Past Papers Worksheet P4 **Average Speed Word Problems** **IGCSE Mathematics 0580**

1. A car completes a 200km journey with an average speed of x km/h.
   The car completes the return journey of 200km with an average speed of (x + 10) km/h.
   (i) Show that the difference between the time taken for each of the two journeys is
   2000/ x(x + 10) hours [3]
   (ii) Find the difference between the time taken for each of the two journeys when x = 80.
   Give your answer in minutes and seconds. [3]
   0580/41/M/J/16 Q6(b)

2. Amira takes 9 hours 25 minutes to complete a long walk.
   (i) Show that the time of 9 hours 25 minutes can be written as 113 /12 hours. [1]
   (ii) She walks (3y + 2) kilometres at 3 km/h and then a further (y + 4) kilometres at 2 km/h.
   Show that the total time taken is (9y+16)/ 6 hours. [2]
   (iii) Solve the equation $\frac{9y+16}{6} = \frac{113}{12}$ [2]
   (iv) Calculate Amira's average speed, in kilometres per hour, for the whole walk [3]
   0580/04/M/J/09 Q16) Q6)(b)

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3. Roshni cycles 2 kilometres at y km/h and then runs 4 kilometres at $(y - 4)$ km/h.
The whole journey takes 40 **minutes**.
(i) Write an equation in y and show that it simplifies to $y^2 - 13y + 12 = 0$. [4]
(ii) Factorise $y^2 - 13y + 12$. [2]
(iii) Solve the equation $y^2 - 13y + 12 = 0$ [1]
(iv) Work out Roshni's running speed. [1]
0580/43/M/J/10 Q9(b)

4. The distance a train travels on a journey is 600km.
(a) Write down an expression, in terms of x, for the average speed of the train when
(i) the journey takes x hours, [1]
(ii) the journey takes $(x + 1)$ hours. [1]
(b) The difference between the average speeds in part(a)(i) and part(a)(ii) is 20 km/h.
(i) Show that $x^2 + x - 30 = 0$ [3]
(ii) Find the average speed of the train for the journey in part(a)(ii).
Show all your working. [4]
0580/42/M/J/14 Q8)

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5. Carol walks 12 km at x km/h and then a further 6km at (x-1) km/h.
The total time taken is 5 hours.
(i) Write an equation, in terms of x, and show that it simplifies to $5x^2$ -23 x + 12 = 0. [3]
(ii) Factorise-$5x^2$ -23 x + 12 = 0. [2]
(iii) Solve the equation $5x^2$ -23x + 12 = 0 [1]
(iv) Write down Carol's walking speed during the final 6km. [1]
0580/41/O/N/19 Q7(c)

6. Chuck cycles along Skyline Drive.
He cycles 60 km at an average speed of x km/h.
He then cycles a further 45 km at an average speed of (x + 4) km/h.
His total journey time is 6 hours.
(i) Write down an equation in x and show that it simplifies to $2x^2 - 27x - 80 = 0$. [4]
(ii) Solve $2x^2 - 27x - 80 = 0.0$ to find the value of x. [3]
0580/41/O/N/14 Q2(b)

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7. Rowena walks 2km at an average speed of x km/h.
(i) Write down an expression, in terms of x, for the time taken. [1]
(ii) Rowena then walks 3km at an average speed of $(x - 1)$km/h.
The total time taken to walk the 5km is 2 hours.
(a) Show that $2x^2 - 7x + 2 = 0$. [3]
(b) ~~Find the value of x.~~
Show all your working and give your answer correct to 2 decimal places. [4]
0580/42/O/N/17 Q8

8. Luigi and Alfredo run in a 10km race.
Luigi's average speed was x km/h.
Alfredo's average speed was 0.5km/h slower than Luigi's average speed.
(a) Luigi took $10 / x$ hours to run the race.
Write down an expression, in terms of x, for the time that Alfredo took to run the race. [1]
(b) Alfredo took 0.25 hours longer than Luigi to run the race.
(i) Show that $2x^2 - x - 40 = 0$. [4]
(ii) ~~Use the quadratic formula to solve~~ $2x^2 - x - 40 = 0$
Show all your working and give your answers correct to 2 decimal places. [4]
(iii) Work out the time that Luigi took to run the 10km race.
Give your answer in hours and minutes, correct to the nearest minute. [3]
0580/43/O/N/17 Q9)

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9. Alfonso runs 10km at an average speed of x km/h.
The next day he runs 12km at an average speed of $(x - 1)$ km/h.
The time taken for the 10km run is 30 minutes less than the time taken for the 12km run.
(i) Write down an equation in x and show that it simplifies to $x^2 - 5x - 20 = 0$. [4]
(ii) ~~Use the quadratic formula to solve the equation~~ $x^2 - 5x - 20 = 0$.
Show your working and give your answers correct to 2 decimal places. [4]
(iii) Find the time that Alfonso takes to complete the 12km run.
Give your answer in hours and minutes correct to the nearest minute. [2]
0580/43/M/J/16 Q7

10. (i) Lia cycles 20km at an average speed of x km/h.
Write down an expression, in terms of x, for the time it takes Lia to complete the journey.
(ii) Lia cycles another 20km at an average speed of $(x + 1)$ km/h.
This journey takes 1/4 hour less than the journey in part (b)(i).
Show that $x^2 + x - 80 = 0$. [3]
(iii) ~~Solve the equation~~ $x^2 + x - 80 = 0$.
Show your working and give your answers correct to 2 decimal places. [4]
(iv) Find the total time taken by Lia to complete both journeys.
Give your answer in hours and minutes correct to the nearest minute [2]
0580/47/M/J/14 Q7(b)
[Answers on next page]

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Answers

Q1) (i) 200/ x – 200 / (x + 10) (ii) 16 [min] 40 [s]	Q6) (i) 60/ x + 45 / (x + 4)= 6 (ii) (x – 16)(2x + 5) [= 0] leading to16
Q2) (i) 9 + 25/60 simplified (ii)2(3y + 2)/6 + 3 (y + 4)/6 (iii)4.5 (iv)2.55	Q7) (b)(i)2/ x (ii)(a) 2/ x + 3 / (x - 1) = 2 (ii)(b) 3.19
Q3) (i)2/ y + 4/(y - 4) =40/60 (ii) (y – 1)(y – 12) (iii) 1, 12 (iv)8	Q8) (a)10/(x – 0.5)(b)(i) 10/(x – 0.5) - 10/(x) = 0.25 (ii) –4.23 and 4.73 (iii) 2 [hours] 7 [minutes]
Q4) (a) (i)600/ x (ii) 600 / (x + 1) (b) (i) 600/ x - 600 / (x + 1) (b)(ii)(from x = 5) 100	Q9) (a)(i) 12/(x – 1) – 10 / x (ii) – 2.62, 7.62 (iii) 1 [hr] 49 [mins]
Q5) (i)12/ x + 6 / (x - 1)= 5 (ii) (5x − 3)(x − 4)(iii)3/5 & 4 (iv)3	Q10) (i) 20 / x (ii) 20/x – 20 / (x + 1) = 1/4 (iii) – 9.46, 8.46 (iv) 4 [h] 29 [min]

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