



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)



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)



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 $5x^2 - 23x + 12 = 0$. [3]

(ii) Factorise $5x^2 - 23x + 12 = 0$. [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 $2x^2 - 27x - 80 = 0$ to find the value of x . [3]

0580/41/O/N/14 Q2(b)



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)



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 $\frac{1}{4}$ 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]

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 to 16
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]