Item 1

Udfyld det tomme felt i logaritme-udtrykket nedenfor. Skriv dit svar som et heltal mellem 0 og 99:

Fill in the blank in the logarithmic expression below. Write your answer as an integer between 0 and 99:

$$\log\left(14^{71}\right) = \square \times \log(14)$$

Check Answer

Item 2

Skriv følgende som en enkelt logaritme

$3 + \frac{1}{2}\log_4(x) + \frac{1}{2}\log_4(y).$

Angiv dit svar som et heltal mellem 0 og 99.

Write the following as a single logarithm

$3 + \frac{1}{2}\log_4(x) + \frac{1}{2}\log_4(y).$

State your answer as an integer between 0 and 99.

$$\log_4(\square\sqrt{xy})$$

Check Answer

Item 3

Reducer udtrykket:

$\frac{98}{x-1} \div \frac{x}{x-1}$

Skriv dit svar som et heltal mellem 0 og 99.

Reduce the expression:

$\frac{98}{x-1} \div \frac{x}{x-1}$

Write your answer as an integer between 0 and 99.

$$\frac{98}{x-1} \div \frac{x}{x-1} = \frac{\square}{x}$$

Check Answer

Item 4

Betragt følgende to funktioner

$h(x) = \frac{1}{x+5}$ and $g(x) = \frac{x}{x-\frac{1}{2}}$

Hvad er domænet for den sammensatte funktion $(h \circ g)(x)$? Angiv dine svar som heltal mellem 0 og 99, således at alle brøker er i irreducible.

Consider the following two functions

$h(x) = \frac{1}{x+5}$ and $g(x) = \frac{x}{x-\frac{1}{2}}$

What is the domain of the composite $(h \circ g)(x)$? State your answers as integers between 0 and 99 such that all fractions are irreducible.

$$\mathbb{R} \setminus \left\{ \frac{\square}{\square}, \quad \frac{1}{\square} \right\}$$

Item 5

Betragt funktionen

$f(x) = \frac{102}{3x-24} + 76.$

Hvad er værdimængden for den inverse funktion f^{-1}? Skriv dit svar som et heltal mellem 0 og 99.

Consider the function

$f(x) = \frac{102}{3x-24} + 76.$

What is the range of the **inverse** function f^{-1}? Write your answer as an integer between 0 and 99.

Range of f^{-1}: $\mathbb{R}\backslash\{\square\}$

Item 6

Udfyld manlgende værdier i nedenstående udtryk således, at det konverterer det binære tal 101010101 til det decimale tal 341_{10}. Skriv dit svar som fire heltal mellem 0 og 99:

Fill in the missing values in the below expression such that it converts the binary number 101010101 to the decimal number 341_{10}. Write your answer as four integers between 0 and 99:

$$1 \times 2^8 + \square \times 2^7 + 1 \times 2^6 + \square \times 2^4 + 1 \times 2^2 + \square \times 2^1 + \square \times 2^0$$

Item 7

Udfyld manglende værdier i nedenstående udtryk således at det konverterer det hexadecimale tal 4726_{16} til det decimale tal 18214_{10}. Skriv dit svar som tre heltal mellem 0 og 99:

Fill in the missing values in the below expression such that it converts the hexadecimal number 4726_{16} to the decimal number 18214_{10}. Write your answer as three integers between 0 and 99:

$$6 \times 16^{\square} + \square \times 16^3 + 2 \times 16^1 + \square \times 16^2$$

Item 8

Konverter det binære tal 10100011010_2 til et hexadecimalt tal.

Convert the binary number 10100011010_2 to a hexadecimal number.

$\square_{16}$

Item 9

Beregn $1000101001_2 + 100001110_2$. Angiv svaret som et binært tal.

Calculate $1000101001_2 + 100001110_2$. State the answer as a binary number.

$\square_2$

Item 10

Hvad er $110_2 \times B_{16}$ i 10-talssystemet? Skriv dit svar som et heltal mellem 0 og 99:

What is $110_2 \times B_{16}$ in decimal? Write your answer as an integer between 0 and 99:

Item 11

Giv primtalsfaktoriseringen af 224. Angiv svaret som tre heltal mellem 0 og 99.

Give the prime factorisation of 224. State your answer as three integers between 0 and 99.

$\square^{\square} \times \square$

Check Answer

Item 12

Find største fælles divisor (gcd) og mindste fælles multiplum (lcm) for heltallene 48 og 120. Angiv dit svar som to heltal.

Find the greatest common divisor (gcd) and least common multiple (lcm) of the integers 48 and 120. State your answer as two integers.

gcd(48,120)=$\square$

lcm(48,120)=$\square$

Item 13

Lad a være et positivt heltal. Find den mindst mulige rest i udtrykket nedenfor. Angiv svaret som et heltal mellem 0 og 99.

Let a be positive integer . Find the smallest possible remainder in the expression below. State your answer as an integer between 0 and 99.

$$88 = a \times 7 + \square$$

Item 14

Rangér følgende rester fra mindste til største. I denne opgave skal du have alle korrekte for at opnå point.

Order the following remainders from smallest to largest. In this assignment you must have all correct to obtain points.

12 mod 3

23 mod 11

45 mod 8

7 mod 5

100 mod 12

Item 15

Betragt den boolske funktion $F(x, y, z) = xy + y(z + x)$. Kopier tabellen nedenfor (du må - selvfølgelig! - gerne lave ekstra søjler) og udfyld manglende værdier. Læs derefter tallene i sidste søjle fra top til bund og oversæt det tilsvarende binære tal til et decimaltal (et tal i 10-talssystemet) - dette decimaltal er dit svar.

x	y	z	F(x,y,z)
0	0	0	
0	0	1	
0	1	0	
0	1	1	
1	0	0	
1	0	1	
1	1	0	
1	1	1	

Skriv dit svar som et heltal mellem 0 og 99.

Consider the Boolean function $F(x, y, z) = xy + y(z + x)$. Copy the table below (you are - of course! - welcome to make additional columns) and fill in the missing values. Then read the numbers in the last column from the top down, and translate the corresponding binary number to decimal - this decimal number is your answer!

x	y	z	F(x,y,z)
0	0	0	
0	0	1	
0	1	0	
0	1	1	
1	0	0	
1	0	1	
1	1	0	
1	1	1	

Write your answer as an integer between 0 and 99.

Item 16

Betragt følgende boolske udtryk

$x\left(yz + z\overline{x}\right) + \overline{x}$

En af de seks simplificeringer nedenfor er korrekt. Vælg hvilken.

Consider the following Boolean expression:

$x\left(yz + z\overline{x}\right) + \overline{x}$

One of the six simplifications below is correct. Choose which one.

A	$\overline{z} + xy$
B	$zy + \overline{x}$
C	zxy
D	z
E	zy
F	$y\left(x + z\right)$

Item 17

Lad X være 1, hvis du beslutter dig for at studere, 0 hvis du ikke gør.
Lad Y være 1, hvis du har adgang til kursusmaterialet, 0 hvis du ikke har.
Lad Z være 1, hvis du bliver distraheret af sociale medier, 0 hvis du ikke gør.

Hvilken af de følgende boolske funktioner $F(X, Y, Z)$ returnerer 1, hvis du er i stand til at studere effektivt, og 0 hvis du ikke gør?

Let X be 1 if you decide to study, 0 if you do not.
Let Y be 1 if you have access to the course material, 0 if you do not.
Let Z be 1 if you are distracted by social media, 0 if you are not.

Which of the following boolean functions $F(X, Y, Z)$ returns 1 if you are able to study efficiently, 0 if you are not.

A $F(X, Y, Z) = XYZ$

B $F(X, Y, Z) = X + Y + \overline{Z}$

C $F(X, Y, Z) = XY\overline{Z}$

D $F(X, Y, Z) = X + Y + Z$

E $F(X, Y, Z) = XY + Z$

Betragt følgende boolske funktion

$F = x\,(\overline{x} + yz)$

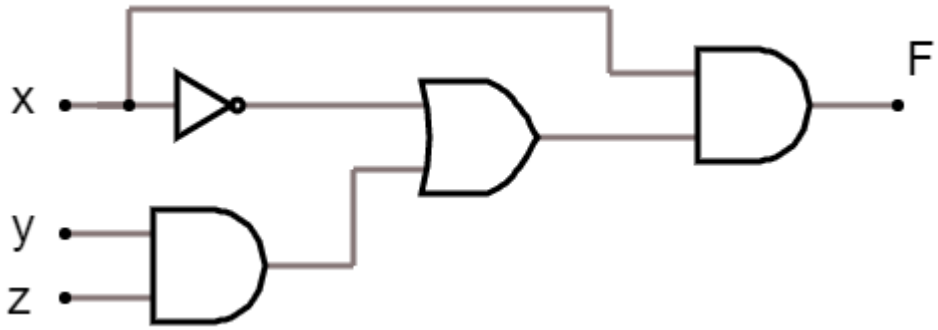
En af de fem kredsløb nedenfor er ækvivalent med det boolske udtryk. Vælg hvilken.

Consider the following Boolean expression:

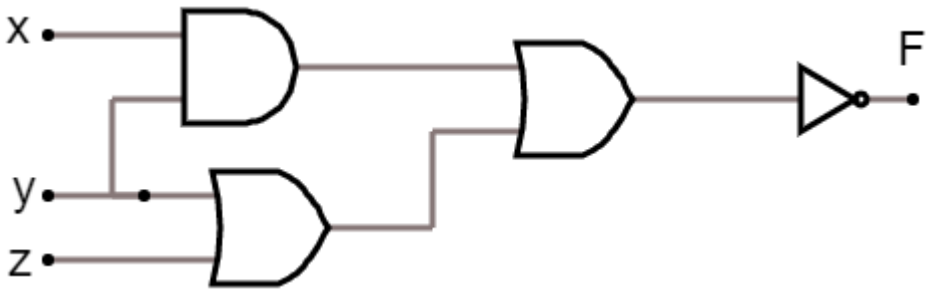
$F = x\,(\overline{x} + yz)$

One of the five circuits below is equivalent to the Boolean expression. Choose which one.

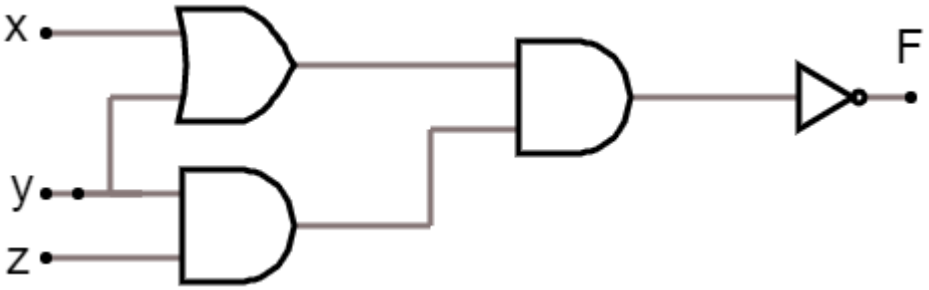
A



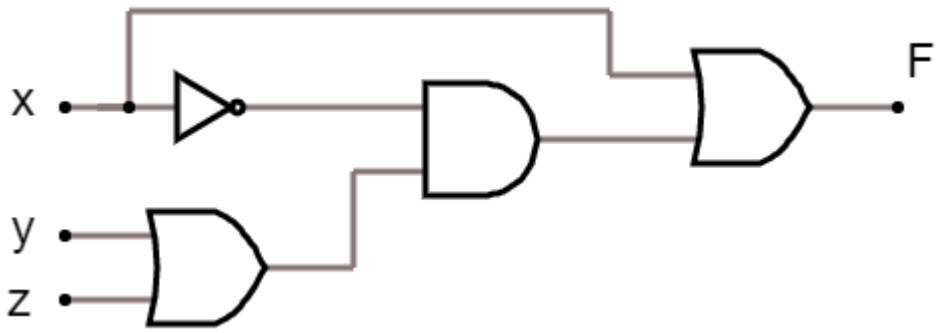
B



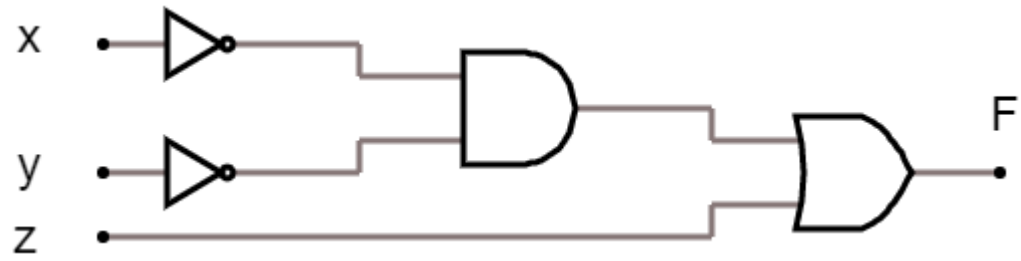
C



D

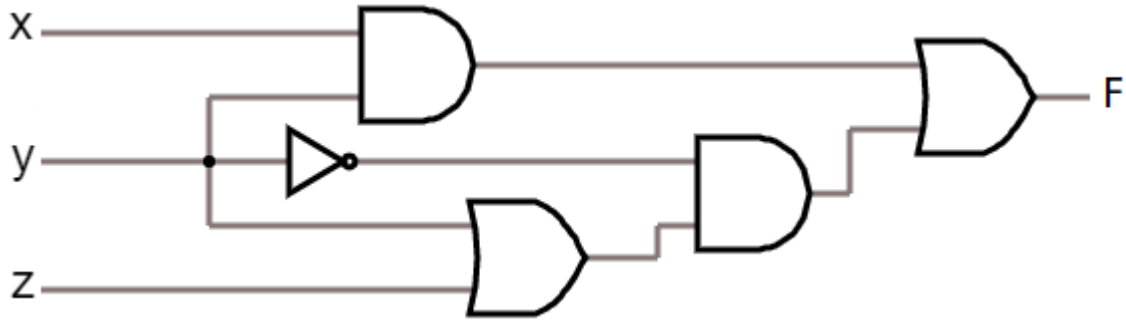


E



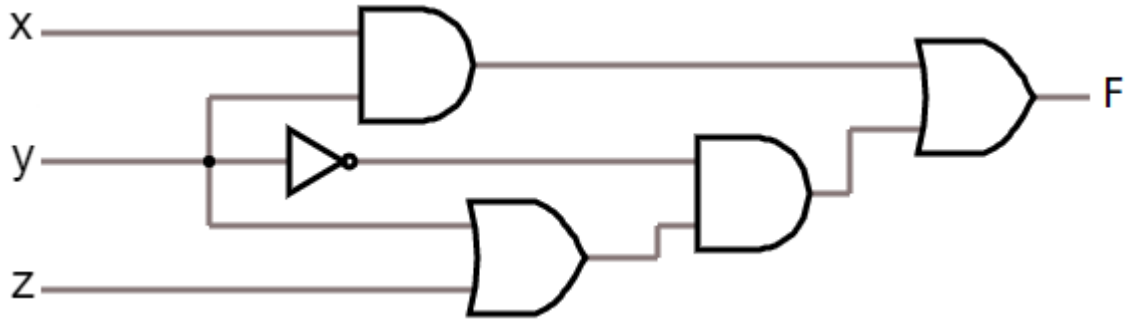
Item 19

Det logiske kredsløb for en boolsk funktion $F(x, y, z)$ er givet nedenfor



Vi betragter nu det binære tal som har cifrene (læst fra venstre) $F(1, 1, 0)$, $F(0, 0, 0)$, $F(0, 1, 0)$, $F(0, 0, 1)$ and $F(1, 0, 1)$. Bestem dette binære tal, og konverter det til decimal. Skriv dit svar som et heltal mellem 0 og 99.

The logic circuit for a Boolean function $F(x, y, z)$ is given below.



We now consider the binary number which has the digits (read from the left) $F(1, 1, 0)$, $F(0, 0, 0)$, $F(0, 1, 0)$, $F(0, 0, 1)$ and $F(1, 0, 1)$. Determine this binary number, and convert it to decimal. Write your answer as an integer between 0 and 99.

Your answer:

Item 20

I det følgende refererer $\log\ n$ til 2-tals logaritmen. Markér hvert udsagn som sandt eller falsk. Bemærk, at i denne opgave skal du have mere end halvdelen korrekte for at opnå point.

In the following, $\log\ n$ refers to log base 2, i.e. the binary logarithm. Mark each statement as true or false. Note, in this assignment you must have more than half correct in order to obtain points.

	True	False
$n^2 \log n = O\left(3^3\right)$	○	○
$\log n^2 = O(1)$	○	○
$6\sqrt{n} = O(n\sqrt{n})$	○	○
$\sqrt{n} + \sqrt{n} = O(n \cdot \log n)$	○	○
$n \cdot \log n = O\left((\log n)^3\right)$	○	○
$2^n = O(\sqrt{n} \cdot \log n)$	○	○
$n\sqrt{n} = O\left(n^{3/2}\right)$	○	○
$8^{\log n} = O\left(n^{2/3}\right)$	○	○
$n \cdot \log n = O\left((\log n)^2\right)$	○	○
$n^n\ = O\left(3^n\right)$	○	○
$7n \cdot \log n = \Theta(\log(n!))$	○	○
$\sum_{i=1}^{n} i = O(\sqrt{n} \cdot \log n)$	○	○

Check Answer

Item 21

Rangér følgende udtryk efter deres $\mathcal{O}(\cdot)$ -klassifikation. Rangér vækstraten fra den langsomste til den hurtigste. Du skal have alle korrekte, for at opnå point i denne opgave.

Order the following expressions by their $\mathcal{O}(\cdot)$ ranking. Order the growth rate from slowest to fastest. You must have all correct to obtain points in this assignment.

$\log \ \log \ n$

$\frac{n^2}{\sqrt{n}}$

$\frac{1}{2}n!$

$\sqrt{n}$

$n \ \log \ n$

$\log \left(n\sqrt{n}\right)$

$10 \ n$

5^n

Item 22

Below you see two code snippets that both find the greatest common divisor of two integers a and b, where $a < b$. Determine the correct **tightest** bound time-complexity of each algorithm.

```java
public int findGCD1(int a, int b) {
    int gcd = 0; // Initialise gcd to 0
    for (int i = 1; i <= a; i++) { // Start loop at 1
        if (a % i == 0 && b % i == 0) {
            gcd = i; // Update gcd if i divides both a and b
        }
    }
    return gcd;
}
```

```java
public int findGCD2(int a, int b) {
    while (b != 0) { // Continue until b becomes 0
        int temp = b;  // Store the current value of b
        b = a % b;     // Update b to the remainder of a divided by b
        a = temp;      // Update a to the previous value of b
    }
    return a; // Return a, which now contains the GCD
}
```

	$\mathcal{O}(\log(a))$	$\mathcal{O}(a \log(a))$	$\mathcal{O}(\log(b))$	$\mathcal{O}(b \log(b))$	$\mathcal{O}(a)$	$\mathcal{O}$
`findGCD1`	○	○	○	○	○	○
`findGCD2`	○	○	○	○	○	○

Item 1

Lad A og B være følgende matricer:

$$A = \begin{bmatrix} 1 & 2 & -4 \\ 3 & 1 & 0 \\ 2 & 3 & -3 \end{bmatrix}, \text{ og } B = \begin{bmatrix} 2 & 3 \\ 1 & 0 \\ 3 & -1 \end{bmatrix}$$

a. Løs ligningen $AX = B$. Angiv dine input som fire heltal mellem 0 og 99.

Let A and B be the following matrices:

$$A = \begin{bmatrix} 1 & 2 & -4 \\ 3 & 1 & 0 \\ 2 & 3 & -3 \end{bmatrix}, \text{ and } B = \begin{bmatrix} 2 & 3 \\ 1 & 0 \\ 3 & -1 \end{bmatrix}$$

a. Solve the equation $AX = B$. State your inputs as four integers between 0 and 99.

$$\begin{bmatrix} \square & \square \\ \square & -3 \\ \square & -2 \end{bmatrix}$$

b. Overvej nu denne lille ændring til A

$$A = \begin{bmatrix} 1 & 2 & -4 \\ 3 & k & 0 \\ 2 & 3 & -3 \end{bmatrix}$$

Find værdien af k, så ligningen $AX = B$ ikke har nogen løsning. Angiv dine input som to heltal mellem 0 og 99, så svaret er en irreducerbar brøk.

b. Now consider this small modification to A

$$A = \begin{bmatrix} 1 & 2 & -4 \\ 3 & k & 0 \\ 2 & 3 & -3 \end{bmatrix}$$

Find the value of k such that the equation $AX = B$ has no solution. State your inputs as two integers between 0 and 99 such that the answer is an irreducible fraction.

$$\frac{\square}{\square}$$

Item 2

Givet det følgende lineære ligningssystem:

$$\begin{cases} x_1 + 8x_3 + 6x_4 = 0 \\ 2x_1 + 3x_2 - x_3 + 4x_4 = 0 \\ 4x_1 + 5x_2 + 7x_4 = 0 \end{cases}$$

a. Skriv totalmatricen. Angiv input som ni heltal mellem 0 og 99.

Given the following system of linear equations:

$$\begin{cases} x_1 + 8x_3 + 6x_4 = 0 \\ 2x_1 + 3x_2 - x_3 + 4x_4 = 0 \\ 4x_1 + 5x_2 + 7x_4 = 0 \end{cases}$$

a. Write the augmented matrix. Give the inputs as nine integers between 0 and 99.

$$\left[\begin{array}{cccc} 1 & \square & \square & 6 & \square \\ 2 & \square & -1 & \square & 0 \\ \square & 5 & \square & \square & \square \end{array}\right]$$

b. Løs systemet og skriv løsningen i parametrisk vektorform. Angiv dine input som fire heltal mellem 0 og 99.

b. Solve the system and write the solution in parametric vector form. State your inputs as four integers between 0 and 99.

$$\begin{bmatrix} x_1 \\ x_2 \\ x_3 \\ x_4 \end{bmatrix} = x_{\square} \begin{bmatrix} \square \\ -\square \\ -1 \\ \square \end{bmatrix}$$

Item 3

Angiv, om følgende matricer er i reduceret række-echelonform (RREF) eller ej. Bemærk, at du i denne opgave skal have mere end halvdelen korrekt for at opnå point.
Mark whether the following matrices are in reduced row echelon form (RREF) or not. Note, in this assignment you must have more than half correct in order to obtain points.

		RREF	**Not** RREF
A	$\begin{bmatrix} 1 & 0 & 1 & 3 \\ 0 & 1 & 2 & 0 \\ 0 & 0 & 0 & 0 \end{bmatrix}$	○	○
B	$\begin{bmatrix} 1 & 0 & 0 & 2 \\ 0 & 1 & 0 & -1 \\ 0 & 0 & 1 & 0 \end{bmatrix}$	○	○
C	$\begin{bmatrix} 1 & 0 & 0 & 1 \\ 0 & 1 & 0 & -2 \\ 0 & 0 & 0 & 0 \\ 0 & 0 & 1 & 1 \end{bmatrix}$	○	○
D	$\begin{bmatrix} 0 & 1 & 0 & 2 \\ 1 & 0 & 1 & 3 \\ 0 & 0 & 0 & 1 \end{bmatrix}$	○	○
E	$\begin{bmatrix} 1 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$	○	○
F	$\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$	○	○
G	$\begin{bmatrix} 1 & 0 & 2 \\ 0 & 1 & 3 \end{bmatrix}$	○	○
H	$\begin{bmatrix} 1 & 2 & 3 & 0 \\ 0 & 1 & 4 & 0 \\ 0 & 0 & 1 & 0 \end{bmatrix}$	○	○

Item 4

Hvor mange korthænder på 4 kort, hvor rækkefølgen ikke betyder noget, kan gives fra et standardspil, så hånden indeholder mindst én spar?
How many card hands of 4 cards, where order does not matter, can be dealt from a standard deck such that the hand contains at least one spade?

Item 5

80% af danskerne går regelmæssigt til lægen; 35% af dem har ingen helbredsproblemer i det følgende år. Af de resterende danskere har kun 5% ingen helbredsproblemer i det følgende år.

Hvad er sandsynligheden for, at en tilfældigt valgt dansker vil have helbredsproblemer i det følgende år?

Angiv dit svar som et heltal mellem 0 og 99, hvor du giver to decimalers præcision, korrekt afrundet.

80% of Danes go to the doctor regularly; 35% of those have no health issues during the following year. Of the remaining Danes, only 5% have no health issues during the following year.

What is the probability a randomly chosen Dane will have health issues in the following year?

State your answer as an integer between 0 and 99 such that you supply two decimal precision, correctly rounded off.

Item 6

Lad A være mængden af 7-bit binære tal, og lad B være mængden af binære tal, der slutter med 11.

a. Hvad er antallet af elementer i mængden $A \cap B$?

Skriv dit svar som et positivt heltal.

Let A be the set of 7-bit binary numbers and let B be the set of binary numbers ending with 11.

a. What is the number of elements in the set $A \cap B$?

Write your answer as a positive integer.

b. Lad x være et tal i mængden $A \cap B$. Hvad er sandsynligheden for, at $x = 23$ eller $x = 27$? Angiv dit svar som en irreducerbar brøk.

b. Let x be a number in the set $A \cap B$. What is the probability that $x = 23$ or $x = 27$? State your answer as an irreducible fraction.

$\frac{\square}{\square}$

Item 7

300 fisk undersøges for DNA-defekter. Tabellen nedenfor viser resultaterne:

		Environmental toxin found		
		Yes	No	Total
DNA defects found	Yes	156	7	163
	No	5	132	137
	Total	161	139	300

Hvad er sandsynligheden for, at en fisk har en defekt, givet at miljøgifte blev fundet?

Angiv dit svar som et heltal mellem 0 og 99, hvor du giver to decimalers præcision, korrekt afrundet.

300 fish are examined for DNA defects. The table below shows the result:

		Environmental toxin found		
		Yes	No	Total
DNA defects found	Yes	156	7	163
	No	5	132	137
	Total	161	139	300

What is the probability that a fish has a defect given that environmental toxin was found?

State your answer as an integer between 0 and 99 such that you supply two decimal precision, correctly rounded off.

```
Algorithm loop1(n)
  s = 1
  for i = n to 1 step −1
    s = s + 1
```

```
Algorithm loop2(n)
  for i = 1 to n
    j = i
    while j > 0
      j = j − 1
```

```
Algorithm loop3(n)
  s = 0
  i = n
  while i > 0
    for j = 1 to i
      s = s + 1
    i = i − 1
```

```
Algorithm loop4(n)
  i = 0
  j = 0
  while i ≤ n
    if i < j then
      i = i + 1
    else
      j = j + 1
      i = 0
```

For hver af de ovenstående algoritmer, angiv deres køretid som en funktion af n i Θ-notation.


```
Algorithm loop1(n)
  s = 1
  for i = n to 1 step −1
    s = s + 1
```

```
Algorithm loop2(n)
  for i = 1 to n
    j = i
    while j > 0
      j = j − 1
```

```
Algorithm loop3(n)
  s = 0
  i = n
  while i > 0
    for j = 1 to i
      s = s + 1
    i = i − 1
```

```
Algorithm loop4(n)
  i = 0
  j = 0
  while i ≤ n
    if i < j then
      i = i + 1
    else
      j = j + 1
      i = 0
```

For each of the above algorithms, state its execution time as a function of n in Θ-notation.

	$\Theta\left(n^3\right)$	$\Theta\left((\log n)^2\right)$	$\Theta(\sqrt{n})$	$\Theta\left(n^2\right)$	$\Theta(n \log n)$	$\Theta(n\sqrt{n})$
loop1	○	○	○	○	○	○
loop2	○	○	○	○	○	○
loop3	○	○	○	○	○	○
loop4	○	○	○	○	○	○

Check Answer

Item 9

Overvej ordet VIRGINIA. Hvor mange unikke måder kan disse bogstaver arrangeres på? Angiv dit svar som et positivt heltal.

Consider the word, VIRGINIA. How many unique ways can these letters be arranged? State your answer as a positive integer.

Item 10

Et IT-firma modtager sine trykte kredsløbskort fra to forskellige leverandører, 1 og 2. Registreringer viser, at 5% af kredsløbskortene fra leverandør 1 og 3% af kredsløbskortene fra leverandør 2 er defekte. 60% af firmaets nuværende kredsløbskort kommer fra leverandør 2, og resten fra leverandør 1. Firmaet holder normalt et lager på 2000 kredsløbskort.

a. Baseret på disse oplysninger, konstruer en kontingenstabel over virksomhedens lager af kredsløbskort. Indsæt værdierne nedenfor.

An IT company receives its printed circuit boards from two different suppliers, 1 and 2. Records show that 5% of the circuit boards from supplier 1 and 3% of the circuit boards from supplier 2 are defective. 60% of the company's current circuit boards come from supplier 2, and the remaining from supplier 1. The company usually keeps a stock of 2000 circuit boards.

a. Based on this information, construct a contingency table of the company's circuit board stock. Insert the values below.

	Supplier 1	Supplier 2
Defectives		
Non-Defectives		

b. Hvis et tilfældigt valgt kredsløbskort fra virksomhedens lager viser sig at være defekt, hvad er sandsynligheden for, at kredsløbskortet kommer fra leverandør 1? Angiv dit svar som en sandsynlighed med 4 decimalers precision, fx 0.1234. Husk at bruge punktum som decimal seperator: "."

b. If a randomly chosen circuit board from the company's stock is chosen and turns out to be defective, what is the probability that the circuit board is from supplier 1. State your answer with 4 decimal precision, e.g. 0.1234. Remember to use dot as decimal seperator: "."

Item 11

Sygdom *A* forekommer med sandsynlighed 0.1, og sygdom *B* forekommer med sandsynlighed 0.2. Det er ikke muligt at have begge sygdomme. Du har én test. Denne test rapporterer positiv med sandsynlighed 0.8 for en patient med sygdom *A*, med sandsynlighed 0.5 for en patient med sygdom *B*, og med sandsynlighed 0.01 for en patient uden sygdom - kald denne hændelse *W*. En positiv test angives som *P*.

Hvis testen viser sig positiv, hvad er sandsynligheden for, at du enten:

1. har sygdom *A*
2. har sygdom *B*, eller
3. har ingen af delene

Angiv dit svar som en sandsynlighed med 4 decimalers precision, fx 0.1234. Husk at bruge punktum som decimal seperator: "."

Disease *A* occurs with probability 0.1, and disease *B* occurs with probability 0.2. It is not possible to have both diseases. You have a single test. This test reports positive with probability 0.8 for a patient with disease *A*, with probability 0.5 for a patient with disease *B*, and with probability 0.01 for a patient with no disease - call the latter event *W*.

If the test comes back positive, what is the probability you have either:

1. disease *A*
2. disease *B*, or
3. neither

State your answer with 4 decimal precision, e.g. 0.1234. Remember to use dot as decimal seperator: "."

$P(A \mid P) =$ ☐

$P(B \mid P) =$ ☐

$P(W \mid P) =$ ☐

Item 12

Bestem den homogene løsning af coefficient matricen A ved at opstille løsningen i parametrisk form:.

$$A = \begin{bmatrix} -1 & 2 & 1 & 4 \\ 1 & 2 & 2 & 6 \end{bmatrix}$$

Indsæt dine svar som positive heltal. Alle fortegn er fortrykte. Bemærk også at du skal indsættes indeks for de frie variable.

Determine the homogenuous solution for the coefficient matrix A by setting up the solution in parametric form:

$$A = \begin{bmatrix} -1 & 2 & 1 & 4 \\ 1 & 2 & 2 & 6 \end{bmatrix}$$

Insert your answers as positive integers. All signs have been pre-printed. Also, note that you must also insert the index of the free variables.

$$\begin{bmatrix} x_1 \\ x_2 \\ x_3 \\ x_4 \end{bmatrix} = x_{\square} \begin{bmatrix} -\frac{1}{\square} \\ -\frac{3}{\square} \\ 1 \\ \square \end{bmatrix} + x_{\square} \begin{bmatrix} -\square \\ -\frac{\square}{2} \\ \square \\ \square \end{bmatrix}$$

For at opnå point i denne opgave skal du have 3 eller flere spørgsmål korrekte. **Ingen dokumentation er nødvendig.**

In order to obtain points in this assignments, you will need more have 3 or more items correct. **No documentation is needed.**

		True	False
A	$k = 3$ vil gøre søjlerne i følgende matrix lineært uafhængige: $\begin{bmatrix} 2 & -10 & 6 \\ 0 & 1 & -2 \\ 0 & 0 & 2k-6 \end{bmatrix}$ $k = 3$ will make the columns of the following matrix linearly independent: $\begin{bmatrix} 2 & -10 & 6 \\ 0 & 1 & -2 \\ 0 & 0 & 2k-6 \end{bmatrix}$	○	○
B	$A\mathbf{x} = \mathbf{b}$ dannet ud fra følgende matrix har en løsning for hver: $\mathbf{b}$: $\begin{bmatrix} 1 & 3 & 3 & 2 \\ 0 & 0 & 5 & -7 \\ 0 & 0 & 0 & 5 \\ 0 & 0 & 0 & 0 \end{bmatrix}$ $A\mathbf{x} = \mathbf{b}$ formed from the following matrix has a solution for each $\mathbf{b}$: $\begin{bmatrix} 1 & 3 & 3 & 2 \\ 0 & 0 & 5 & -7 \\ 0 & 0 & 0 & 5 \\ 0 & 0 & 0 & 0 \end{bmatrix}$	○	○
C	Hvis søjlerne i *A* består af følgende vektorer, så er *A* invertibel: $u_1 = \begin{bmatrix} 1 \\ 2 \\ 1 \\ 1 \end{bmatrix}, u_2 = \begin{bmatrix} -2 \\ 1 \\ -1 \\ 1 \end{bmatrix}, u_3 = \begin{bmatrix} 1 \\ 1 \\ -2 \\ -1 \end{bmatrix}, u_4 = \begin{bmatrix} -1 \\ 1 \\ 1 \\ -1 \end{bmatrix}$. If the columns of *A* are made up of the following vectors, then *A* is invertible: $u_1 = \begin{bmatrix} 1 \\ 2 \\ 1 \\ 1 \end{bmatrix}, u_2 = \begin{bmatrix} -2 \\ 1 \\ -1 \\ 1 \end{bmatrix}, u_3 = \begin{bmatrix} 1 \\ 1 \\ -2 \\ -1 \end{bmatrix}, u_4 = \begin{bmatrix} -1 \\ 1 \\ 1 \\ -1 \end{bmatrix}$.	○	○
D	Vektorerne fra spørgsmål (c) udgør en uafhængig mængde. The vectors from question (c) form an independent set.	○	○
E	Let $u_1,\ u_2,\ u_3, \text{and}\ u_4$ be as in question (c), then u_4 lies in span $\{u_1, u_2,\ u_3\}$. Lad $u_1,\ u_2,\ u_3, \text{og}\ u_4$ være som i spørgsmål (c), så ligger u_4 i span $\{u_1, u_2,\ u_3\}$.	○	○