

**Maths Revision
Booklet**

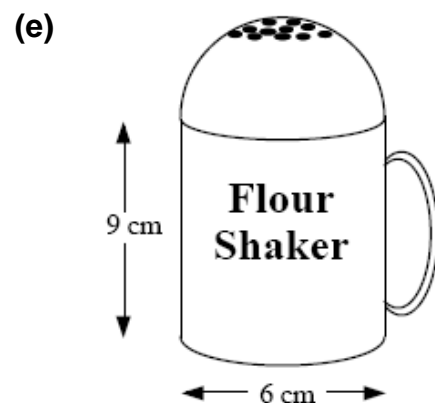
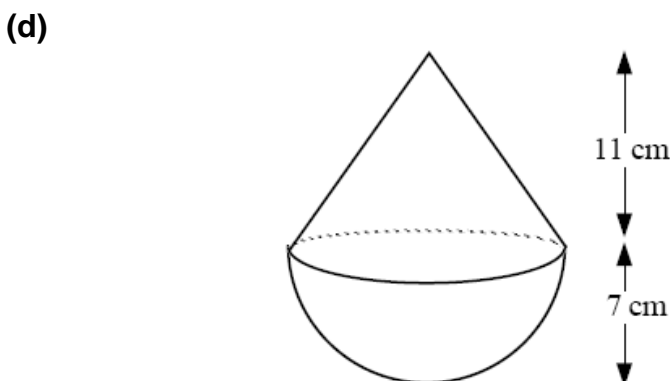
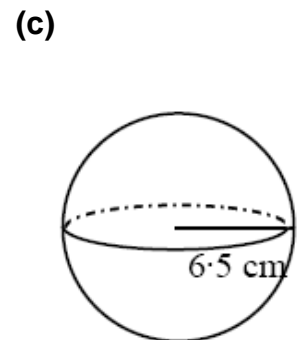
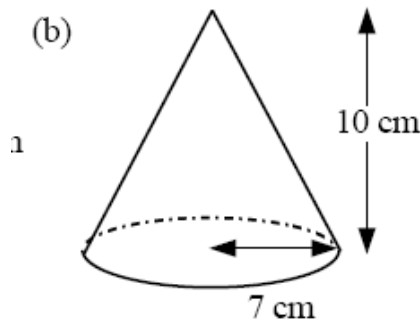
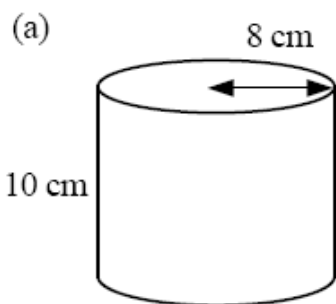
Page	Contents
2	Percentages
2	Volume
3	Expanding Brackets
4	Factorising
4	Surds
5	Straight Line
5	Arcs & Sectors
6	Solutions

Percentages

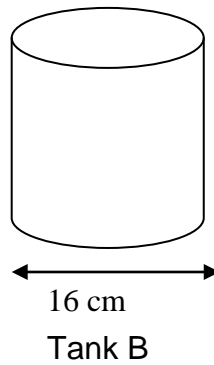
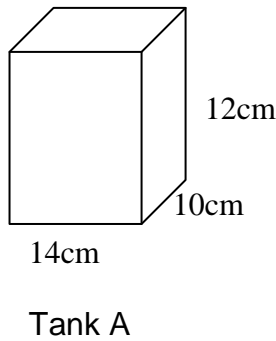
1. £4800 was put into an Isa account for 5 years. During this time it accrued 4% interest per annum. How much was in the account at the end of this period?
2. A car was bought for £9600. In the first year it lost 18% of its value, and in the second year it lost a further 9%. What would the car be worth after 2 years – give your answer to the nearest pound.
3. A house was bought for £140,000 last year. It has been revalued this year at £142,000. What is the percentage increase in its value? Give your answer correct to 1 decimal place.
4. Sam had a pay rise last year of 3%. If he now earns £25,338, what was his salary last year?
5. How much interest would be earned by placing £5400 into a savings account at an interest rate of $2\frac{1}{2}\%$ for 4 years?
6. A washing machine sells for £333.70. This includes VAT at $17\frac{1}{2}\%$. What is the price without VAT?
7. Mary bought a flat for £84000. It's value appreciated by 3% in the first year and depreciated by 3% in the second year. How much is the flat worth two years after Mary bought it?

Volume

1. Calculate the volume of the following shapes:-



2. Water from a full tank A is transferred to tank B. Find the depth of the water in tank B. Give your answer to 2 s.f



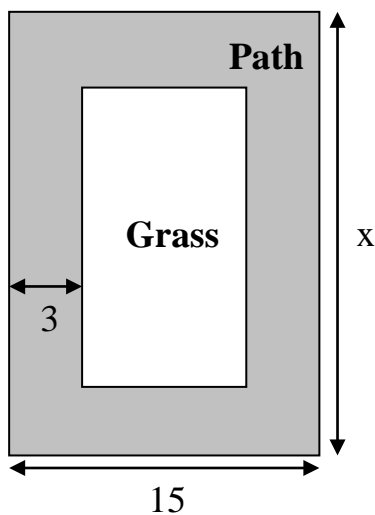
3. Paper cones are provided beside a water cooler in a works canteen. They have a depth of 10 cm and a diameter at the top of 7 cm. Jane fills a paper cone with water and pours it into her china mug, which is cylindrical with a radius of 4.5 cm. How deep is the water in the cup?

Expanding Brackets

1. Expand and simplify:

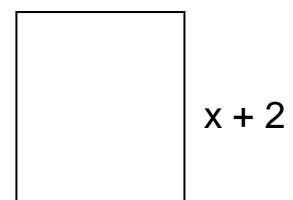
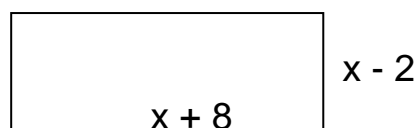
- a) $(2a + 1)(a + 3)$ b) $(y - 6)^2$ c) $(4 - y)(2 + y)$ d) $(3x - 1)(x + 5)$
 e) $(2d - 1)(2d + 2)$ f) $(x - 2)(2x^2 - 7x - 3)$ g) $(5x - 1)(4x^2 - x - 2)$

2. Find an expression for the area of the path round the garden shown:



The path is 3 metres wide all the way round the garden

3. Find x if the rectangle and square shown have the same area:



Factorising

1. Factorise the following trinomial expressions:-

- | | | | |
|-------------------|---------------------|---------------------|---------------------|
| a) $x^2 + 3x + 2$ | b) $x^2 + 6x + 5$ | c) $x^2 + 7x + 10$ | d) $t^2 + 9t + 8$ |
| e) $y^2 - 4y + 4$ | f) $p^2 - 12p + 35$ | g) $v^2 - 10v + 16$ | h) $x^2 - x - 2$ |
| i) $a^2 - 6a - 7$ | j) $m^2 - 12m + 36$ | k) $z^2 - 2z - 15$ | l) $c^2 - 13c + 12$ |

2. Factorise – a mixture of types (common factor, trinomial, difference of 2 squares):

- | | | | |
|-------------------|-------------------|-------------------|--------------------|
| a) $x^2 + 3x + 2$ | b) $m^2 - 36$ | c) $x^2 + 6x + 5$ | d) $x^2 + 7x + 10$ |
| e) $y^2 + 6y$ | f) $t^2 + 9t + 8$ | g) $a^2 + 5a$ | h) $x^2 - 4$ |
| i) $2x + 3xy$ | j) $9b^2 - 16$ | k) $3x^3 - x^2$ | l) $64y^2 - 25$ |

3. Factorise fully:

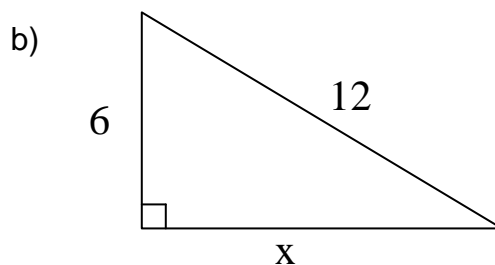
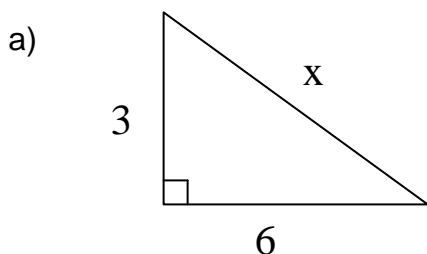
- | | | | |
|----------------------|----------------------|---------------------|---------------------|
| a) $2x^2 + 5x + 3$ | b) $2x^2 + 7x + 5$ | c) $3x^2 + 7x + 2$ | d) $2x^2 - 5x + 3$ |
| e) $3x^2 - 2x - 5$ | f) $3x^2 - 13x - 10$ | g) $5x^2 - 13x - 6$ | h) $5x^2 - 11x + 2$ |
| i) $3x^2 + 11x + 10$ | j) $6x^2 + 5x + 1$ | k) $2x^2 - 7x + 6$ | l) $5x^2 + 6x - 8$ |
| m) $2x^2 - 18$ | n) $5x^2 - 80$ | o) $3x^2 - 12$ | p) $11x^2 - 11$ |
| q) $4x^2 - 100$ | r) $9x^2 - 36$ | s) $8x^2 - 50$ | t) $27x^2 - 300$ |

Surds

1. Write the following as surds in their simplest form

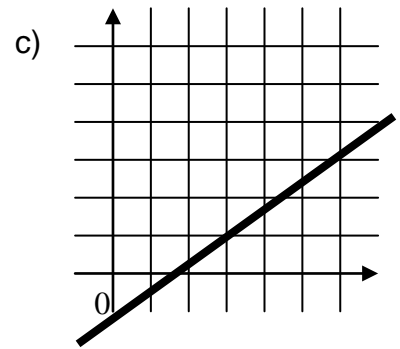
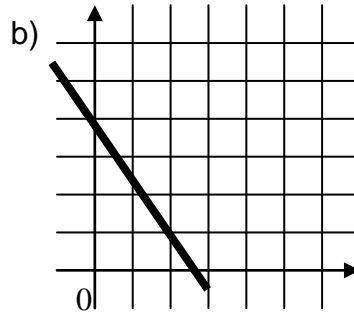
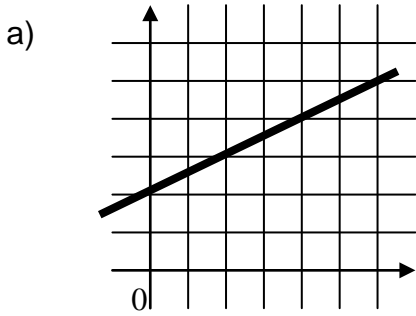
- | | | | |
|---|--|----------------------------------|-----------------------------|
| a) $\sqrt{27}$ | b) $\sqrt{75}$ | c) $2\sqrt{98}$ | d) $\sqrt{125} - \sqrt{80}$ |
| e) $\sqrt{20} + \sqrt{45} - \sqrt{125}$ | f) $\sqrt{27} + \sqrt{75} - \sqrt{12}$ | g) $\sqrt{3} \times \sqrt{3}$ | |
| h) $\sqrt{2} \times \sqrt{18}$ | i) $2\sqrt{5} \times 3\sqrt{5}$ | j) $\frac{\sqrt{40}}{\sqrt{10}}$ | |
| k) $\frac{\sqrt{80}}{\sqrt{5}}$ | l) $\frac{\sqrt{90}}{\sqrt{5}}$ | m) $5\sqrt{72}$ | |

2. Find the length of the missing side, x, as a surd in its simplest form:



Straight Line

1. Find the equation of each line shown on the graphs below:



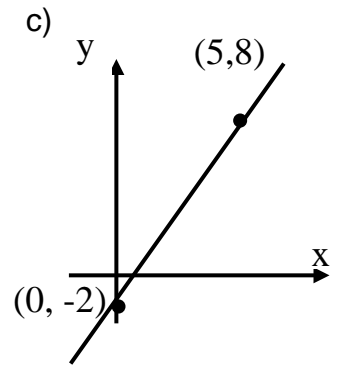
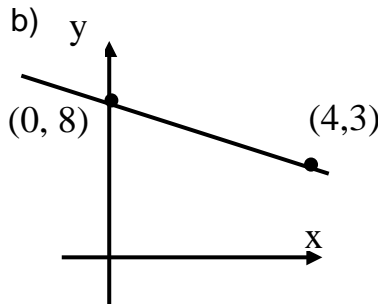
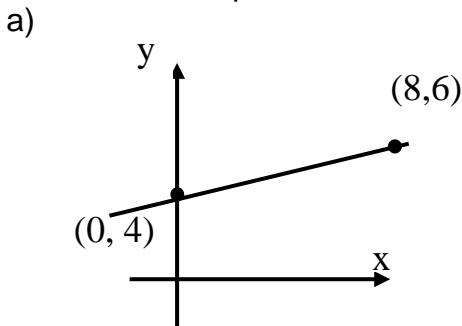
2. Find the gradient of the lines joining the given points:

a) $A(-2, 3)$ and $B(0, 1)$

b) $C(4, -5)$ and $D(2, 2)$

c) $E(-5, -1)$ and $F(4, -4)$

3. Find the equation of each line shown:



4. Find the equation of the line below:

a) Gradient of 4, passing through $(2, -3)$

b) Gradient of -1, passing through $(-6, 8)$

c) Gradient of $1/2$, passing through $(-8, -7)$

d) passing through $A(2, 5)$ and $B(5, 11)$

5. State the y-intercept and gradient of each line below:

a) $y = 6x - 9$

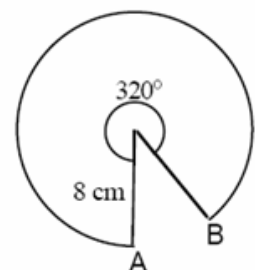
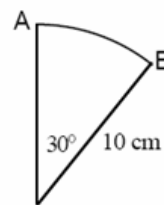
b) $y + x = 7$

c) $3y = 15 - 2x$

d) $5x + 2y - 10 = 0$

Arcs and Sectors

1. Find the arc length and area of each:



2. A pendulum of length 20 cm swings through an arc length of 13 cm. Through what angle has it turned?

3. A sector has a radius of 12 cm and an area of 120 cm^2 . What is the angle at the centre?

Percentages

1. £5839.93 2. £7164 3. 14.3% 4. £24 600

5. £560.59 6. 284 7. £83 924.40

$(x + 5)(x + 1)$

1. a) 2010.6 cm^3 b) 513.1 cm^3 c) 1150.3 cm^3 d) 1282.8 cm^3

e) 311.0 cm^3

2. $V \text{ cuboid} = 1680 \text{ cm}^3$ Height = 8.4 cm (2sf)

3. $V \text{ cone} = 128.28 \text{ cm}^3$ Depth = 2.01 cm

Expanding Brackets

1 a) $2a^2 + 7a + 3$ b) $y^2 - 12y + 36$ c) $8 + 2y - y^2$ d) $3x^2 + 14x - 5$

e) $4d^2 + 2d - 2$ f) $2x^3 - 11x^2 + 11x + 6$ g) $20x^3 - 9x^2 - 9x + 2$

2. $15x - 9(x - 6) = 6x + 54$

3. $(x + 8)(x + 2) = (x + 2)^2$
 $x = 10$

Factorising

1. a) $(x + 2)(x + 1)$ b) $(x + 5)(x + 1)$ c) $(x + 5)(x + 2)$ d) $(t + 8)(t + 1)$

e) $(y - 2)^2$ f) $(p - 7)(p - 5)$ g) $(v - 8)(v - 2)$ h) $(x - 2)(x + 1)$

i) $(a - 7)(a + 1)$ j) $(m - 6)^2$ k) $(z - 5)(z + 3)$ l) $(c - 12)(c - 1)$

2. a) $(x + 2)(x + 1)$ b) $(m - 6)(m + 6)$ c) $(x + 5)(x + 1)$ d) $(x + 5)(x + 2)$

e) $y(y + 6)$ f) $(t + 8)(t + 1)$ g) $a(a + 5)$ h) $(x - 2)(x + 2)$

i) $x(2 + 3y)$ j) $(3b - 4)(3b + 4)$ k) $x^2(3x - 1)$ l) $(8y - 5)(8y + 5)$

3. a) $(2x + 3)(x + 1)$ b) $(2x + 5)(x + 1)$ c) $(3x + 1)(x + 2)$ d) $(2x + 1)(x - 3)$

e) $(3x - 5)(x + 1)$ f) $(3x + 2)(x - 5)$ g) $(5x - 2)(x + 3)$ h) $(5x - 1)(x - 2)$

i) $(3x + 5)(x + 2)$ j) $(3x + 1)(2x + 1)$ k) $(2x - 3)(x - 2)$ l) $(5x - 4)(x + 2)$

m) $2(x - 3)(x + 3)$ n) $5(x - 4)(x + 4)$ o) $3(x - 2)(x + 2)$ p) $11(x - 1)(x + 1)$

q) $4(x - 5)(x + 5)$ r) $9(x - 2)(x + 2)$ s) $2(2x - 5)(2x + 5)$ t) $3(3x - 10)(3x + 10)$

Surds

- 1 a) $3\sqrt{3}$ b) $5\sqrt{3}$ c) $14\sqrt{2}$ d) $\sqrt{5}$ e) 0 f) $6\sqrt{3}$ g) 3
h) 6 i) 30 j) 2 k) 4 l) $3\sqrt{2}$ m) $30\sqrt{2}$
2. a) $3\sqrt{5}$ b) $6\sqrt{3}$

Straight Line

1. a) $y = \frac{1}{2}x + 2$ b) $y = -\frac{3}{2}x + 4$ c) $y = \frac{2}{3}x - 1$
2. a) $m = -1$ b) $m = -\frac{7}{2}$ c) $m = -\frac{1}{3}$
3. a) $y = \frac{1}{4}x + 4$ b) $y = -\frac{5}{4}x + 8$ c) $y = 2x - 2$
4. a) $y + 3 = 4(x - 2)$
 $y = 4x - 5$ b) $y - 8 = -(x + 6)$
 $y = -x + 2$ c) $y + 7 = \frac{1}{2}(x + 8)$
 $2y = x - 6$
- d) $y - 5 = 2(x - 2)$
 $y = 2x + 1$
5. a) $m = 6$ $c = (0, -9)$ b) $m = -1$ $c = (0, 7)$
c) $m = -\frac{2}{3}$ $c = (0, 5)$ d) $m = -\frac{5}{2}$ $c = (0, 5)$

Arcs and Sectors

1. a) Arc length = 5.23 cm Area of sector = 26.2 cm^2
b) Arc length = 44.7 cm Area of sector = 178.7 cm^2
2. Angle = 37°
3. Angle = 95.5°