

7th June

Higher Plus 5-a-day



Corbettmaths

On 1st March 2001, the ratio of Freddie's age to his mother's age was 1:11  $11x = y$

On 1st March 2018, the ratio of Freddie's age to his mother's age was 2:5  $5(x+17) = 2(y+17)$   
 $5x + 85 = 2(11x + 17)$

Write the ratio of Freddie's age to his mother's age on 1st March 2030  $29 \text{ years}$

$$5x + 85 = 22x + 34$$

$$51 = 17x$$

$$x = 3$$

$$y = 33$$

$$32 : 62$$

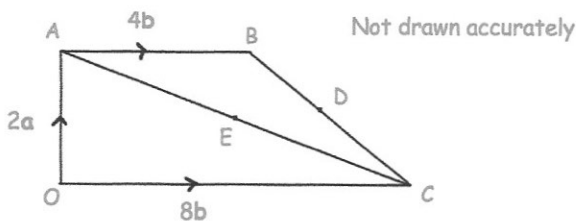
$$16 : 31$$


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$\vec{OA} = 2a$   $\vec{AB} = 4b$  and  $\vec{OC} = 8b$

Point D is the midpoint of BC.  
 Point E is the midpoint of AC.

Show  $\vec{ED}$  and  $\vec{OC}$  are parallel



$$\vec{AC} = 8b - 2a$$

$$\vec{AE} = 4b - a$$

$$\vec{BC} = -4b - 2a + 8b = 4b - 2a$$

$$\vec{ED} = \vec{EA} + \vec{AB} + \vec{BD}$$

$$\vec{EA} = a - 4b$$

$$\vec{AB} = 4b$$

$$\vec{BD} = 2b - a$$

$$\vec{ED} = 2b$$

$\therefore \vec{OC} = 4\vec{ED}$  so parallel.

Express  $\frac{\sqrt{3} + 2}{2 - \sqrt{3}}$  in the form  $\frac{x(2 + \sqrt{3})}{x(2 + \sqrt{3})}$

$a + b\sqrt{3}$  where a and b are integers.

$$\frac{2\sqrt{3} + 3 + 4 + 2\sqrt{3}}{4 - 3}$$

$$= 4\sqrt{3} + 7$$

$$= 7 + 4\sqrt{3}$$

The line l is a tangent to the circle  $x^2 + y^2 = 104$  at the point P.

P is the point (10, 2)  $\text{gradient of OP} = \frac{1}{5}$

Work out the equation of the line l

$$y = -5x + c$$

$$2 = -50 + c$$

$$c = 52$$

$$y = -5x + 52$$