

D Summer IGCSE Revision 3

1. Factorise

(a) $2ax + 2ay + 3x + 3y$,

$$(x + y)(2a + 3)$$

(b) $12x^2 + 2x - 30$.

$$2(2x - 3)(3x + 5)$$

2. Complete the square on $x^2 + 3x - 1$. Hence give the vertex of $y = x^2 + 3x - 1$.

$$y = (x + \frac{3}{2})^2 - \frac{13}{4}, \text{ Vertex} = (-\frac{3}{2}, -\frac{13}{4})$$

3. Find the x^3 coefficient in the expansion of $(2x^2 + 3x + 1)(x^4 + 3x^3 - 2x^2 + x - 3)$.

$$-1$$

4. A cuboidal box of cereal has volume 420ml. A sticker talking about the benefits of the cereal has area 40cm^2 . A new, mathematically similar, larger box of cereal is introduced with volume 725.76ml. What would the area of the new sticker be?

$$57.6$$

5. A cuboidal box of cereal has volume v . A sticker talking about the benefits of the cereal has area a . A new, mathematically similar, larger box of cereal is introduced with volume V . What would the area (A) of the new sticker be?

$$a \left(\frac{V}{v}\right)^{\frac{2}{3}}$$

6. Simplify fully $\frac{8x^2 - 18}{6x + 9}$.

$$\frac{2(2x-3)}{3}$$

7. Two shapes are mathematically similar. The base on the smaller one is 3.2cm. If the surface area of the larger one is 84cm^2 and the surface area of the smaller one is 21cm^2 . What is the length of the base on the larger one?

$$6.4$$

If the volume of the larger one is V , find an expression for the volume of the smaller one.

$$\frac{V}{8}$$

8. For the following, find $\frac{dy}{dx}$:

(a) $y = 3x^4 - 2\sqrt{x}$.

$$\frac{dy}{dx} = 12x^3 - x^{-\frac{1}{2}}$$

(b) $y = \frac{1}{x} - \frac{3}{x^2} + \frac{7x}{3x^7}$.

$$\frac{dy}{dx} = -x^{-2} + 6x^{-3} - 14x^{-7}$$

(c) $y = \frac{1-\sqrt{x}}{x}$.

$$\frac{dy}{dx} = -x^{-2} + \frac{x^{-\frac{3}{2}}}{2}$$

9. A closed cylinder of length l and radius r has a hemisphere of radius r glued to one end. Find a simplified expression for

(a) its volume,

$$\frac{\pi r^2(3l+2r)}{3}$$

(b) its surface area.

$$\pi r(3r + 2l)$$

10. A car is reduced in a sale by 14%. Its sale price is 1357.08 GBP. What was its original price?

$$1578$$

11. I flick a bias coin 5 times. The probability of a head is 0.7. What is the probability of exactly 3 heads from my 5 throws (in any order)?

$$0.3087$$

12. Power P is inversely proportional to the square of time t .

(a) If $P = 10$ when $t = 2$ find an expression for P in terms of t .

$$P = \frac{40}{t^2}$$

(b) Sketch P against t for $t > 0$.

(c) Find t when $P = 30$.

$$1.1547 \text{ (to 5 sig figs)}$$