1. A parallelogram has base $(2x - 1)$ metres and height $(4x - 7)$ metres.
   The area of the parallelogram is 1 m^2.
   (i) Show that $4x^2 - 9x + 3 = 0$. [3]
   (ii) Solve the equation $4x^2 - 9x + 3 = 0$.
   Show all your working and give your answers correct to 2 decimal places. [4]
   (iii) Calculate the height of the parallelogram. [1]
   0580/41/M/J/12 Q6(a)

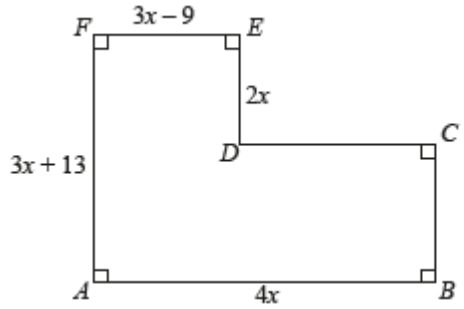
2. The difference between the areas of the two rectangles is 62 cm^2.



   (i) Show that $x^2 + 2x - 63 = 0$. [3]
   (ii) Factorise $x^2 + 2x - 63$ [2]
   (iii) Solve the equation $x^2 + 2x - 63 = 0$ to find the difference between the perimeters of the two rectangles. [2]
   0580/41/M/J/19 Q7(b)

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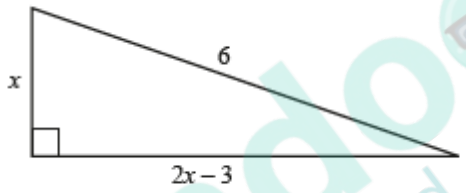
3. The area of shape ABCDEF is 24 cm^2.
All lengths are in centimetres.



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(i) Show that $5x^2 + 17x - 12 = 0$ [3]
(ii)Solve, by factorising, the equation
$5x^2 + 17x - 12 = 0$.
You must show all your working [4]
0580/42/O/N/15 Q5

4. In this question, all measurements are in metres.



The diagram shows a right-angled triangle.
(a) Show that $5x^2 - 12x - 27 = 0$.[3]
(b) Solve $5x^2 - 12x - 27 = 0$.
Show all your working and give your answers correct to 2 decimal places. [4]
(c) Calculate the perimeter of the triangle. [2]
(d) Calculate the smallest angle of the triangle. [2]
0580/42/M/J/18 Q7)(a)

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5. (a)The perimeter of the rectangle is 80 cm.



The area of the rectangle is A cm^2.

(i) Show that $x^2 - 40x + A = 0$ [3]

(ii) When A = 300, solve, by factorising, the equation $x^2 - 40x + A = 0$ [3]

(iii) When A = 200, solve, by using the quadratic formula, the equation $x^2 - 40x + A = 0$.
Show all your working and give your answers correct to 2 decimal places.[4]

(b) A car completes a 200 km journey with an average speed of x km/h.
The car completes the return journey of 200 km with an average speed of $(x + 10)$ km/h.

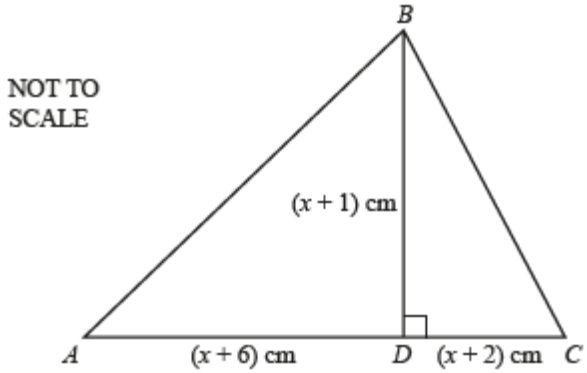
(i) Show that the difference between the time taken for each of the two journeys is $\frac{2000}{x(x+10)}$ hours. [3]

(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

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6. (a) In triangle ABC, the line BD is perpendicular to AC.



In triangle ABC, the line BD is perpendicular to AC.
AD = (x + 6) cm, DC = (x + 2) cm and the height BD = (x + 1) cm.
The area of triangle ABC is 40 cm^2.
(i) Show that $x^2 + 5x - 36 = 0$. [3]
(ii) Solve the equation $x^2 + 5x - 36 = 0$. [2]
(iii) Calculate the length of BC. [2]
(b) 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 $\frac{9y+16}{6}$ 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 Q6)

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7. 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 $5x^2 - 23x + 12$. [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

8. 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

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9. 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)

10. Paulo and Jim each buy sacks of rice but from different shops.
Paulo pays \$72 for sacks costing \$m each.
Jim pays \$72 for sacks costing \$(m + 0.9) each.
(a) (i) Find an expression, in terms of m, for the number of sacks Paulo buys. [1]
(ii) Find an expression, in terms of m, for the number of sacks Jim buys. [1]
(b) Paulo buys 4 more sacks than Jim.
Write down an equation, in terms of m, and show that it simplifies to
$10m^2 + 9m - 162 = 0$. [4]
(c) (i) Solve $10m^2 + 9m - 162 = 0$. [3]
(ii) Find the number of sacks of rice that Paulo buys. [1]
0580/41/O/N/18 Q9)

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11. Apples cost x cents each and oranges cost (x + 2) cents each.
Dylan spends $3.23 on apples and $3.23 on oranges.
The total of the number of apples and the number of oranges Dylan buys is 36.
(a) Write an equation in x and show that it simplifies to $18x^2 - 287x - 323 = 0$. [4]
(b) (i) Find the two prime factors of 323. [1]
(ii) Complete the statement.
$18x^2 - 287x - 323 =$
$(18x$ .....)(x .....) [2]
(iii) Solve the equation $8x^2 - 287x - 323 = 0$. [1]
(c) Find the largest number of apples Dylan can buy for $2. [1]
0580/41/O/N/16

12. Sara spends $\$x$ on pens which cost $2.50 each.
She also spends $\$(x - 14.50)$ on pencils which cost $0.50 each.
The total of the number of pens and the number of pencils is 19.
Write down and solve an equation in x. [6]
0580/41/O/N/13 Q8(c)

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Answers

Q1) (i) $(4x - 7)(2x - 1) = 1$ (ii) 0.41, 1.84 (iii)0.36 or 0.37	Q7) (c)(i)12/ x + 6 / (x - 1)= 5 (ii) $(5x - 3)(x - 4)$ (iii)3/5 , 4(iv)3
Q2) (i) $(2x + 3)(x - 1) - (x + 1)(x - 2) = 62$ (ii) $(x + 9)(x - 7)$ (iii) 20	Q8) (a)(i) 12/($x - 1$) – 10 / x = 1/2 (ii) – 2.62, 7.62 (iii) 1 [hr] 49 [mins]
Q3) Q5(a)(i) $4x(3x + 13) - 2x(4x - \{3x - 9\}) = 24$ (ii)3/5 , -4	Q9) (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) $x^2 + (2x - 3)^2 = 6^2$ (b) – 1.42, 3.82 (c) 14.4 or 14.5 (d) 39.5	Q10) (a)(i)72/m (ii)72/(m + 0.9) (b)72/m - 72/(m + 0.9) = 4 (c) (i)3.6 and −4.5 (c)(ii) 20
Q5) (a)(i)A = 1/2(80 – 2x) x x (ii)30 , 10 (iii) 5.86, 34.14 (b)(i)$200/x - 200/(x + 10)$ (ii) 16 [min] 40 [s]	Q11) (a)$323/x + 323/(x + 2) = 36$ (b)(i) 17, 19 (ii)(….+19)(…..-17) (iii)17 , -19/18 (c)11
Q6) (a)(i) 0.5 $[(x + 6) + (x + 2)] \times (x + 1) (= 40)$ (ii) –9, 4 (iii) 7.81 (b)(i)9+ 25/60 (ii)$\frac{2(3y+2)}{6} + \frac{3(y+4)}{6}$(iii)4.5 (iv) 2.55	Q12) x/2.5 + (x-14.5)/0.5 = 19, x = 20

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