

UNIT 12 *Formulae***Extra Exercises 12.1**

1. If $x = 6$, $y = 7$ and $z = 8$, evaluate the following expressions:

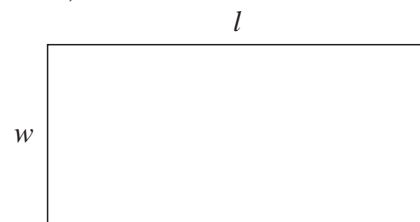
- | | | |
|-----------------|-----------------|-------------|
| (a) $x + y$ | (b) $z - x$ | (c) $z + y$ |
| (d) $2x$ | (e) $3y$ | (f) $4z$ |
| (g) $x + y + z$ | (h) $x + y - z$ | (i) $z - y$ |

2. Calculate the values of the following expressions, if $a = 3$, $b = 7$ and $c = 5$.

- | | | |
|---------------|---------------|---------------|
| (a) ab | (b) bc | (c) ac |
| (d) $2a + b$ | (e) $2b + c$ | (f) $3c + a$ |
| (g) $2b + 2c$ | (h) $3a + 7b$ | (i) $5b - 6c$ |
| (j) $6b + 3c$ | (k) $3b - 2c$ | (l) $6a - 2b$ |

3. Calculate the area and perimeter of the rectangle shown, if:

- (a) $l = 6$ and $w = 2$,
(b) $l = 8$ and $w = 5$,
(c) $l = 13$ and $w = 6$.



UNIT 12 *Formulae***Extra Exercises 12.2**

1. Calculate:

- | | | |
|---------------------|------------------------|------------------------|
| (a) $3 - 8$ | (b) $(-5) + 8$ | (c) $3 - (-5)$ |
| (d) $30 + (-5)$ | (e) $(-4) \times (-8)$ | (f) $(-2) \times (-6)$ |
| (g) $5 \times (-7)$ | (h) $(-4) - (-8)$ | (i) $8 - (-4)$ |
| (j) $24 \div (-6)$ | (k) $(-20) \div (-4)$ | (l) $100 \div (-5)$ |

2. If $x = 8$, $y = 4$ and $z = -2$, calculate the values of the following expressions:

- | | | |
|-------------------|---------------|---------------|
| (a) $x + z$ | (b) $x - z$ | (c) xz |
| (d) $\frac{x}{z}$ | (e) xyz | (f) $xy + 3z$ |
| (g) $2x - 5y$ | (h) $4z + 8y$ | (i) $5x + 2z$ |

3. If $a = 4$, $b = 5$ and $c = -10$, calculate the values of the following expressions:

- | | | |
|---------------------|--------------------|------------------------|
| (a) $3(a + b)$ | (b) $4(b - a)$ | (c) $2(a + c)$ |
| (d) a^2 | (e) b^2 | (f) c^2 |
| (g) $a^2 + c$ | (h) $a^2 + b^2$ | (i) $\sqrt{a + b}$ |
| (j) $\sqrt{3b - c}$ | (k) $\frac{ab}{c}$ | (l) $\frac{ab + c}{b}$ |

UNIT 12 *Formulae***Extra Exercises 12.3**

1. Solve the following equations

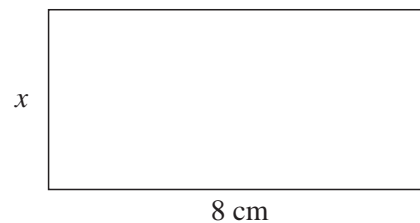
- | | | |
|------------------------|-----------------------|------------------|
| (a) $3 + x = 8$ | (b) $5x = 40$ | (c) $x - 2 = 6$ |
| (d) $\frac{x}{2} = 14$ | (e) $2x = 14$ | (f) $3 + x = 15$ |
| (g) $x - 1 = 9$ | (h) $x - 4 = 12$ | (i) $3x = 27$ |
| (j) $5x = 45$ | (k) $\frac{x}{3} = 6$ | (l) $4x = 32$ |
| (m) $x - 2 = 3$ | (n) $6x = 42$ | (o) $x - 7 = 21$ |

2. Solve the following equations:

- | | | |
|-----------------|------------------|------------------------|
| (a) $3x = -12$ | (b) $2x = -40$ | (c) $\frac{x}{-2} = 8$ |
| (d) $x + 4 = 2$ | (e) $x - 3 = -2$ | (f) $x + 8 = 3$ |

3. The area of the rectangle shown is 24 cm^2 .

- (a) Write down an equation involving x .
(b) Calculate the value of x .



UNIT 12 *Formulae***Extra Exercises 12.4**

1. Solve the following equations:

(a) $5x + 2 = 12$

(b) $6x - 3 = 21$

(c) $4x + 1 = 13$

(d) $2x + 7 = 21$

(e) $5x - 8 = 22$

(f) $4x + 1 = -7$

(g) $5x + 13 = 3$

(h) $4(x - 7) = 8$

(i) $3(2x + 7) = 27$

(j) $\frac{x}{4} + 2 = 5$

(k) $\frac{x + 2}{3} = 8$

(l) $\frac{2x + 6}{3} = 8$

2. Solve the following equations:

(a) $x + 2 = 2x - 1$

(b) $6x - 1 = 2x + 23$

(c) $4x + 2 = 5x + 1$

(d) $3x + 2 = 5x - 8$

(e) $3(2x + 1) = 4x + 19$

(f) $7x + 4 = 3(x + 8)$

3. A formula states:

$$s = \frac{1}{2}(u + v)t$$

(a) Calculate s , if $u = 3$, $v = 6$ and $t = 10$.

(b) Calculate t , if $s = 8$, $u = 1$ and $v = 3$.

(c) Calculate u , if $s = 52$, $v = 5$ and $t = 8$.

(d) Calculate v , if $s = 4$, $u = 6$ and $t = 8$.

UNIT 12 *Formulae***Extra Exercises 12.5**

1. Complete the following table to solve the equation $x^3 = 100$, giving your answer correct to 1 decimal place.

x	x^3	<i>Comment</i>
4		
5		
4.5		
4.6		
4.7		
4.65		

2. Solve the equation

$$x^2 + x^3 = 50$$

giving your answer correct to:

- (a) 1 decimal place,
 - (b) 2 decimal places.
3. Solve the equation

$$x + x^4 = 200$$

giving your answer correct to 2 decimal places.

UNIT 12 *Formulae***Extra Exercises 12.6**

1. Make x the subject of each of the following formulae:

(a) $y = 4x$

(b) $y = x + 4$

(c) $y = \frac{x}{6}$

(d) $y = x - 7$

(e) $y = 2x + 1$

(f) $y = 3(x + 2)$

(g) $y = 4(x - 6)$

(h) $y = \frac{x}{2} + 1$

(i) $y = 4x - 8$

2. Make t the subject of each of the following formulae:

(a) $x = 4t + p$

(b) $x = bt - a$

(c) $y = xt + p$

(d) $p = \frac{t}{2} + a$

(e) $q = \frac{t}{x} - b$

(f) $p = 2(t + r)$

3. The formula $p = \frac{22k}{10}$ can be used to convert kilograms to pounds. Make k the subject of this formula.

4. The cost, C , of a taxi journey is calculated using the formula

$$C = 1.8 + 2d$$

where d is the distance travelled, in miles. Make d the subject of this formula.

Extra Exercises 12.1 Answers

- | | | | |
|----|-------------|--------|--------|
| 1. | (a) 13 | (b) 2 | (c) 15 |
| | (d) 12 | (e) 21 | (f) 32 |
| | (g) 21 | (h) 5 | (i) 1 |
| 2. | (a) 21 | (b) 35 | (c) 15 |
| | (d) 13 | (e) 19 | (f) 18 |
| | (g) 24 | (h) 58 | (i) 17 |
| | (j) 57 | (k) 11 | (l) 4 |
| 3. | (a) 12 , 16 | | |
| | (b) 40 , 26 | | |
| | (c) 78 , 38 | | |

Extra Exercises 12.2 Answers

- | | | | |
|----|---------|---------|---------|
| 1. | (a) -5 | (b) 3 | (c) 8 |
| | (d) 25 | (e) 32 | (f) 12 |
| | (g) -35 | (h) 4 | (i) 12 |
| | (j) -4 | (k) 5 | (l) -20 |
| 2. | (a) 6 | (b) 10 | (c) -16 |
| | (d) -4 | (e) -64 | (f) 26 |
| | (g) -4 | (h) 24 | (i) 36 |
| 3. | (a) 27 | (b) 4 | (c) -12 |
| | (d) 16 | (e) 25 | (f) 100 |
| | (g) 6 | (h) 41 | (i) 3 |
| | (j) 5 | (k) -2 | (l) 2 |

Extra Exercises 12.3 Answers

- | | | | |
|----|---------------|----------|---------|
| 1. | (a) 5 | (b) 8 | (c) 8 |
| | (d) 28 | (e) 7 | (f) 12 |
| | (g) 10 | (h) 16 | (i) 9 |
| | (j) 9 | (k) 18 | (l) 8 |
| | (m) 5 | (n) 7 | (o) 28 |
| 2. | (a) -4 | (b) -20 | (c) -16 |
| | (d) -2 | (e) 1 | (f) -5 |
| 3. | (a) $8x = 24$ | (b) 3 cm | |
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Extra Exercises 12.4 Answers

1. (a) 2 (b) 4 (c) 3
 (d) 7 (e) 6 (f) -2
 (g) -2 (h) 9 (i) 1
 (j) 12 (k) 22 (l) 9
2. (a) 3 (b) 6 (c) 1
 (d) 5 (e) 8 (f) 5
3. (a) 45 (b) 4 (c) 8 (d) -5

Extra Exercises 12.5 Answers

1.

x	x^3 to 1 d.p.	<i>Comment</i>
4	64	Too small
5	125	Too big
4.5	91.125	Too small
4.6	97.336	Too small
4.7	103.823	Too big
4.65	100.5	Too big

$$4.6 < x < 4.65$$

$$x = 4.6 \text{ to 1 d.p.}$$

2. (a) 3.4 (b) 3.38
3. 3.74 or -3.78

Extra Exercises 12.6 Answers

1. (a) $x = \frac{y}{4}$ (b) $x = y - 4$ (c) $x = 6y$
(d) $x = y + 7$ (e) $x = \frac{y-1}{2}$ (f) $x = \frac{y}{3} - 2$ or $x = \frac{y-6}{3}$
(g) $x = \frac{y}{4} + 6$ or $x = \frac{y+24}{4}$ (h) $x = 2(y-1)$ (i) $x = \frac{y+8}{4}$
2. (a) $t = \frac{x-p}{4}$ (b) $t = \frac{x+a}{b}$ (c) $t = \frac{y-p}{x}$ (d) $t = 2(p-a)$
(e) $t = x(q+b)$ (f) $t = \frac{p}{2} - r$ or $t = \frac{p-2r}{2}$
3. $k = \frac{10p}{22} = \frac{5p}{11}$
4. $d = \frac{C-1.8}{2}$