

Challenge 2021 Maths III solutions

- 1) 55 minutes
- 2) $x = -6, y = -2\frac{1}{2}$
- 3) 0.29kg
- 4) a) Angles in pentagon AFGCB = 540° so $FGC = 130^\circ$
b) $FGE = 120^\circ$
 $EGC = 110^\circ$
 $EGC + GCD = 180^\circ$ hence result (co-interior angles)
OR as $FGE = 120^\circ$ then by alternate angles EG and FA parallel, which is parallel to DC.
- 5) 10:11 (two properties of wine in this question therefore 2D table ideal) (need to work with actual amount of wine, even though it's a ratio question, so red corked = x, for example)
- 6) 63, 98 (LCM question)
- 7) 16.5cm (3 scenarios. Water same in each. Form 2 equations (1st scenario and 2nd scenario gives relationship between r_1 and r_2 then solve using 1st scenario and 3rd scenario)
- 8) 16%
- 9) 12
- 10) 1 hour 24 minutes
- 11) a) 17
b) 17 first and 4 second
- 12) HP win by 40 metres
- 13) a) $x^2 - y^2$
b) Annulus area = $\pi \times 6.7^2 - \pi \times 3.4^2$
 $= \pi(6.7^2 - 3.4^2)$
 $= (6.7 + 3.3)(6.7 - 3.3)\pi$
 $= 34\pi$
c) 7.5cm, 9.5cm (as $17 \times 2 = 34$, so $x+y=17$, $x-y=2$. Or use 34×1 (though lots of other options))
- 14) a) 540
b) 600