

## Topic Check In - 6.02 Algebraic formulae

1. Find the value of  $m + 2(n - 3)$  when  $m = 4$  and  $n = 5$ .
2. Rearrange  $v = u + at$  to make  $u$  the subject.
3. Find the circumference of a circle with diameter 6 cm, correct to the nearest whole number.
4. Given  $v^2 = u^2 + 2as$ , find  $v$  when  $u = 10$ ,  $a = 2$  and  $s = 75$ .
5. Given  $F = \frac{9}{5}C + 32$ , find  $C$  when  $F = 77$ .
6. For the following question you may use the formula  $v = u + at$  where:

$v$  = final speed                       $u$  = initial speed  
 $a$  = acceleration                       $t$  = time

A car accelerates uniformly with acceleration  $2 \text{ m/s}^2$ . If the initial speed is  $20 \text{ m/s}$  and the final speed is  $50 \text{ m/s}$ , show that it takes 15 seconds to reach the final speed.

7. For the following question you may use the formula  $v^2 = u^2 + 2as$  where:

$v$  = final speed                       $u$  = initial speed  
 $a$  = acceleration                       $s$  = distance travelled

A train is travelling at a speed of  $40 \text{ m/s}$ . When the driver applies the brakes, the train decelerates at  $2 \text{ m/s}^2$ . Show that the driver needs to start applying the brakes when he is  $400 \text{ m}$  from the station.

8. Mary is given the question 'Find the value of  $a + b \times c$  when  $a = 2$ ,  $b = 3$  and  $c = 4$ .' She says that " $a + b = 5$ , then multiply by  $c$  gives an answer of 20". Explain why she is incorrect.
9. Kyle wishes to construct a circular patio in his garden which is to be at least  $30 \text{ m}^2$ . Find the minimum radius of the circle in whole metres.

10. For the following question you may use the formula  $s = ut + \frac{1}{2}at^2$  where:

$t$  = time                                       $u$  = initial speed  
 $a$  = acceleration                       $s$  = distance travelled

A car is stopped at a traffic light. As the light goes green, a cyclist passes the car at  $8 \text{ m/s}$ . The car immediately accelerates at  $4 \text{ m/s}^2$ . How far ahead of the cyclist is the car after 5 seconds have passed?

### Extension

Jake is 12 years older than his dog. Next year he will be four times as old as his dog will be. How old is Jake now?



# GCSE (9–1) MATHEMATICS

## Answers

1. 8
2.  $u = v - at$
3. 19 cm
4. 20
5. 25°C
6.  $(50 - 20)/2 = 15$  seconds
7. Substitute to give total distance = 400 m or substitute  $s = 400$  and show that  $v^2 = 0$ .
8. Mary should multiply before adding, so the answer should be  $2 + 3 \times 4 = 2 + 12 = 14$ .
9. 4 m
10. 10 m

## Extension

Jake is 15 years old (and the dog is 3 years old).



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Assessment Objective	Qu.	Topic	R	A	G
AO1	1	Substitute values into an expression.			
AO1	2	Change the subject of a formula.			
AO1	3	Recall and use standard formula for circumference of a circle.			
AO1	4	Substitute into a kinematics formula.			
AO1	5	Substitute into and rearrange a formula.			
AO2	6	Show that a worded kinematic problem can be solved by rearranging.			
AO2	7	Show that a worded kinematic problem can be solved by rearranging and using BIDMAS.			
AO2	8	Correctly use BIDMAS in substitution.			
AO3	9	Recall and use standard formula for area of a circle, rounding appropriately.			
AO3	10	Solve a kinematics problem.			

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