

Maths

Year 9 Higher Workbook

Algebra

Collecting like terms

Substitution into formula

Expanding a bracket

Factorise a bracket

Factorise quadratic

Expand two binomials

Geometry

Angle sums (algebraic)

Angle sum in triangle (alg)

Area

Complete all work in your maths book, using ruler and pencil for diagrams. All work must be marked in red, using answers provided. All working must be shown.

Collecting like terms (simplifying)

Video: <https://corbettmaths.com/2013/12/28/collecting-like-terms-video-9/>

Question 1: Simplify each of the following

- | | | | |
|--------------------------|--------------------------|-----------------------------------|---------------------|
| (a) $y + y + y + y$ | (b) $w + w + w + w + w$ | (c) $a + a + a + a + a + a$ | (d) $s + s + s$ |
| (e) $n + n$ | (f) $g + g + g + g - g$ | (g) $y + y + y + y - y - y$ | (h) $p + p - p - p$ |
| (i) $3y + 2y$ | (j) $4a + 3a$ | (k) $9k + 5k$ | (l) $7m + m$ |
| (m) $15c + 20c$ | (n) $6w - 3w$ | (o) $10y + 3y - 5y$ | (p) $20t - 14t$ |
| (q) $7x - 3x - x$ | (r) $8k - 8k$ | (s) $7y - 2y + y$ | (t) $5u - 4u$ |
| (u) $y^2 + y^2$ | (v) $a^2 + a^2 + a^2$ | (w) $c^2 + c^2 + c^2 + c^2 + c^2$ | (x) $7y^2 + 3y^2$ |
| (y) $2w^2 + 4w^2 + 8w^2$ | (z) $6y^2 - 2y^2 + 3y^2$ | | |

Question 2: Simplify the following expressions

- | | | | |
|--------------------------|--------------------|--------------------|-------------------|
| (a) $4u - 6u$ | (b) $8w - 9w$ | (c) $4a + 2a - 9a$ | (d) $2y - 9y$ |
| (e) $-3g - 2g$ | (f) $-4f + 9f$ | (g) $-m - 7m$ | (h) $5y^2 - 7y^2$ |
| (i) $6a^2 + 2a^2 - 9a^2$ | (j) $ab + ab + ab$ | | |

Question 3: Simplify the following expressions

- | | | |
|-----------------------------|-------------------------|--------------------------------|
| (a) $3a + 2b + 4a + b$ | (b) $7y + 5y + 2h + 2h$ | (c) $g + 8a + 2a + g$ |
| (d) $7m + 7p + 8m + p + 2p$ | (e) $9e + 2 + e + 2$ | (f) $4 + 3a + 2a + 8$ |
| (g) $2y + 4 + 3y - 1$ | (h) $8 + 3w - w - 3$ | (i) $5 - 4s - 2 + 10s$ |
| (j) $3x + 6y + 5x - 2y$ | (k) $6m - 2s + 11s + m$ | (l) $2a + 3b - 2 + a + 3b + 4$ |
| (m) $3a - 2b + a - 5b$ | (n) $2x - 2y - 6x + 5y$ | (o) $y - 4m - 3y - 5m$ |

Answers

Question 1

- | | | | | |
|------------|------------|------------|-------------|-------------|
| (a) $4y$ | (b) $5w$ | (c) $6a$ | (d) $3s$ | (e) $2n$ |
| (f) $3g$ | (g) $2y$ | (h) 0 | (i) $5y$ | (j) $7a$ |
| (k) $14k$ | (l) $8m$ | (m) $35c$ | (n) $3w$ | (o) $8y$ |
| (p) $6t$ | (q) $3x$ | (r) 0 | (s) $6y$ | (t) u |
| (u) $2y^2$ | (v) $3a^2$ | (w) $5c^2$ | (x) $10y^2$ | (y) $14w^2$ |
| (z) $7y^2$ | | | | |

Question 2

- | | | | | |
|-----------|-----------|-------------|------------|-----------|
| (a) $-2u$ | (b) $-w$ | (c) $-3a$ | (d) $-7y$ | (e) $-5g$ |
| (f) $5f$ | (g) $-8m$ | (h) $-2y^2$ | (i) $-a^2$ | (j) $3ab$ |

Question 3:

- | | | | |
|---------------|----------------|----------------|--------------------|
| (a) $6a + 3b$ | (b) $12y + 4h$ | (c) $10a + 2g$ | (d) $15m + 10p$ |
| (e) $10e + 4$ | (f) $5a + 12$ | (g) $5y + 3$ | (h) $2w + 5$ |
| (i) $3 + 6s$ | (j) $8x + 4y$ | (k) $7m + 9s$ | (l) $3a + 6b + 2$ |
| (m) $4a - 7b$ | (n) $3y - 4x$ | (o) $-2y - 9m$ | (p) $7p - 3q + 7r$ |

Substitution into formula

Video <https://corbettmaths.com/2012/08/20/substitution-into-expressions/>

Question 1: If $a = 7$ $b = 10$ $c = 3$ $d = 8$ and $e = 15$
Find the value of each expression.

- | | | | |
|-------------------|-------------------|-------------------|-------------------|
| (a) $a + 5$ | (b) $b - 4$ | (c) $c + d$ | (d) $e - d$ |
| (e) $2a$ | (f) $4b$ | (g) $3e$ | (h) $5c$ |
| (i) $\frac{b}{2}$ | (j) $\frac{e}{5}$ | (k) $\frac{d}{4}$ | (l) $\frac{a}{2}$ |
| (m) a^2 | (n) b^2 | (o) c^2 | (p) d^2 |
| (q) $2a + 1$ | (r) $3b - 7$ | (s) $9c + 11$ | (t) $4e - 45$ |
| (u) $2a + 3c$ | (v) $4d - b$ | (w) $5a + 2d$ | (x) $e - 4c$ |
| (y) $30 - 4a$ | (z) $15 - 3c$ | | |

Question 2: If $f = 5$ $g = 6$ $h = 4$ and $i = 2$
Find the value of each expression.

- | | | | |
|----------------|---------------|---------------|---------------|
| (a) fg | (b) hi | (c) fgh | (d) i^3 |
| (e) \sqrt{h} | (f) $3f + 2g$ | (g) $5h + 7i$ | (h) $9h - 7i$ |

Question 3: If $a = -2$ $b = 5$ $c = -6$ $d = 10$ and $e = 9$
Find the value of each expression.

- | | | | |
|-------------------|-------------------|----------------|---------------|
| (a) $a + 4$ | (b) $b - 8$ | (c) $c + e$ | (d) $a - d$ |
| (e) $d - c$ | (f) $2c$ | (g) $7a$ | (h) $-7b$ |
| (i) $2d + 3c$ | (j) $6e + 3a$ | (k) $5a + 7$ | (l) $20 + 4a$ |
| (m) ac | (n) $40 - d$ | (o) $2e - a$ | (p) $bd + a$ |
| (q) $\frac{a}{2}$ | (r) $\frac{d}{4}$ | (s) \sqrt{e} | (t) c^2 |

Question 1:

- | | | | |
|--------|---------|--------|---------|
| (a) 12 | (b) 6 | (c) 11 | (d) 7 |
| (e) 14 | (f) 40 | (g) 45 | (h) 15 |
| (i) 5 | (j) 3 | (k) 2 | (l) 3.5 |
| (m) 49 | (n) 100 | (o) 9 | (p) 64 |
| (q) 15 | (r) 23 | (s) 38 | (t) 15 |
| (u) 23 | (v) 22 | (w) 51 | (x) 3 |
| (y) 2 | (z) 6 | | |

Question 2:

- | | | | |
|--------|--------|---------|--------|
| (a) 30 | (b) 8 | (c) 120 | (d) 8 |
| (e) 2 | (f) 27 | (g) 34 | (h) 22 |

Question 3:

- | | | | |
|--------|---------|---------|---------|
| (a) 2 | (b) -3 | (c) 3 | (d) -12 |
| (e) 16 | (f) -12 | (g) -14 | (h) -35 |
| (i) 2 | (j) 48 | (k) -3 | (l) 12 |
| (m) 12 | (n) 30 | (o) 20 | (p) 48 |
| (q) -1 | (r) 2.5 | (s) 3 | (t) 36 |

Expand a bracket

Video <https://corbettmaths.com/2013/12/23/expanding-brackets-video-13/>

Question 1: Expand the following brackets

- | | | | |
|------------------|-------------------|------------------|-----------------------|
| (a) $5(y + 3)$ | (b) $4(a + 2)$ | (c) $8(w + 10)$ | (d) $3(x - 7)$ |
| (e) $9(s - 1)$ | (f) $2(8 - t)$ | (g) $7(4 + h)$ | (h) $10(a + 2b + 3c)$ |
| (i) $4(3y + 2)$ | (j) $5(2p - 1)$ | (k) $3(7a + 2)$ | (l) $9(2x - 5)$ |
| (m) $5(4 + 3t)$ | (n) $7(9 - 2c)$ | (o) $8(3w + 1)$ | (p) $9(1 - 4p)$ |
| (q) $11(2k - 5)$ | (r) $20(6a + 5c)$ | (s) $3(15w - 7)$ | (t) $3(9 - 2a)$ |

Question 2: Expand the following brackets

- | | | | |
|-----------------|------------------|------------------|-------------------|
| (a) $-2(w + 5)$ | (b) $-3(c + 7)$ | (c) $-8(c + 7)$ | (d) $-10(y - 2)$ |
| (e) $-7(g - 3)$ | (f) $-4(2w + 3)$ | (g) $-9(3w - 5)$ | (h) $-9(5x - 1)$ |
| (i) $-5(6 - c)$ | (j) $-6(4 + 3m)$ | (k) $-2(1 + 9c)$ | (l) $-5(8a - 7w)$ |

Question 3: Expand the following brackets

- | | | | |
|------------------|------------------|------------------|-------------------|
| (a) $a(c + 2)$ | (b) $c(d - 3)$ | (c) $a(b + c)$ | (d) $w(8 - y)$ |
| (e) $c(5 + a)$ | (f) $w(a - 9)$ | (g) $y(s + t)$ | (h) $2a(c - 3)$ |
| (i) $5x(y + 8)$ | (j) $3a(2c + 9)$ | (k) $6g(2c - 1)$ | (l) $9k(2 + d)$ |
| (m) $5(2f + 9w)$ | (n) $3y(5p + 2)$ | (o) $2s(t + 1)$ | (p) $-4a(8x - 3)$ |

Question 4: Expand the following brackets

- | | | | |
|-----------------|------------------|------------------|-------------------|
| (a) $a(a + 2)$ | (b) $y(y - 5)$ | (c) $w(a + w)$ | (d) $c(9 - c)$ |
| (e) $p(2p + 5)$ | (f) $2w(3w - 1)$ | (g) $9y(2y + 3)$ | (h) $4c(2a + 5c)$ |

Answers

Question 1

- | | | | |
|----------------|-------------------|----------------|-----------------------|
| (a) $5y + 15$ | (b) $4a + 8$ | (c) $8w + 80$ | (d) $3x - 21$ |
| (e) $9s - 9$ | (f) $16 - 2t$ | (g) $28 + 7h$ | (h) $10a + 20b + 30c$ |
| (i) $12y + 8$ | (j) $10p - 5$ | (k) $21a + 6$ | (l) $18x - 45$ |
| (m) $20 + 15t$ | (n) $63 - 14c$ | (o) $24w + 8$ | (p) $9 - 36p$ |
| (q) $22k - 55$ | (r) $120a + 100c$ | (s) $45w - 21$ | (t) $27 - 6a$ |

Question 2:

- | | | | |
|----------------|-----------------|-----------------|------------------|
| (a) $-2w - 10$ | (b) $-3c - 21$ | (c) $-8c - 56$ | (d) $-10y + 20$ |
| (e) $-7g + 21$ | (f) $-8w - 12$ | (g) $-27w + 45$ | (h) $-45x + 9$ |
| (i) $-30 + 5c$ | (j) $-24 - 18m$ | (k) $-2 - 18c$ | (l) $-40a + 35w$ |

Question 3:

- | | | | |
|-----------------|-----------------|-----------------|-------------------|
| (a) $ac + 2a$ | (b) $cd - 3c$ | (c) $ab + ac$ | (d) $8w - wy$ |
| (e) $5c + ac$ | (f) $aw - 9w$ | (g) $sy + ty$ | (h) $2ac - 6a$ |
| (i) $5xy + 40x$ | (j) $6ac + 27a$ | (k) $12cg - 6g$ | (l) $18k + 9dk$ |
| (m) $10f + 45w$ | (n) $15py + 6y$ | (o) $2st + 2s$ | (p) $-32ax + 12a$ |

Question 4:

- | | | | |
|-----------------|-----------------|-------------------|-------------------|
| (a) $a^2 + 2a$ | (b) $y^2 - 5y$ | (c) $aw + w^2$ | (d) $9c - c^2$ |
| (e) $2p^2 + 5p$ | (f) $6w^2 - 2w$ | (g) $18y^2 + 27y$ | (h) $8ac + 20c^2$ |

Factorise into a single bracket

Video <https://corbettmaths.com/2013/02/06/factorisation/>

Question 1: Factorise the following expressions

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|-----------------|-----------------|------------------|-----------------------|
| (a) $4x + 6$ | (b) $15x + 20$ | (c) $9y - 12$ | (d) $5x + 15$ |
| (e) $6x - 3$ | (f) $4x + 8$ | (g) $5y - 25$ | (h) $8w + 24$ |
| (i) $10y + 15$ | (j) $14w + 21$ | (k) $20y - 30$ | (l) $27x + 18$ |
| (m) $6 - 4x$ | (n) $9 + 12y$ | (o) $45 + 60x$ | (p) $16y - 32$ |
| (q) $22a + 55$ | (r) $100 - 40y$ | (s) $6x + 9y$ | (t) $4w - 2a$ |
| (u) $25y - 35z$ | (v) $8x^2 + 20$ | (w) $30y^3 - 15$ | (x) $42y + 28x - 56c$ |

Question 2: Factorise the following expressions

- | | | | |
|-------------------|-------------------|-------------------|-------------------|
| (a) $x^2 + 7x$ | (b) $x^2 - 3x$ | (c) $y^2 + y$ | (d) $w^2 + 9w$ |
| (e) $x^2 - 7x$ | (f) $4w^2 + 10w$ | (g) $6x^2 - 8x$ | (h) $9y^2 - 6y$ |
| (i) $10c + c^2$ | (j) $5g - g^2$ | (k) $14x^2 + 35x$ | (l) $40x^2 - 50x$ |
| (m) $12x^2 + 18x$ | (n) $24x^2 - 18x$ | (o) $45y^2 + 60y$ | (p) $7w^2 + 2w$ |

Question 3: Factorise the following expressions

- | | | | |
|--------------------|----------------------|--------------------|---------------------------|
| (a) $x^2 + xy$ | (b) $a^2 - ab$ | (c) $xy + xz$ | (d) $ab + ac - ad$ |
| (e) $6c^2 - 4cd$ | (f) $10x^2 + 15xy$ | (g) $12ab + 18bc$ | (h) $8xy + 4y^2$ |
| (i) $8cdf + 10cde$ | (j) $7w^2 + 6w + wy$ | (k) $8ab^2 - 10ab$ | (l) $4xy^2 + 6xy + 2x^2y$ |
| (m) $6mn - 7m^2n$ | (n) $11g^2h + 22h^2$ | | |

Answers

Question 1

- | | | | |
|------------------------|-------------------|--------------------|-----------------|
| (a) $2(2x + 3)$ | (b) $5(3x + 4)$ | (c) $3(3y - 4)$ | (d) $5(x + 3)$ |
| (e) $3(2x - 1)$ | (f) $4(x + 2)$ | (g) $5(y - 5)$ | (h) $8(w + 3)$ |
| (i) $5(2y + 3)$ | (j) $7(2w + 3)$ | (k) $10(2y - 3)$ | (l) $9(3x + 2)$ |
| (m) $2(3 - 2x)$ | (n) $3(3 + 4y)$ | (o) $15(3 + 4x)$ | (p) $16(y - 2)$ |
| (q) $11(2a + 5)$ | (r) $20(5 - 2y)$ | (s) $3(2x + 3y)$ | (t) $2(2w - a)$ |
| (u) $5(5y - 7z)$ | (v) $4(2x^2 + 5)$ | (w) $15(2y^3 - 1)$ | |
| (x) $14(3y + 2x - 4c)$ | | | |

Question 2

- | | | | |
|------------------|------------------|-------------------|-------------------|
| (a) $x(x + 7)$ | (b) $x(x - 3)$ | (c) $y(y + 1)$ | (d) $w(w + 9)$ |
| (e) $x(x - 7)$ | (f) $2w(2w + 5)$ | (g) $2x(3x - 4)$ | (h) $3y(3y - 2)$ |
| (i) $c(10 + c)$ | (j) $g(5 - g)$ | (k) $7x(2x + 5)$ | (l) $10x(4x - 5)$ |
| (m) $6x(2x + 3)$ | (n) $6x(4x - 3)$ | (o) $15y(3y + 4)$ | (p) $w(7w + 2)$ |

Question 3

- | | | | |
|--------------------|---------------------|-------------------|-----------------------|
| (a) $x(x + y)$ | (b) $a(a - b)$ | (c) $x(y + z)$ | (d) $a(b + c - d)$ |
| (e) $2c(3c - 2d)$ | (f) $5x(2x + 3y)$ | (g) $6b(2a + 3c)$ | (h) $4y(2x + y)$ |
| (i) $e(7d - 9c)$ | (j) $4a(6b^2 + 7c)$ | (k) $5xy(6 + 7z)$ | (l) $2a(2bc - 3)$ |
| (m) $2cd(4f + 5e)$ | (n) $w(7w + 6 + y)$ | (o) $2ab(4b - 5)$ | (p) $2xy(2y + 3 + x)$ |
| (q) $mn(6 - 7m)$ | (r) $11h(g^2 + 2h)$ | | |

Factorising quadratics

Video: <https://corbettmaths.com/2013/02/06/factorising-quadratics-1/>

Remember TEAM (Times to make End, Add to make Middle)

Positives only

- | | | | |
|----------------------|----------------------|-----------------------|----------------------|
| (a) $x^2 + 7x + 12$ | (b) $x^2 + 6x + 8$ | (c) $x^2 + 5x + 6$ | (d) $x^2 + 8x + 7$ |
| (e) $x^2 + 4x + 4$ | (f) $x^2 + 8x + 15$ | (g) $x^2 + 6x + 9$ | (h) $x^2 + 11x + 28$ |
| (i) $x^2 + 10x + 25$ | (j) $x^2 + 12x + 20$ | (k) $x^2 + 25x + 24$ | (l) $x^2 + 11x + 24$ |
| (m) $x^2 + 9x + 14$ | (n) $x^2 + 23x + 60$ | (o) $x^2 + 29x + 100$ | (p) $x^2 + 20x + 51$ |

Mixed

- | | | | |
|----------------------|----------------------|----------------------|-----------------------|
| (a) $x^2 - 9x + 8$ | (b) $x^2 + 24x + 23$ | (c) $x^2 - 5x - 14$ | (d) $x^2 - 7x + 12$ |
| (e) $x^2 + 12x + 36$ | (f) $x^2 - 2x - 63$ | (g) $x^2 + 14x + 24$ | (h) $x^2 + 17x + 60$ |
| (i) $x^2 - 11x + 30$ | (j) $x^2 - 4x - 32$ | (k) $x^2 - 2x - 63$ | (l) $x^2 - 16x - 17$ |
| (m) $x^2 - 11x + 18$ | (n) $x^2 - 13x + 22$ | (o) $x^2 + 18x + 56$ | (p) $x^2 - 21x + 110$ |

EXT – Set 1 to work on these

Question 1: Factorise each of the following

- | | | |
|------------------------|-----------------------|-----------------------|
| (a) $2x^2 + 7x + 5$ | (b) $2x^2 + 11x + 15$ | (c) $2x^2 + 9x + 10$ |
| (d) $3x^2 + 13x + 4$ | (e) $3x^2 + 4x + 1$ | (f) $3x^2 + 8x + 4$ |
| (g) $5x^2 + 13x + 6$ | (h) $5x^2 + 26x + 5$ | (i) $7x^2 + 10x + 3$ |
| (j) $11x^2 + 47x + 12$ | (k) $2x^2 + 17x + 36$ | (l) $5x^2 + 62x + 24$ |

Answers

Question 1:

- | | | | |
|-------------------|------------------|-------------------|------------------|
| a) $(x+3)(x+4)$ | b) $(x+2)(x+4)$ | c) $(x+2)(x+3)$ | d) $(x+7)(x+1)$ |
| e) $(x+2)(x+2)^*$ | f) $(x+5)(x+3)$ | g) $(x+3)(x+3)^*$ | h) $(x+7)(x+4)$ |
| i) $(x+5)(x+5)^*$ | j) $(x+2)(x+10)$ | k) $(x+24)(x+1)$ | l) $(x+8)(x+3)$ |
| m) $(x+2)(x+7)$ | n) $(x+20)(x+3)$ | o) $(x+25)(x+4)$ | p) $(x+17)(x+3)$ |

Question 5:

- | | | | |
|-----------------|------------------|------------------|-------------------|
| a) $(x-1)(x-8)$ | b) $(x+23)(x+1)$ | c) $(x+2)(x-7)$ | d) $(x-3)(x-4)$ |
| e) $(x+6)(x+6)$ | f) $(x+7)(x-9)$ | g) $(x+2)(x+12)$ | h) $(x+15)(x+2)$ |
| i) $(x-5)(x-6)$ | j) $(x-8)(x+4)$ | k) $(x-9)(x+7)$ | l) $(x-17)(x+1)$ |
| m) $(x-2)(x-9)$ | n) $(x-11)(x-2)$ | o) $(x+14)(x+4)$ | p) $(x-10)(x-11)$ |

EXT

Question 1:

- | | | |
|------------------------|-----------------------|------------------------|
| (a) $(2x + 5)(x + 1)$ | (b) $(2x + 5)(x + 3)$ | (c) $(2x + 5)(x + 2)$ |
| (d) $(3x + 1)(x + 4)$ | (e) $(3x + 1)(x + 1)$ | (f) $(3x + 2)(x + 2)$ |
| (g) $(5x + 3)(x + 2)$ | (h) $(5x + 1)(x + 5)$ | (i) $(7x + 3)(x + 1)$ |
| (j) $(11x + 3)(x + 4)$ | (k) $(2x + 9)(x + 4)$ | (l) $(5x + 2)(x + 12)$ |

Expand 2 binomials

Video <https://corbettmaths.com/2013/12/23/expanding-two-brackets-video-14/>

Use grid method, complete all questions for practice.

Question 1: Expand and simplify

(a) $(w + 4)(w + 2)$ (b) $(y + 1)(y + 2)$ (c) $(c + 2)(c + 5)$ (d) $(x + 6)(x + 7)$

(e) $(a + 5)(a - 3)$ (f) $(g + 7)(g - 4)$ (g) $(s - 4)(s + 5)$ (h) $(x + 1)(x - 3)$

(i) $(p - 3)(p - 2)$ (j) $(y - 4)(y - 4)$ (k) $(k - 5)(k - 6)$ (l) $(v + 4)(v + 3)$

(m) $(n + 8)(n - 10)$ (n) $(b - 3)(b + 7)$ (o) $(z - 9)(z - 3)$ (p) $(a - 5)(a + 7)$

(q) $(w + 2)(w - 8)$ (r) $(r + 7)(r + 7)$ (s) $(w - 11)(w + 1)$ (t) $(t - 8)(t - 7)$

Question 2: Expand and simplify

(a) $(8 + x)(2 + x)$ (b) $(9 + y)(4 - y)$ (c) $(1 + y)(3 + y)$ (d) $(10 - t)(4 - t)$

(e) $(4 - w)(w + 2)$ (f) $(6 - x)(x - 4)$ (g) $(2 - r)(8 - r)$ (h) $(x + 2)(8 - x)$

Question 3: Expand and simplify

(a) $(y + 2)(y - 2)$ (b) $(w + 7)(w - 7)$ (c) $(a + 1)(a - 1)$ (d) $(x - 10)(x + 10)$

(e) $(g - 8)(g + 8)$ (f) $(6 - x)(6 + x)$ (g) $(4 - r)(4 + r)$ (h) $(11 + y)(11 - y)$

Answers

Question 1:

(a) $w^2 + 6w + 8$

(b) $y^2 + 3y + 2$

(c) $c^2 + 7c + 10$

(d) $x^2 + 13x + 42$

(e) $a^2 + 2a - 15$

(f) $g^2 + 3g - 28$

(g) $s^2 + s - 20$

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

(i) $p^2 - 5p + 6$

(j) $y^2 - 8y + 16$

(k) $k^2 - 11k + 30$

(l) $v^2 + 7v + 12$

(m) $n^2 - 2n - 80$

(n) $b^2 + 4b - 21$

(o) $z^2 - 12z + 27$

(p) $a^2 + 2a - 35$

(q) $w^2 - 6w - 16$

(r) $r^2 + 14r + 49$

(s) $w^2 - 10w - 11$

(t) $t^2 - 15t + 56$

Question 2:

(a) $16 + 10x + x^2$

(b) $36 - 5y - y^2$

(c) $3 + 4y + y^2$

(d) $40 - 14t + t^2$

(e) $2w + 8 - w^2$

(f) $10x - x^2 - 24$

(g) $16 + r^2 - 10r$

(h) $6x + 16 - x^2$

Question 3:

(a) $y^2 - 4$

(b) $w^2 - 49$

(c) $a^2 - 1$

(d) $x^2 - 100$

(e) $g^2 - 64$

(f) $36 - x^2$

(g) $16 - r^2$

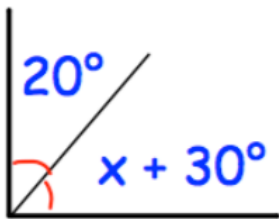
(h) $121 - y^2$

Angles (algebraic)

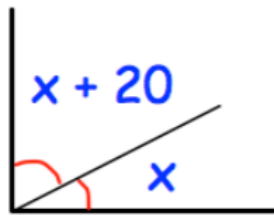
Video: <https://corbettmaths.com/2013/04/20/forming-equations-involving-perimeter-or-angles/>

Question 4: Calculate x in each of these diagrams.

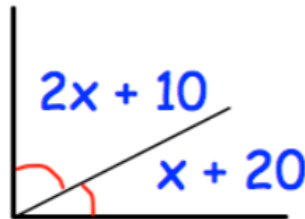
(a)



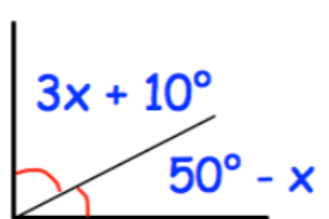
(b)



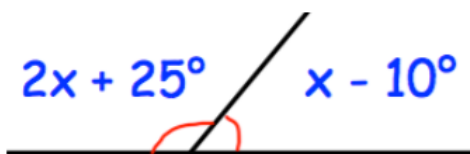
(c)



(d)



(e)



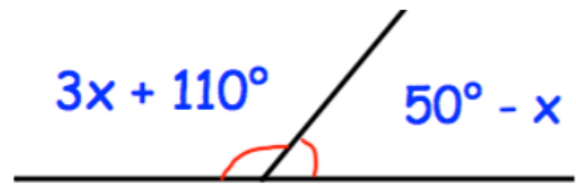
(f)

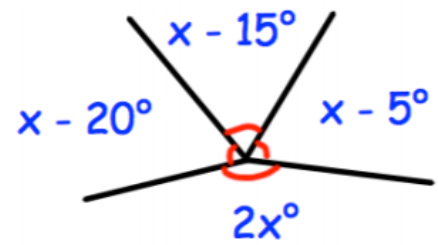
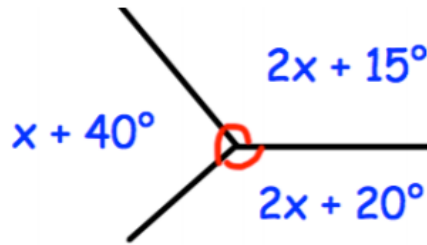
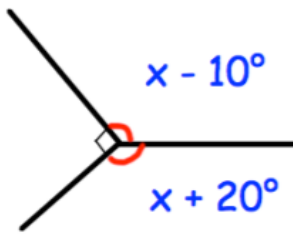


(g)

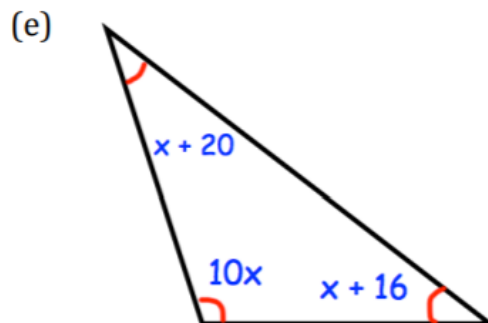
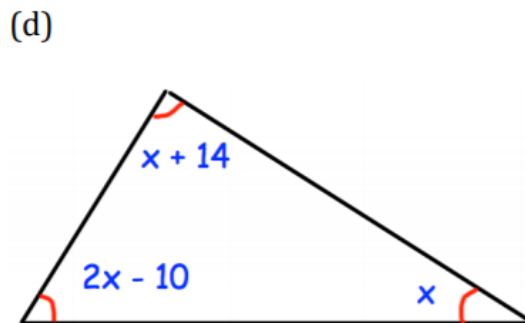
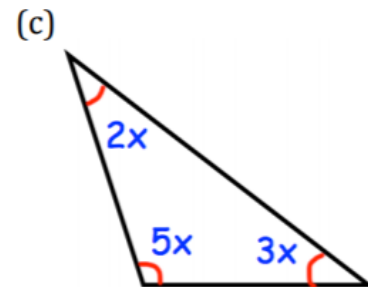
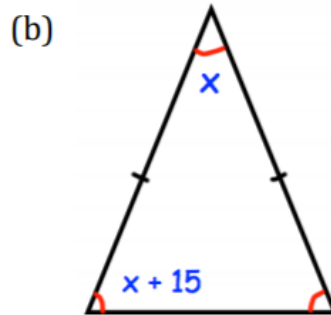
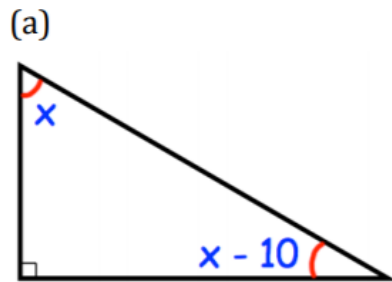


(h)





Question 5: Calculate x in each of these diagrams.



Answers

Question 4:

(a) 40

(b) 35

(c) 20

(d) 15

(e) 55

(f) 70

(g) 15.8

(h) 10

(i) 130

(j) 57

(k) 80

Question 5:

(a) $x=50$

(b) $x=50$

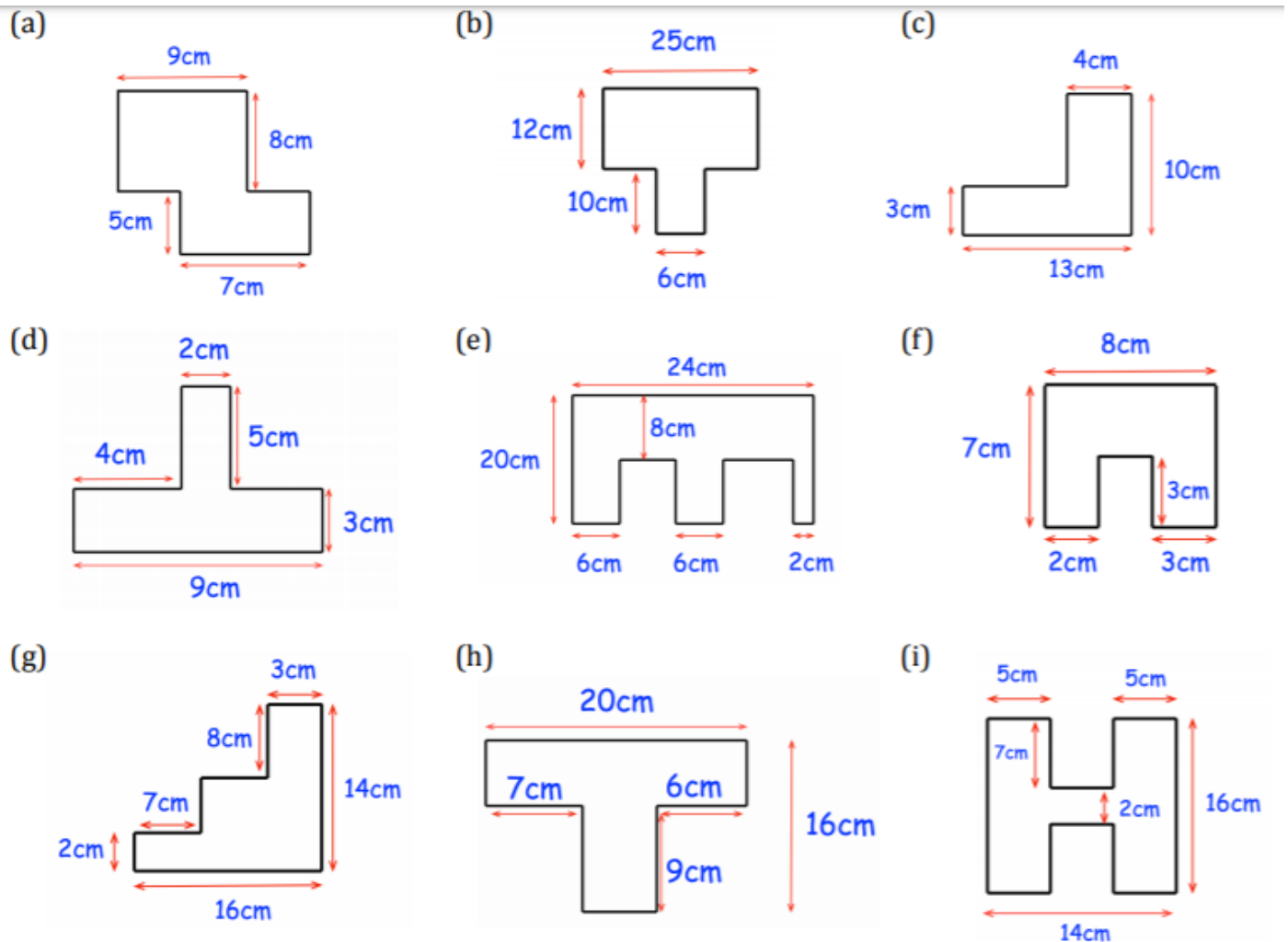
(c) $x=18$

(d) $x=44$

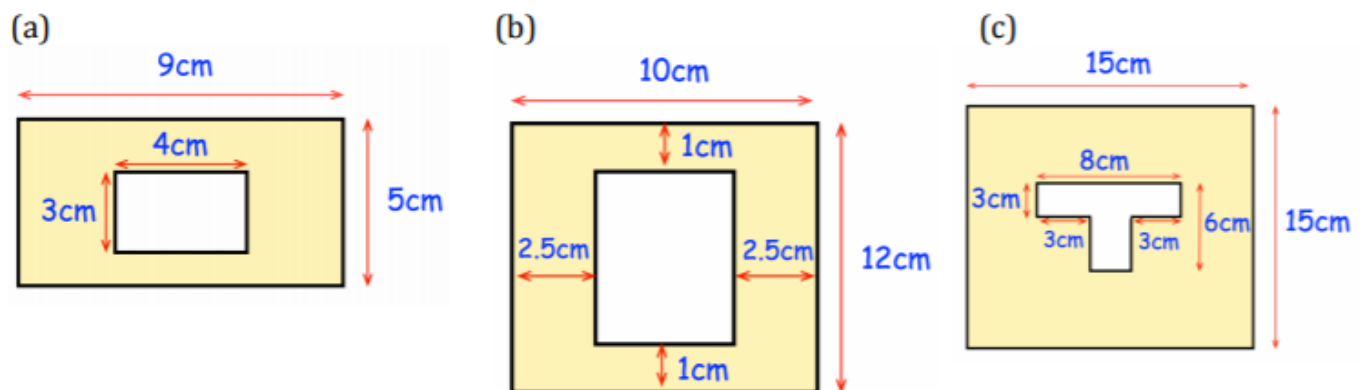
(e) $x=12$

Area

The space inside a 2d shape.



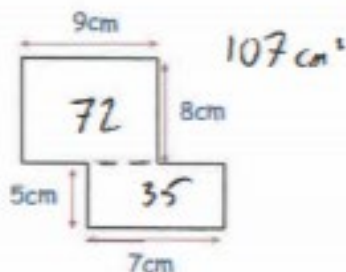
Question 2: Work out the shaded area.



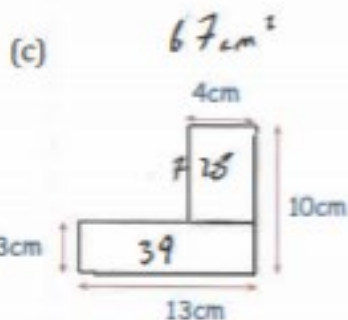
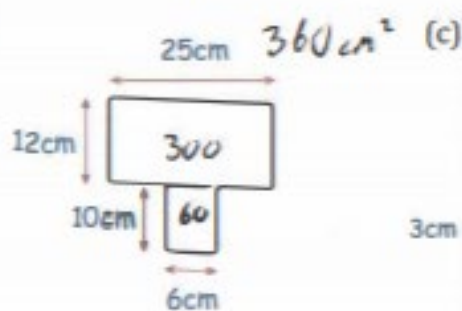
Answers

Question 1: Work out the area of each of these shapes.

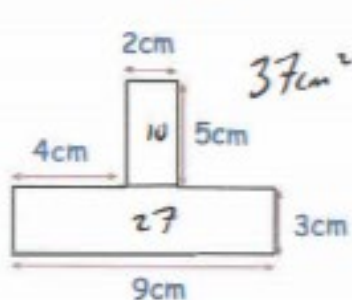
(a)



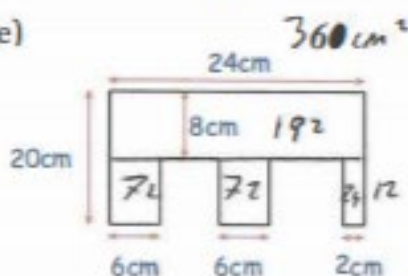
(b)



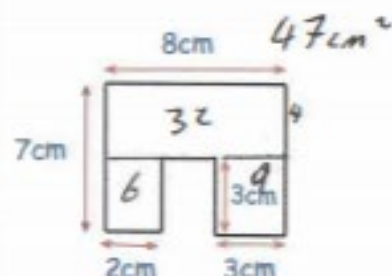
(d)



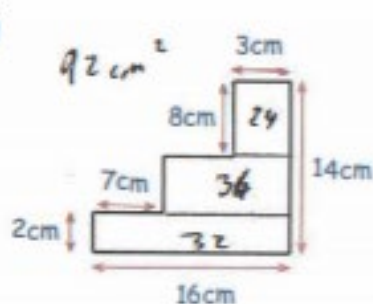
(e)



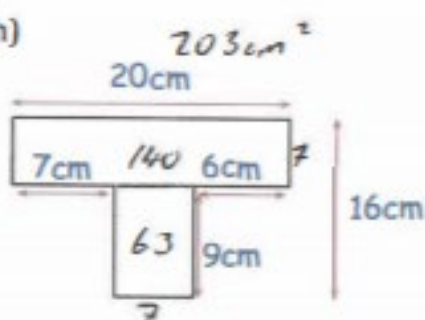
(f)



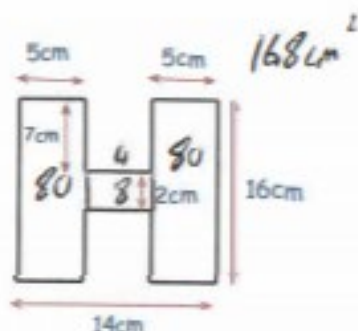
(g)



(h)

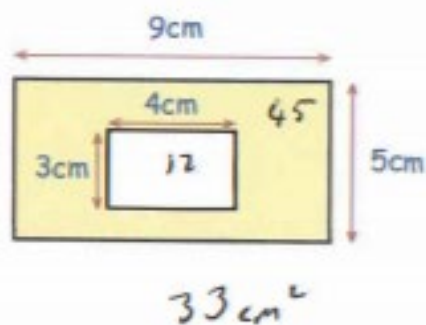


(i)

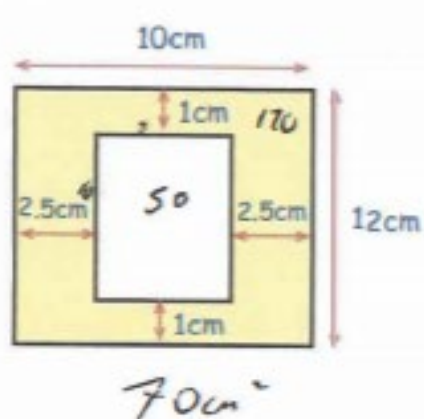


Question 2: Work out the shaded area.

(a)



(b)



(c)

