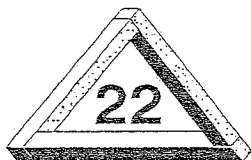


- (c) Three apples cost the same as 7 oranges.
The cost of 8 apples and 5 oranges is \$2.84.
Find the cost of each apple and each orange.

- (d) A rectangle is 180 cm^2 in area. If the length is 5 times the width, use simultaneous equations to find the dimensions of this rectangle.



Factorisation

Question 1 Factorise the following by taking out the common factor:

(a) $5x - 20$

(b) $-3x - 12$

(c) $2a^2 - 10a$

(d) $x^4 + x^3$

(e) $6mx - 3x^2$

(f) $20m^5 n^2 - 5m^3 n^3$

(g) $x^2 y + xy + xy^2$

(h) $x^5 + x^4 + x^3$

(i) $3x^2 y - 9x^3 y^2 + 12xy$

Question 2 Factorise the following:

(a) $a(a - 3) + 2(a - 3)$

(b) $a(x^2 + 4) - b(x^2 + 4)$

(c) $m(m + n) - n(m + n)$

(d) $p(p^2 + 5) - 3(p^2 + 5)$

(e) $3(5 - x) - y(5 - x)$

(f) $a(x - y) + b(y - x)$

Question 3 Factorise the following completely:

(a) $x^2 + ay + xy + ax$

(b) $15m - 3 + 5mn - n$

(c) $pq + pr - sq - sr$

(d) $py^2 - py - y + 1$

(e) $ax - by - ay + bx$

(f) $ax + by - ay - bx$

Question 4 Factorise the following:

(a) $x^2 - y^2$

(b) $m^2 - 16$

(c) $y^2 - 121$

(d) $36n^2 - 25$

(e) $81x^2 - 121y^2$

(f) $100m^2 - 49n^2$

(g) $16x^2 - 1$

(h) $4x^2 - 9y^2$

(i) $81a^2 - 49b^2$

Question 5 Factorise the following completely:

(a) $2x^2 - 18$

(b) $3m^2 - 75$

(c) $5x^2 - 125$

(d) $72m^2 - 2n^2$

(e) $8a^2 - 98b^2$

(f) $200p^2 - 8q^2$

(g) $18x^2 - 98y^2$

(h) $3x^2 - 243y^2$

(i) $5 - 20x^2$

Question 6 Factorise each of the following:

(a) $a^2 - 11a + 24$

(b) $y^2 - 3y - 28$

(c) $m^2 - 2n - 24$

(d) $a^2 - 7a - 30$

(e) $x^2 - 4x - 12$

(f) $m^2 + 9m + 18$

(g) $p^2 - 18p + 56$

(h) $x^2 - 2x - 8$

(i) $y^2 - 7y - 8$

(j) $m^2 + 18m - 63$

(k) $q^2 + 22q + 96$

(l) $p^2 - 17p + 42$

(m) $a^2 + 12a - 45$

(n) $m^2 + 5m - 24$

(o) $x^2 + 4x - 77$

Question 7 Factorise the following:

(a) $5x^2 - 7x - 6$

(b) $2x^2 - 15x + 7$

(c) $3m^2 + 8m + 4$

(d) $3y^2 - 4y - 15$

(e) $2x^2 + x - 10$

(f) $6n^2 + 5n - 21$

(g) $15 - 4x - 35x^2$

(h) $6m^2 + 7mn - 20n^2$

(i) $5a^2 - 2ab - 7b^2$

Question 8 Factorise completely:

(a) $2x^2 + 12x + 10$

(b) $6x^2 + 15x + 6$

(c) $5x^2 - 25x + 30$

(d) $6x^2 + 15x - 21$

(e) $2x^2 - 4x - 30$

(f) $4x^2 + 18x - 10$

Question 9 Factorise completely:

(a) $2mx^2 - 6mx - 36m$

(b) $x^3 - x$

(c) $2x^2 + 22x + 48$

(d) $(m+n)^2 + 5(m+n)$

(e) $x^4 - y^4$

(f) $x^4 + 11x^2 + 24$

(g) $3m^2(a^2 + b^2) - 27(a^2 + b^2)$

(h) $x^4 + 48x^2 - 49$

(i) $x^4 - 13x^2 + 36$

Question 10 Factorise and simplify the following:

(a) $\frac{3m-15}{3}$

(b) $\frac{x^2-9}{x-3}$

(c) $\frac{y+1}{y^2-1}$

(d) $\frac{x^2-16}{5x-20}$

(e) $\frac{m^2-5m+6}{4m-8}$

(f) $\frac{y^2-7y+10}{y^2+3y-10}$

Question 11 Simplify the following:

(a) $\frac{x^3}{y^2} \times \frac{1}{x} \times \frac{x^2}{y}$

(b) $\frac{m^4}{n^2} \div \frac{m}{n^5}$

(c) $\frac{x^2-4}{x+1} \times \frac{x^2-x-2}{x+2}$

(d) $\frac{x^2-2x-3}{x^2-4} \times \frac{x^2-4x+4}{x^2-9}$

(e) $\frac{x}{x+1} \times \frac{x^2-1}{x^2+x-2} \div \frac{x^2}{x+2}$

(f) $\frac{m^2-n^2}{m^2-2mn+n^2} \times \frac{m^2+2mn+n^2}{m^2-mn-2n^2}$

(g) $\frac{y+5}{y^2+7y+10} \times \frac{y^2+5y+6}{y^2+8y+15}$

$$(h) \frac{x^4 - y^4}{x^2 + y^2} \times \frac{y^2}{(x-y)^2} + \frac{xy + y^2}{x-y}$$

$$(i) \frac{x^2 + 6x + 8}{x^2 - 9x + 20} \times \frac{x^2 - 25}{x^2 + 3x - 4} + \frac{x + 2}{x^2 - 16}$$

Question 12 Simplify the following:

$$(a) \frac{1}{x} + \frac{1}{y}$$

$$(b) \frac{m}{n} + \frac{n}{m}$$

$$(c) \frac{x+1}{x} - \frac{1}{2x}$$

$$(d) \frac{1}{x-1} - \frac{1}{x+1}$$

$$(e) \frac{3}{x+2} - \frac{2}{x-1}$$

$$(f) \frac{m}{m-1} - \frac{m+1}{m}$$

$$(g) \frac{3x}{x+4} + \frac{x-2}{x+1}$$

$$(h) \frac{1}{x+y} - \frac{x}{x-y}$$

$$(i) \frac{1}{a-b} - \frac{b}{a+b}$$

$$(j) \frac{y^2}{y^2 - y - 6} + \frac{y}{y+2}$$

$$(k) \frac{x+1}{x^2-4} - \frac{x-1}{x+2}$$

$$(l) \frac{2x+1}{x-4} - \frac{x-2}{8-2x}$$

$$(m) \frac{2x-1}{x^2-4x-21} - \frac{x+1}{x^2-49}$$

$$(n) \frac{5}{x^2-5x+6} - \frac{3}{x^2+4x-21} + \frac{2}{x^2+5x-14}$$
