5}{8m+8x} \\&= \frac{2mx^6}{(m+x)} \times \frac{8(m+x)}{7m^5x^5} \\&= \frac{16x}{7m^4}\end{aligned}$$

(f)

$$\frac{36m^2 - 8m}{9m - 2} = \frac{4m(9m - 2)}{(9m - 2)} = 4m$$