D1 – General Algorithms and Flowcharts Exam Questions (Edexcel)

Q1.

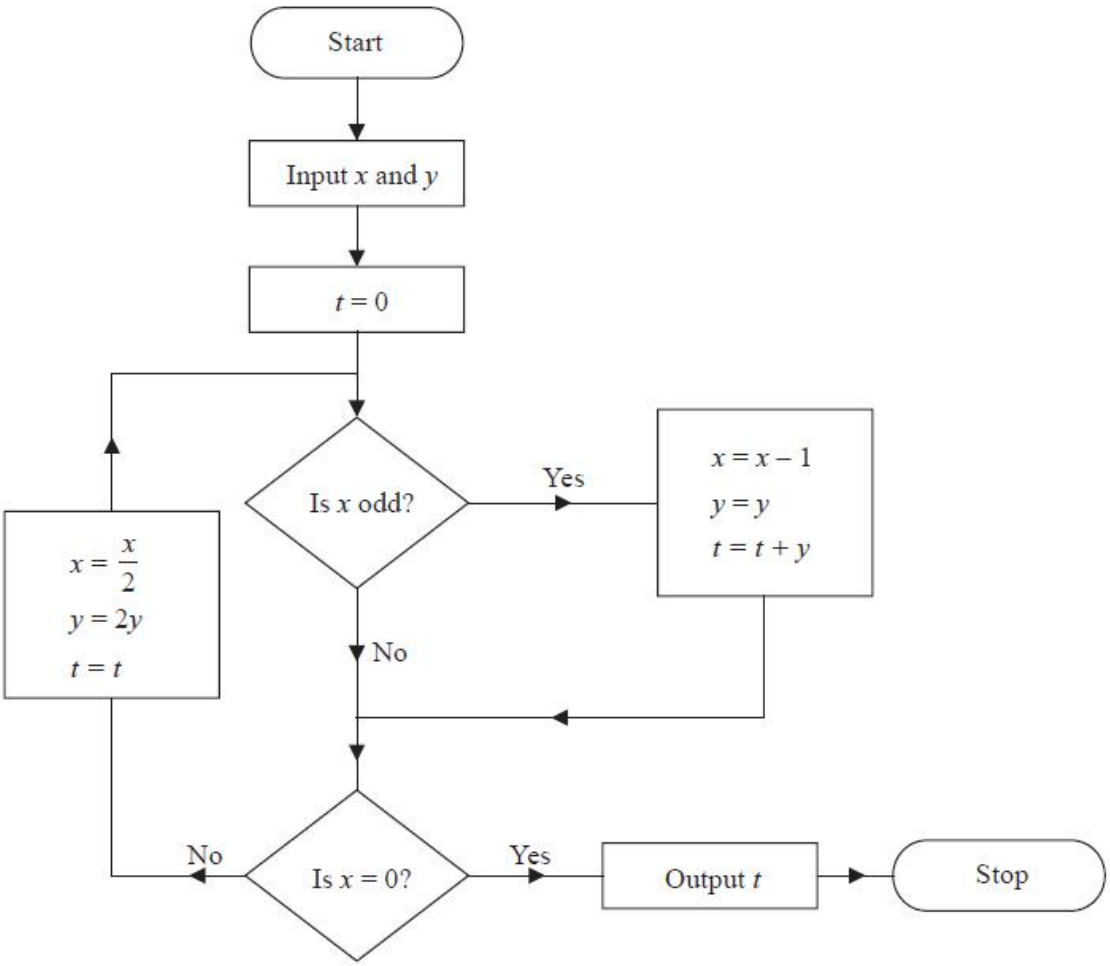


Figure 4

An algorithm is described by the flow chart shown in Figure 4.

Given that $x = 27$ and $y = 5$,

(a) complete the table in the answer book to show the results obtained at each step when the algorithm is applied. Give the final output.

(4)

The numbers 122 and $\frac{1}{2}$ are to be used as inputs for the algorithm described by the flow chart.

(b) (i) State, giving a reason, which number should be input as x.

(ii) State the output.

(3)

(Total for question = 7 marks)

(Q04 6689/01, June 2016)

x	y	t	Is x odd?	Is $x = 0$?
27	5	0	Yes	

Q2.

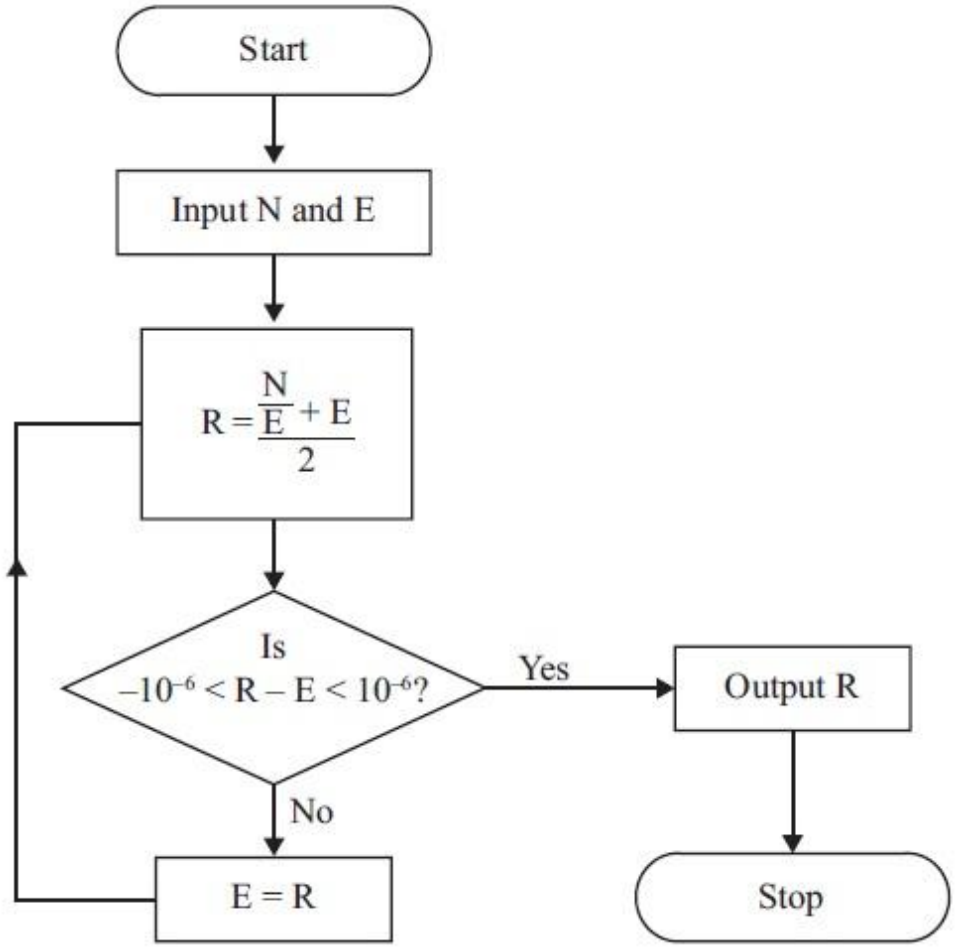


Figure 1

Hero's algorithm for finding a square root is described by the flow chart shown in Figure 1.

Given that N = 72 and E = 8,

(a) use the flow chart to complete the table in the answer book, working to at least seven decimal places when necessary. Give the final output correct to seven decimal places.

(4)

The flow chart is used with N = 72 and E = −8,

(b) describe how this would affect the output.

(1)

(c) State the value of E which cannot be used when using this flow chart.

(1)

(Total 6 marks)

(Q01 6689/01, Jan 2013)

N	E	R	Is $-10^{-6} < R - E < 10^{-6}$?

Final output _____

Q3.

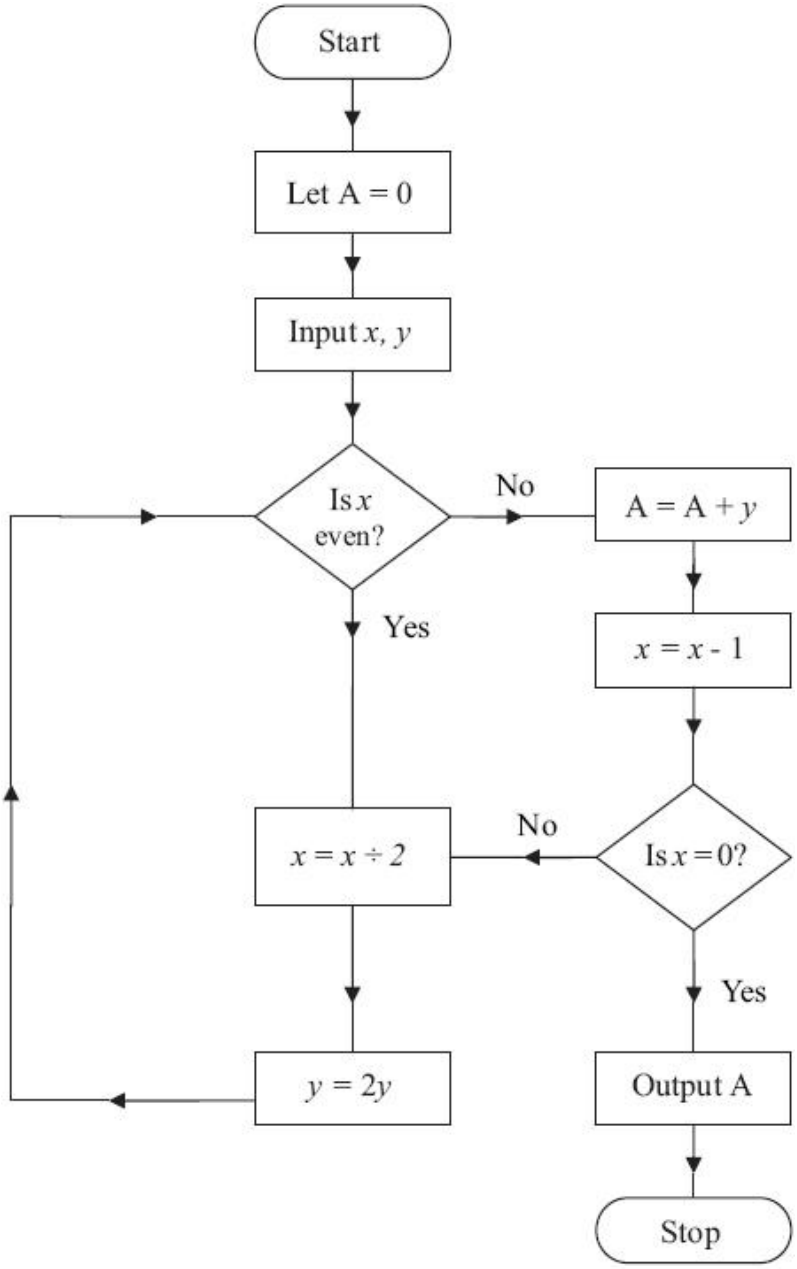


Figure 3

An algorithm is described by the flow chart shown in Figure 3.

(a) Given that $x = 54$ and $y = 63$, complete the table in the answer book to show the results obtained at each step when the algorithm is applied.

(7)

(b) State what the algorithm achieves.

(2)

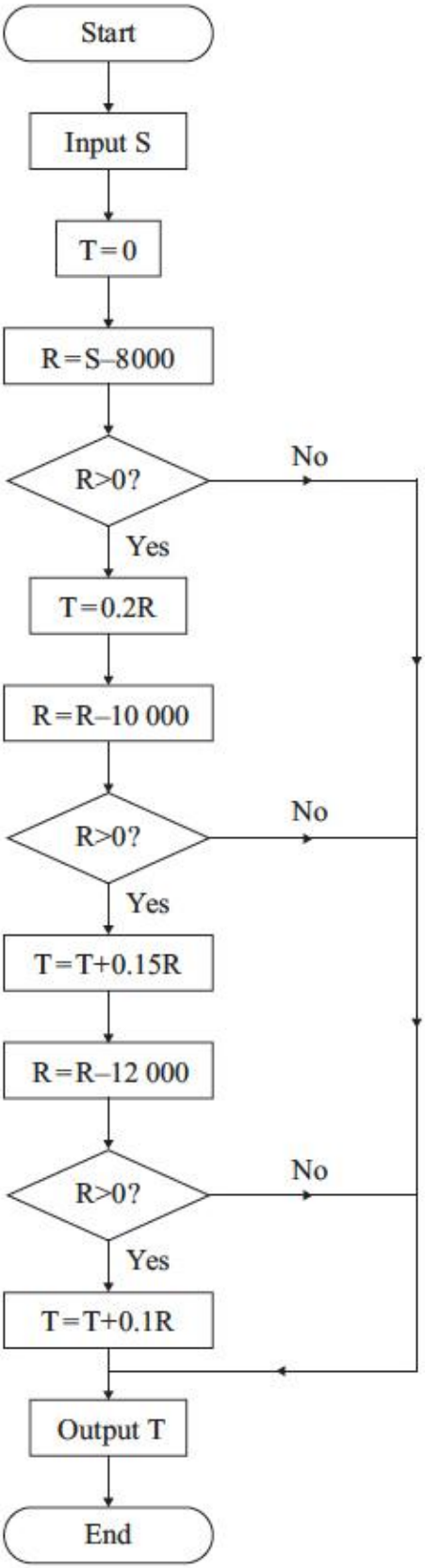
(Total 9 marks)

(Q01 6689/01, June 2007)

A	x	y	x even?	$x = 0$?

A = _____

Q4.



An algorithm is described by the flowchart shown to the left.

(a) Given that S = 25 000, complete the table in the answer book to show the results obtained at each step when the algorithm is applied.

(5)

This algorithm is designed to model a possible system of income tax, T, on an annual salary, £S.

(b) Write down the amount of income tax paid by a person with an annual salary of £ 25 000.

(1)

(c) Find the maximum annual salary of a person who pays no tax.

(1)

(Total 7 marks)

(Q04 6689/01, Jan 2010)

You may not need to use all the lines in this table

S	T	R	R>0?	Output

Q5.

The following algorithm produces a numerical approximation for the integral

$$I = \int_A^B x^4 \, dx$$

Step 1 Start

Step 2 Input the values of A, B and N

Step 3 Let H = (B – A) / N

Step 4 Let C = H / 2

Step 5 Let D = 0

Step 6 Let $D = D + A^4 + B^4$

Step 7 Let E = A

Step 8 Let E = E + H

Step 9 If E = B go to Step 12

Step 10 Let $D = D + 2 \times E^4$

Step 11 Go to Step 8

Step 12 Let F = C × D

Step 13 Output F

Step 14 Stop

For the case when A = 1, B = 3 and N = 4,

(a) (i) complete the table in the answer book to show the results obtained at each step of the algorithm.

(ii) State the final output.

(4)

(b) Calculate, to 3 significant figures, the percentage error between the exact value of *I* and the value obtained from using the approximation to *I* in this case.

(3)

(Total for question = 7 marks)

(Q02 8FM0/27, June 2019)

A	B	N	H	C	D	E	F

Final output: _____