

UNIT 2 Formulae

Mental Tests

Test 2.1 (*no calculator*)

1. The perimeter of a triangle is given by the formula $p = a + b + c$ when a, b, c are the lengths of the three sides. What is the perimeter length when $a = 2$ cm, $b = 5$ cm, $c = 6$ cm? (13 cm)
2. Find the value of the function $f = x^2 + y^2$ when $x = 3$ and $y = 4$. (25)
3. Evaluate $-10 + 7$. (-3)
4. Evaluate $8 - (-9)$. (17)
5. What is the value of $(-3)^2$? (9)
6. Find the value of $(-2) \times (-5)$. (10)
7. What is the difference in temperature between -4°C and 7°C ? (11°C)
- 8/9. The distance travelled, s metres, by a bicycle moving at constant speed, v m/s, for a time, t seconds, is given by $s = vt$.
 - (a) Find s when $v = 20$ m/s and $t = 15$ seconds. (300 m)
 - (b) Find v when $s = 100$ m and $t = 5$ seconds. (20 m/s)
10. If $a + bx = c$, find an expression for x . ($\frac{c-a}{b}$)

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Test 2.2 (*no calculator*)

1. The perimeter of a quadrilateral is given by the formula $p = a + b + c + d$ when a, b, c and d are the lengths of its sides. What is the perimeter length when $a = 5$ cm, $b = 3$ cm, $c = 7$ cm, $d = 3$ cm? (18 cm)
2. Find the value of the function $f = 2x + 3y$ when $x = 2, y = 5$. (19)
3. Evaluate $-12 + 9$. (-3)
4. Evaluate $10 - (-12)$. (22)
5. What is the value of $(-5)^2$? (25)
6. Find the value of $(-4) \times (-3)$. (12)
7. What is the difference in height between -2 m and 5 m? (7 m)
- 8/9. The total cost, £ C , of n pens at p pence each is given by $C = \frac{np}{100}$.
 - (a) Find C when $n = 400$ and $p = 15$. (£60)
 - (b) Find the price per pen, in pence, when 200 pens can be bought for £20. (10p)
10. If $ax - b = c$, find an expression for x . ($\frac{b+c}{a}$)

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Test 2.3 (*no calculator*)

1/2. If $v = u + ft$, what is the value of v when

(a) $u = 10$, $f = 2$ and $t = 15$, (40)

(b) $u = 20$, $f = -3$ and $t = 5$? (5)

3. Find the value of $\frac{4xy}{z^2}$ when $x = 5$, $y = 20$, $z = 4$. (25)

4. If $z^2 = x^2 + y^2$, what is the value of z when $x = 5$, $y = 12$? (± 13)

5. If $v^2 = u^2 + 2fs$, what is the value of v when $u = 15$, $f = -4$, $s = 13$? (± 11)

6. Make x the subject of $ax + b = cx + d$. ($\frac{d-b}{a-c}$)

7. If $ax = by$, find an expression for x . ($\frac{by}{a}$)

8. Simplify the expression $2(5 - x) + 3(x - 1)$. ($x + 7$)

9. Factorise $6xy - 12x^2$. ($6x(y - 2x)$)

10. Simplify $\frac{x}{2} + \frac{(3 - 2x)}{4}$. ($\frac{3}{4}$)

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Test 2.4 (no calculator)

1/2. If $s = ut + \frac{1}{2}ft^2$, what is the value of s when

(a) $u = 0, f = 5, t = 2$ (10)

(b) $u = 10, f = -1, t = 2$ (18)

3. Find the value of $\frac{3x^2}{yz}$ when $x = 4, y = 2, z = 6$. (4)

4. If $z^2 = x^2 - y^2$, what is the value of z when $x = 10, y = 6$? (± 8)

5. If $v^2 = u^2 + 2fs$, what is the value of v when $u = 10, f = -7, s = 6$? (± 4)

6. Make x the subject of $ax - b = d - cx$. ($\frac{d+b}{a+c}$)

7. If $\frac{x}{a} = \frac{y}{b}$, find an expression for x . ($\frac{ay}{b}$)

8. Simplify the expression $3(x - 2) - 2(x + 1)$. ($x - 8$)

9. Factorise $10x^2y - 5xy$. ($5xy(2x - 1)$)

10. Simplify $\frac{x+1}{5} - \left(\frac{2x+1}{10}\right)$. ($\frac{1}{10}$)