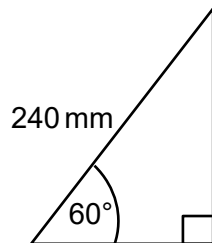


Foundation Check In - 6.02 Algebraic formulae

1. Given $v = \sqrt{u^2 + 2as}$ and $v > 0$, find the value of v when $a = -0.96$, $s = 3.6$ and $u = 4.02$. Give your answer to 2 significant figures.
2. Rearrange the formula to make v the subject of $d = \frac{m}{v}$.
3. A taxi charges an initial £2.50 plus £1.20 per mile travelled. Write an expression for the cost, C , of a taxi journey of m miles.
4. Rearrange the formula to make u the subject of $2as = v^2 - u^2$.
5. Find the acceleration of a ball that goes from rest to 5 m/s in 2 seconds.
6. Show that a triangle which has a base of 12 cm, perpendicular height of 16 cm and diagonal side of 20 cm is a right-angled triangle.
7. Tia states that the value of $\frac{4x + 2y}{x - y}$ when $x = 2$ and $y = -1$ is 6. Explain why she is wrong.
8. Show that the base length of the right-angled triangle below is 120 mm.



9. The volume of a sphere is 1400 cm^3 . A cone has the same volume and the same size radius as the sphere. Work out the height of the cone, giving your answer to 3 significant figures.

[The volume v of a sphere with radius r is $V = \frac{4}{3}\pi r^3$.]

[The volume v of a cone with radius r and perpendicular height h is $V = \frac{1}{3}\pi r^2 h$.]

10. Cara has £160 to spend on a birthday celebration with her family. She pays £75 for a magician to entertain at the event and she plans to buy each adult an alcoholic drink for £4.50 and each child a bottle of juice for £1.75. Write an expression to find how much money Cara will have remaining after x adults and y children attend the birthday celebration. If seven adults attend the event, what is the maximum number of children that could attend?



GCSE (9–1) MATHEMATICS

Extension

A group of sixth form students are planning to run an end of term disco.
The local youth club offers its hall for hire for £120 per evening.
The students think they will have a maximum of 80 people attending the disco and they want to offer refreshments costing £6 per person.
The ticket price needs to cover the cost of running the disco.

Write an expression for the price of the ticket, T , if p represents the number of people attending the disco.

Work out the price of the ticket if the maximum number of people attend the disco.



GCSE (9-1) MATHEMATICS

Answers

1. 3.0

2. $v = \frac{m}{d}$

3. $C = 2.5 + 1.2m$

4. $u = \sqrt{v^2 - 2as}$

5. 2.5 ms^{-2}

6. Using Pythagoras' theorem, $12^2 + 16^2 = 20^2$ gives $144 + 256 = 400$ so it is a right-angled triangle.

7. $\frac{4 \times 2 + 2 \times -1}{2 - -1} = \frac{6}{3} = 2$. Tia made an error subtracting a negative in the denominator which meant she calculated $6 \div 1 = 6$.

8. $\cos 60 = \frac{a}{240}$

$$a = 240 \cos 60 = 240 \times \frac{1}{2} = 120 \text{ mm}$$

9. 27.8 cm

10. $85 - 4.5x - 1.75y$
30 children

Extension

$$T = \frac{120 + 6p}{p}$$

If $p = 80$, $T = \text{£}7.50$



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Assessment Objective	Qu.	Topic	R	A	G
AO1	1	Substitute numerical values into a complex formula			
AO1	2	Rearrange a formula to change the subject where a reciprocal of the subject appears			
AO1	3	Formulate a simple formula from a real-world context			
AO1	4	Rearrange a formula to change the subject where a power of the subject appears			
AO1	5	Use a kinematic formula to work out acceleration			
AO2	6	Recall and use Pythagoras' theorem			
AO2	7	Substitute positive and negative numbers into an algebraic fraction			
AO2	8	Recall and use trigonometry formula			
AO3	9	Use formulae for the volume of a sphere and a cone			
AO3	10	Formulate an expression involving two variables to solve a real-world problem			

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