

EXAMINATION

Kandidatnummer: _____

Course code and name: ITD25018 Technology project

Examination date and duration: 28.2.20, 3 hours Permitted

Aids: List of formulas

Lecturers: Maben Rabi, Tor Arne Moxheim

Date of announcement of the examination results: 20.3.20

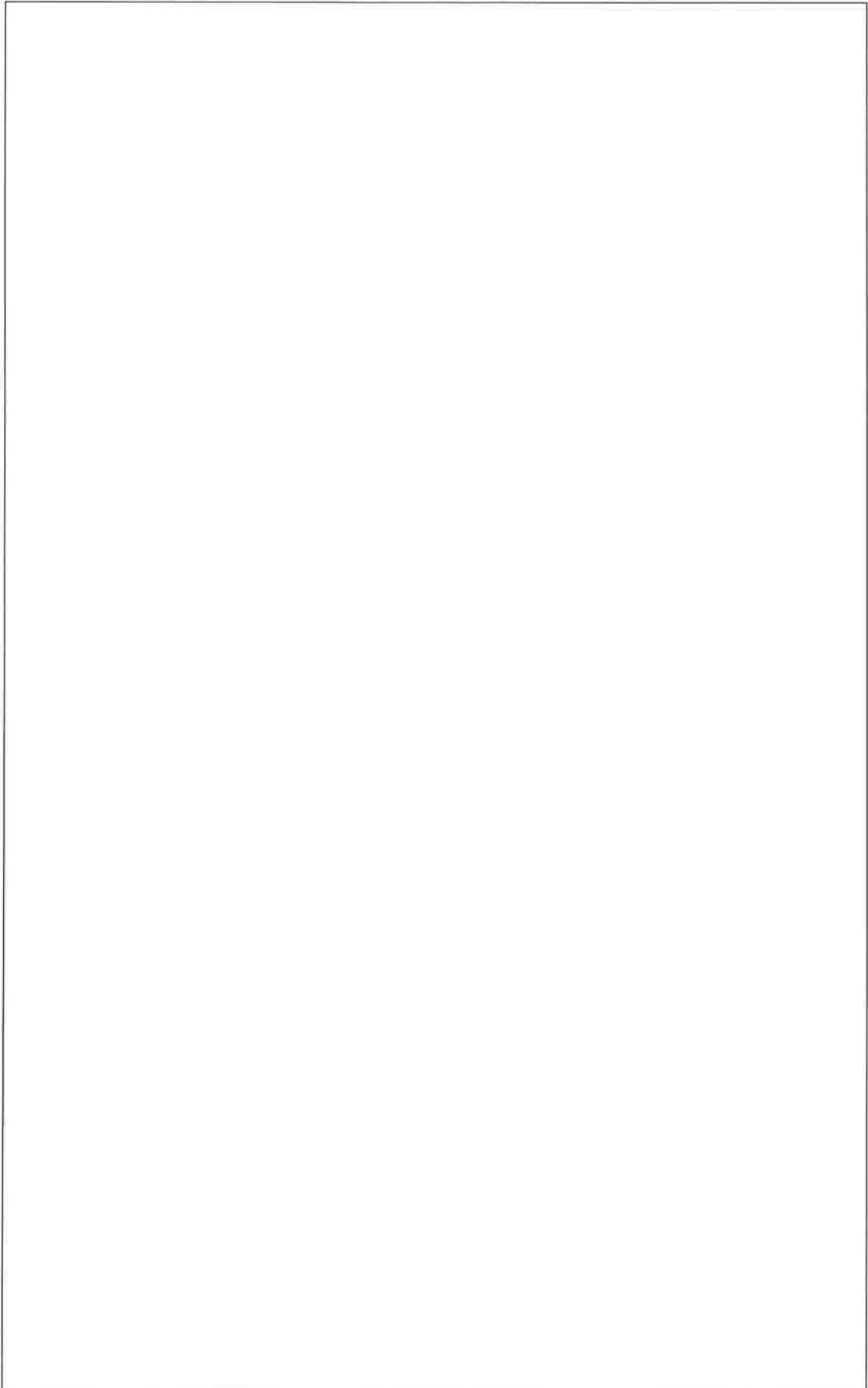
- This exam contains 17 pages (including this cover page and list of formulas) and 9 questions, carrying a total of 50 points.
- Questions 1 to 3 are on the Økonomidelen, and carry 18 points.
- Questions 4 to 9 are on the Teknologidelen, and carry 32 points.
- You may write your answers in either English or Norwegian.
- For each multiple choice question, pick only one choice.

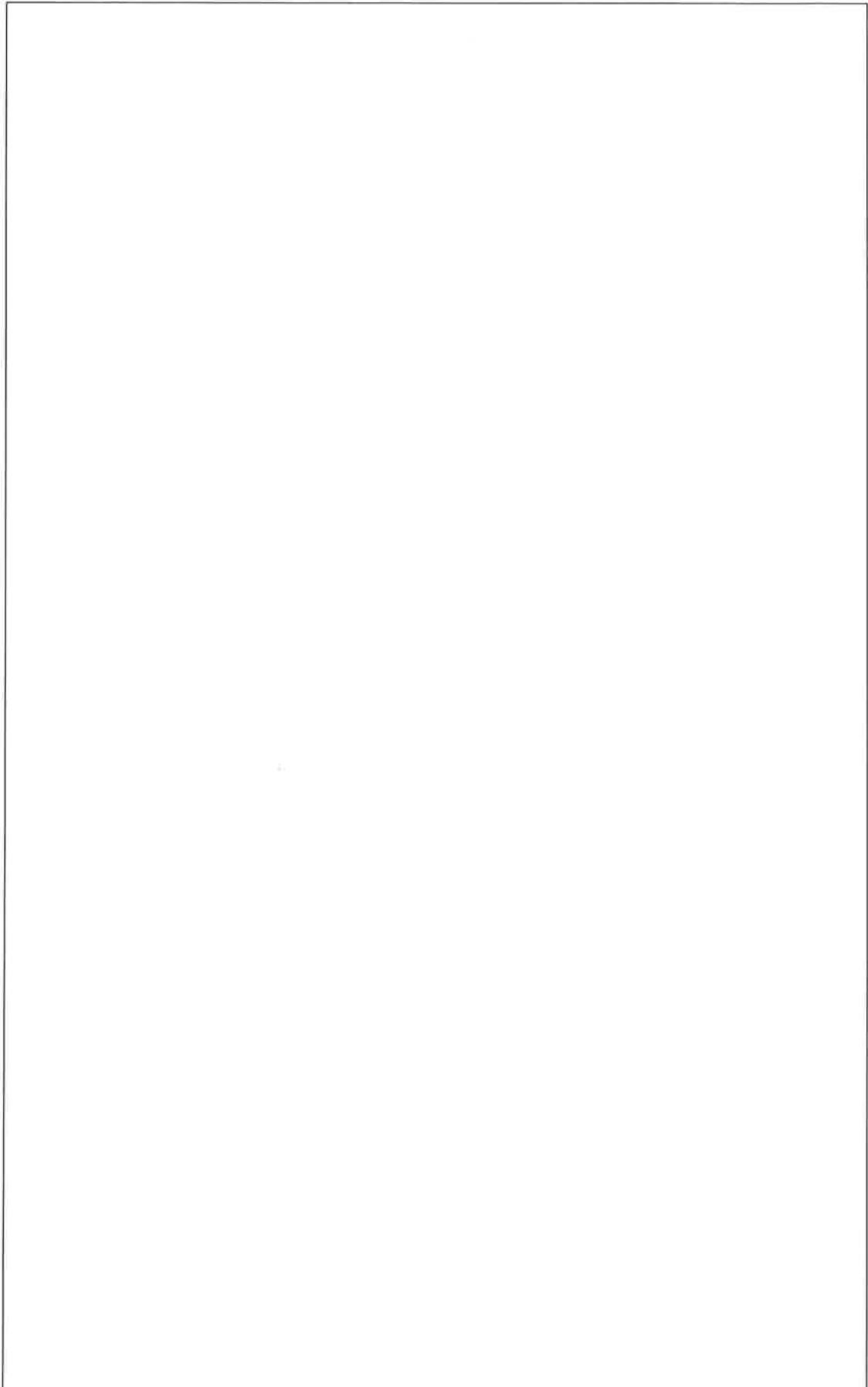
Grade Table (for sensur use only)

Question	Points	Score
1	6	
2	6	
3	6	
4	4	
5	4	
6	4	
7	6	
8	6	
9	8	
Total:	50	

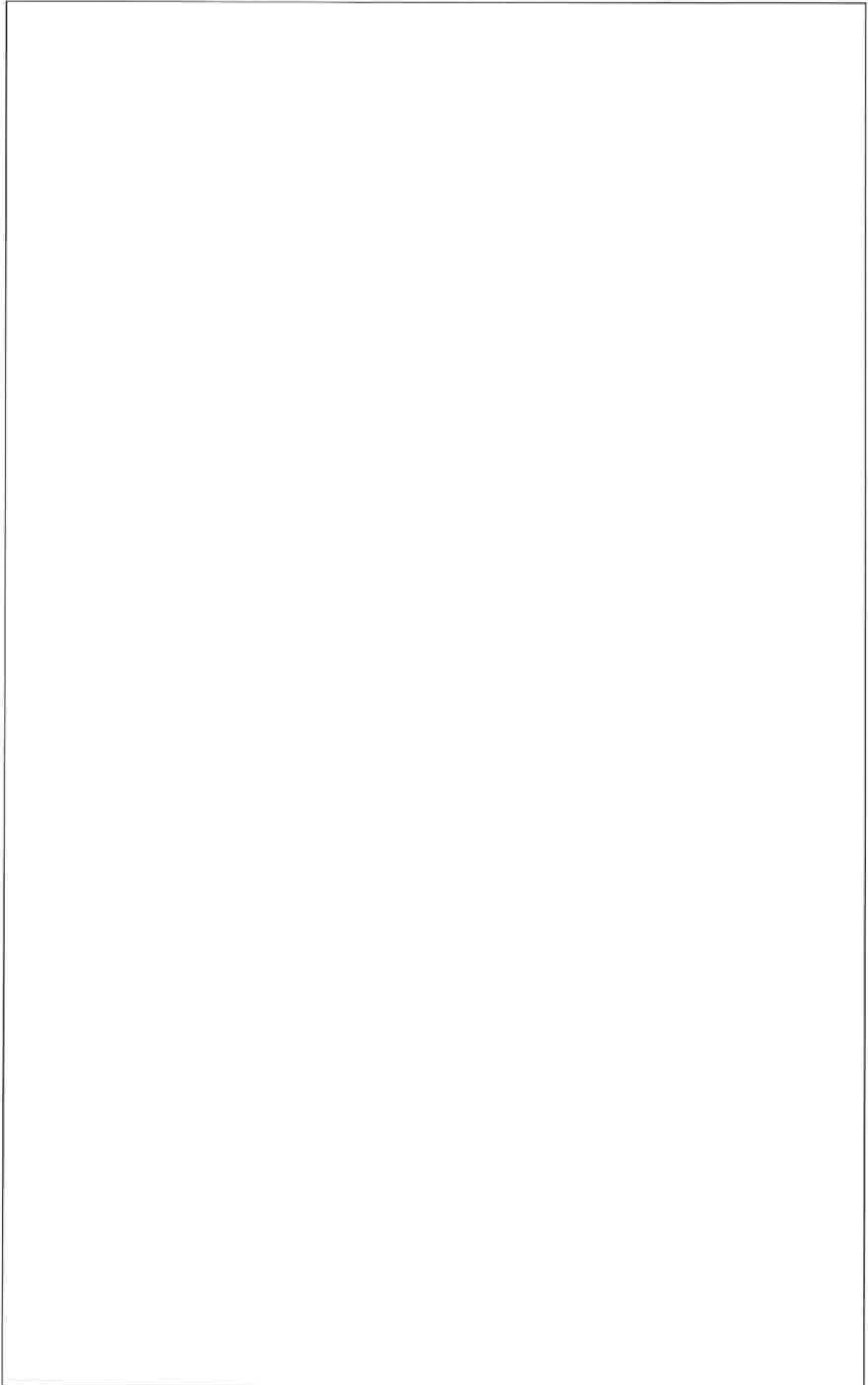
1 Økonomidelen

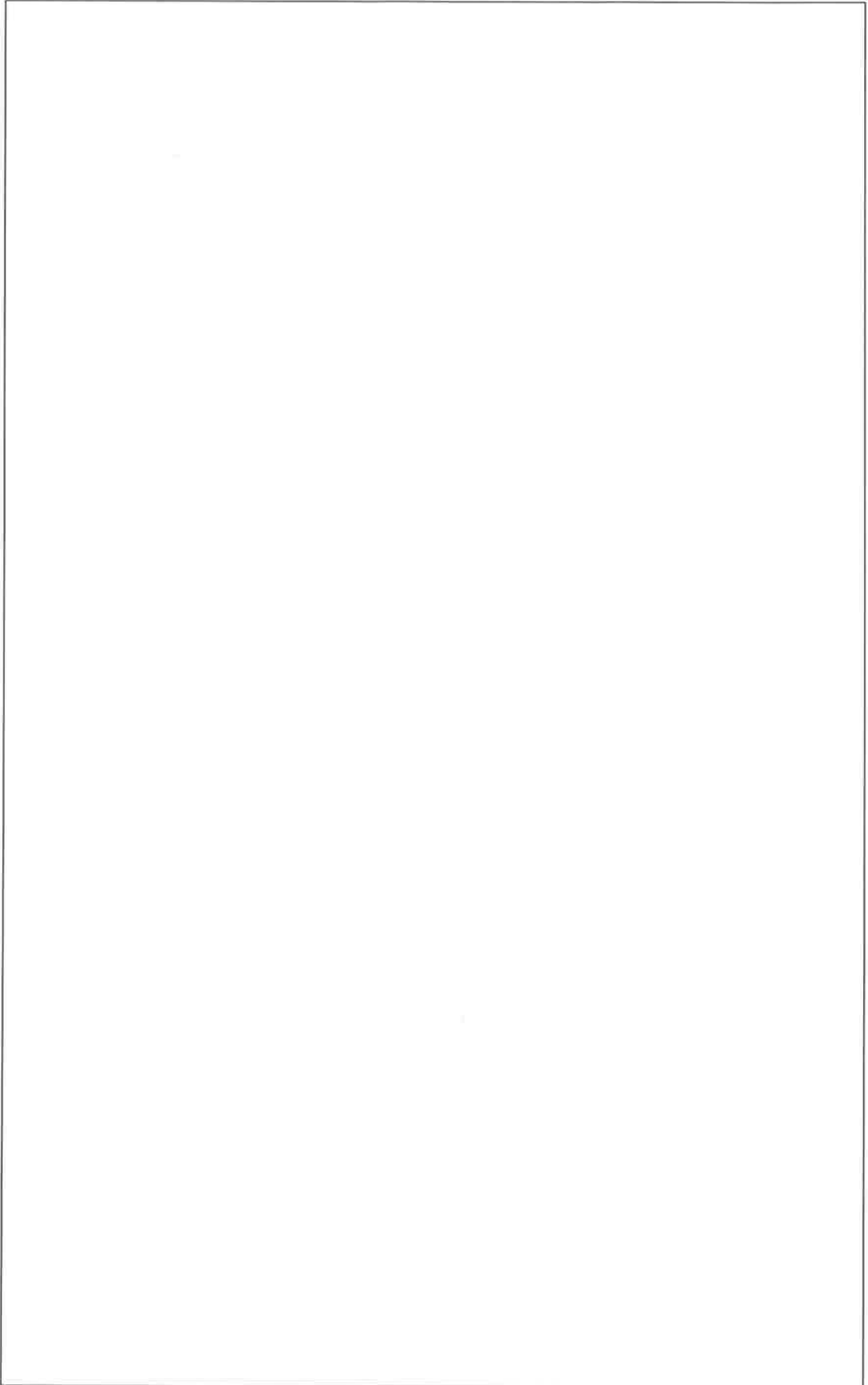
1. (6 points) Forklar hvordan hvert av punktene a til f påvirker likviditeten. Begrunn svarene.
- (a) Det er avtalt med kundene at det på alt salg gis 30 dager kreditt.
 - (b) Mange medarbeidere har ytret ønske om å få utbetalt feriepene i januar i stedet for i juni.
 - (c) Anleggsmidlene avskrives med kr 140 000 per år.
 - (d) Det tas opp et langsiktig lån på kr 300 000.
 - (e) Bedriften har fått et tilbud om 10 % rabatt hvis de kjøper inn et stort parti. Mengden tilsvarer vareforbruket i 4 måneder. Ordinær innkjøpspris eksklusive merverdiavgift er kr 1 000 000. Rabatten forutsetter kjøp og betaling i januar.
 - (f) Bedriften har en kassakredittramme på kr 400 000. De har benyttet 60 % av denne.



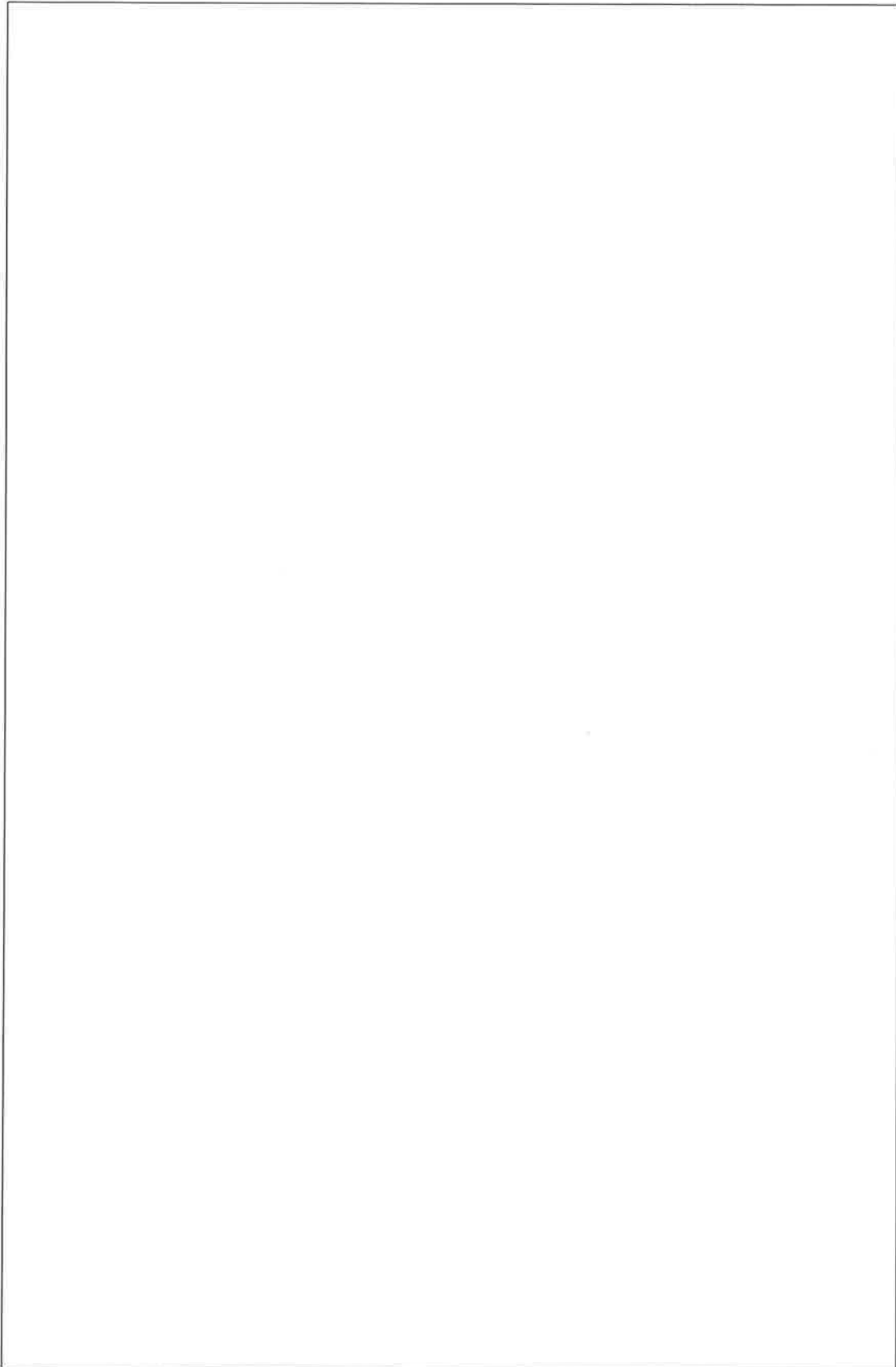


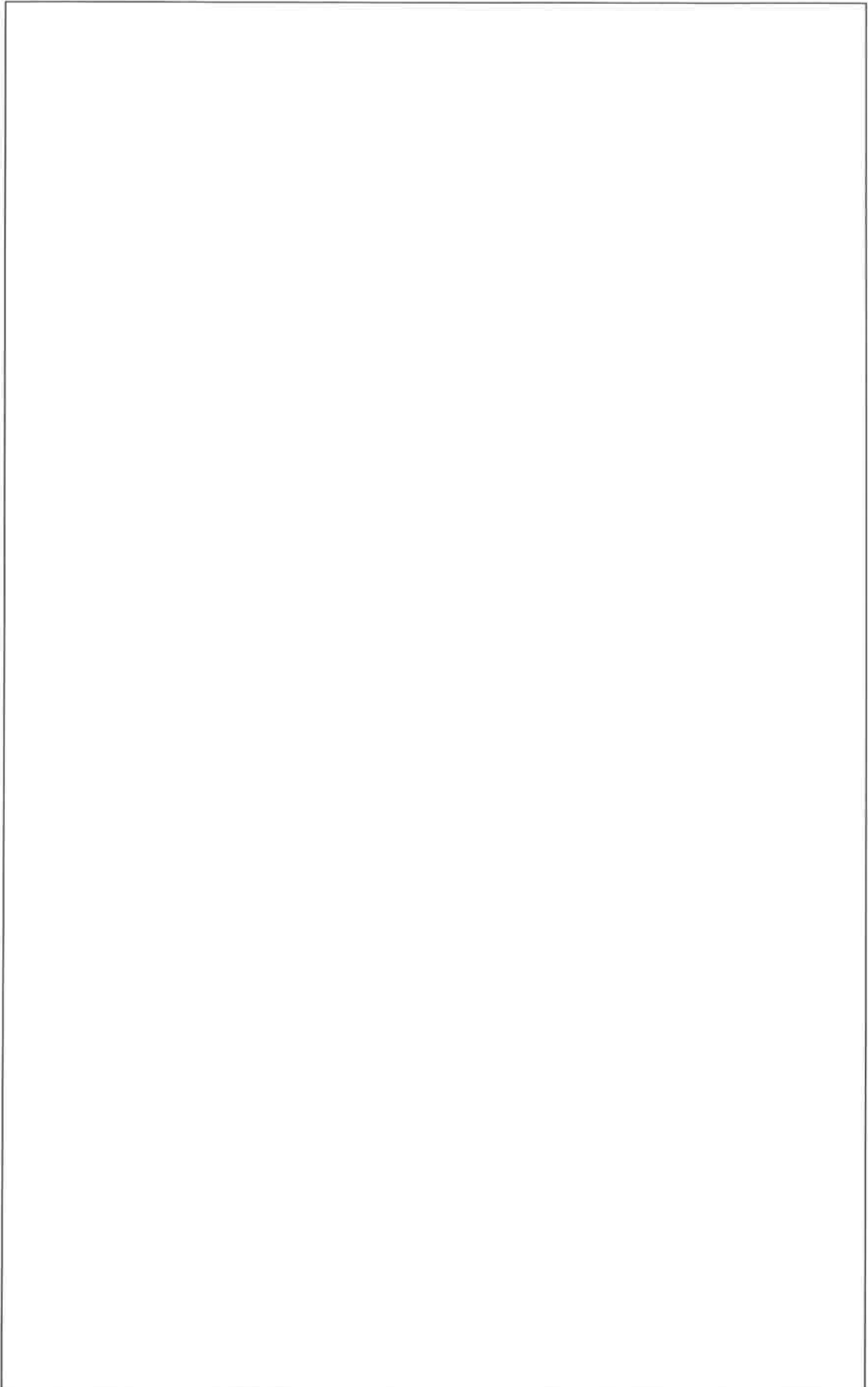
2. (6 points) Forklar hvorfor regnskapsanalyse er ett viktig verktøy for en bedriftsleder.

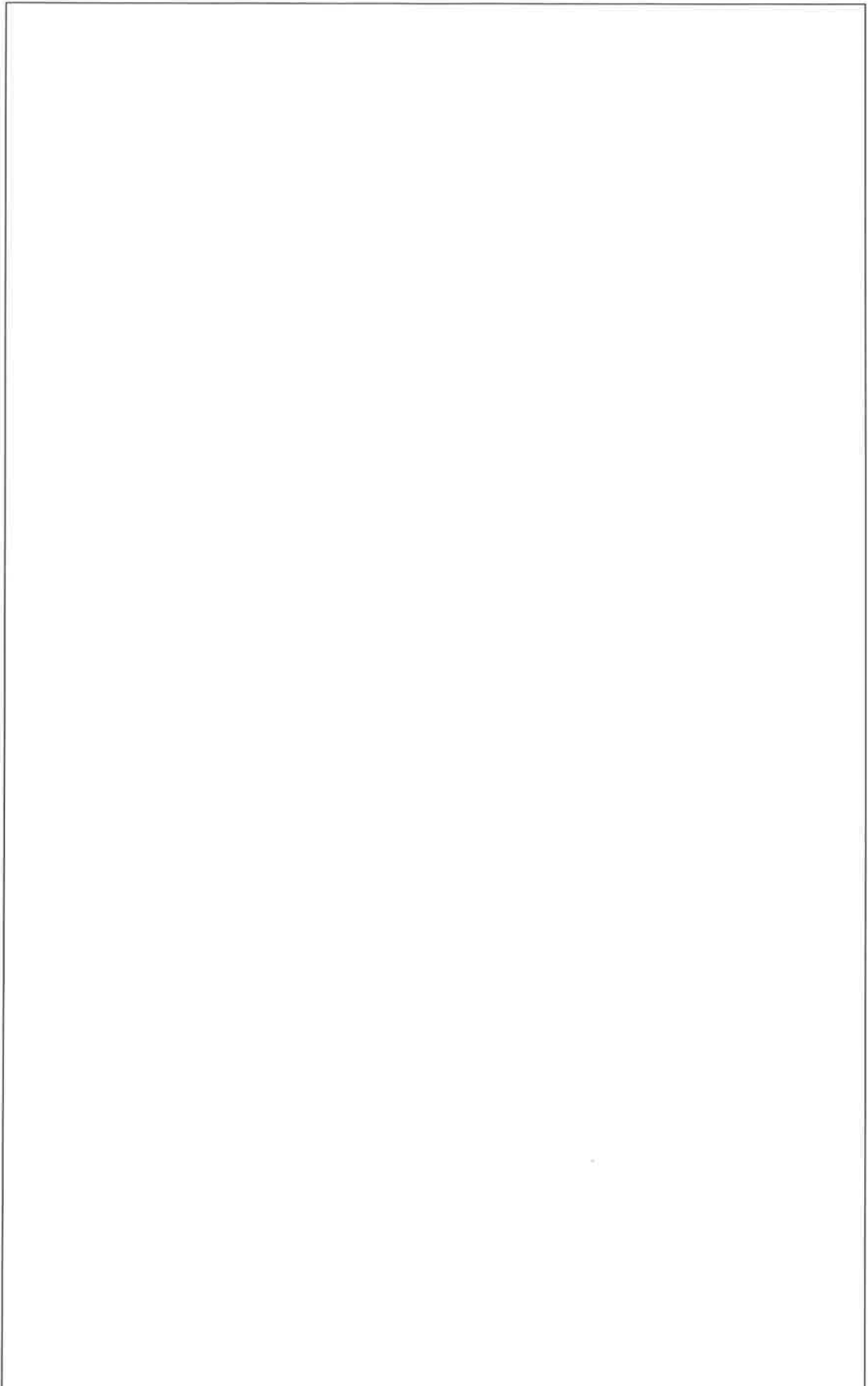




3. (6 points) Forklar forskjellen på faste, variable, direkte og indirekte kostnader.

A large, empty rectangular box with a thin black border, intended for the student to write their answer to the question. The box occupies most of the page below the question text.





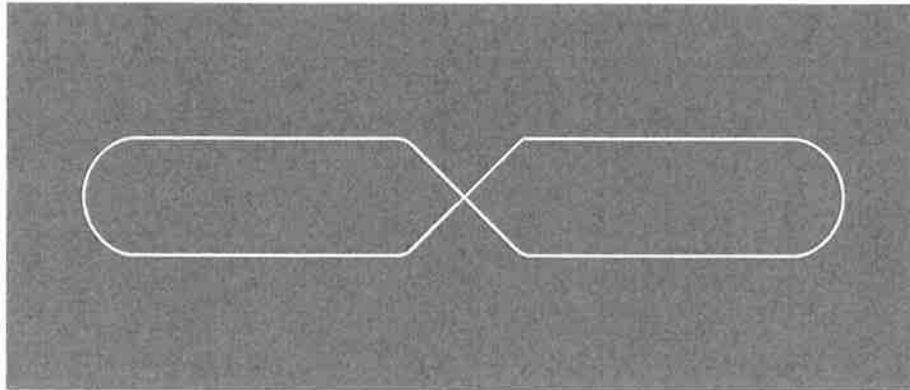
2 Teknologidelen

4. (4 points) The London Millenium bridge was opened in June 2000, after being built to specification. But it had to be closed to the public soon afterwards, because of excessive sideways movement, which was seen when many people walked on it at the same time.



- Which one of the following statements is correct ?
- A. The project was a success as on June 2000 because it produced a bridge as per the given specification
 - B. The project failed as on June 2000 because of bad initial specifications of requirements
 - C. The project failed as on June 2000 because of bad implementation
 - D. The project failed as on June 2000 because of an insufficient budget
 - E. None of the above is true
5. (4 points) Which one of the following statements is correct ?
- A. A project is any activity with an assigned budget
 - B. A project is any activity with a manager
 - C. A project is any activity whose promised outcome is a step change
 - D. A project is any activity with definite start and end dates
6. (4 points) Which of the following contributes most to the failure of a typical Mechatronics project ?
- A. Not programming in Python
 - B. Not using the most expensive Electric motors
 - C. Not testing during development
 - D. Not using the most expensive computing hardware

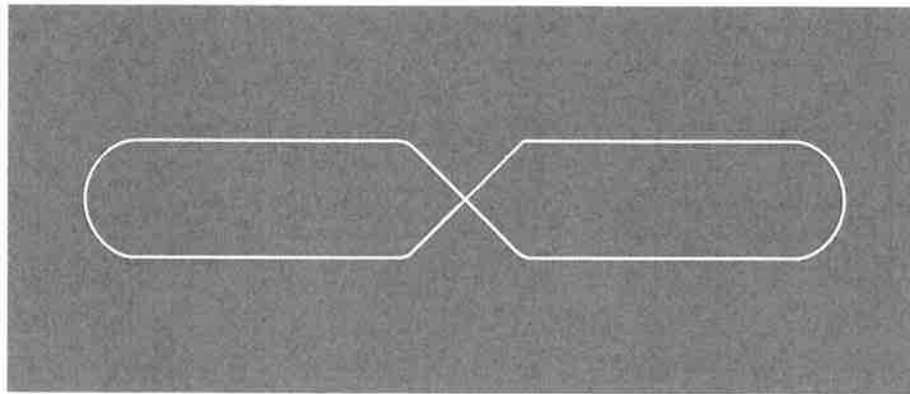
7. (6 points) Suppose that you are building a GoPiGo robot whose job is to keep driving until its battery drains out, on the infinity track below:



You have been given a camera so that the robot can sense the lanes and other features of the track. Which one of the following statements is correct ?

- A. The camera angle (angle between camera axis and the vertical) does not affect the accuracy of lane-following
- B. The camera angle (angle between camera axis and the vertical) does not affect the highest speed possible for the robot
- C. If the robot's speed is made slower, then the rate of camera frames per second can be made smaller
- D. After completing a few rounds of the track, the camera can be turned off because the robot can reliably follow the track using a stored record of the previous movements.
- E. None of the above is true

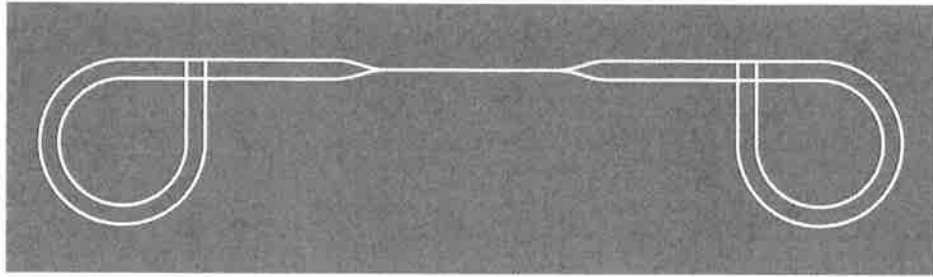
8. (6 points) Suppose that you are building a GoPiGo robot whose job is to keep driving until its battery drains out, on the infinity track below:



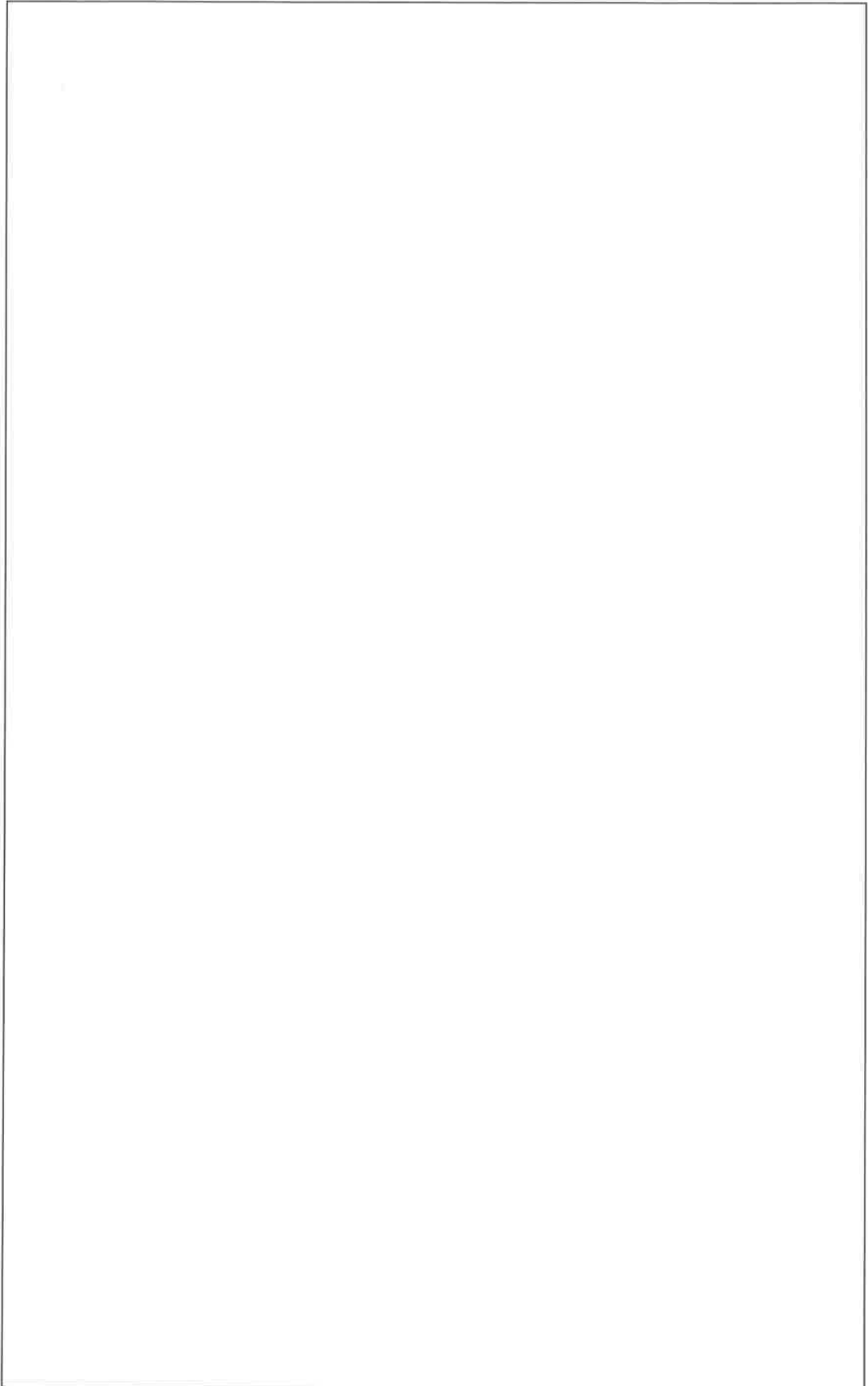
You have been given a camera so that the robot can sense the lanes and other features of the track. Suppose that it is explicitly known that the intersection at the middle of the track is made up of two straight lane-segments crossing at 90 degrees to each other. Which one of the following statements is correct ?

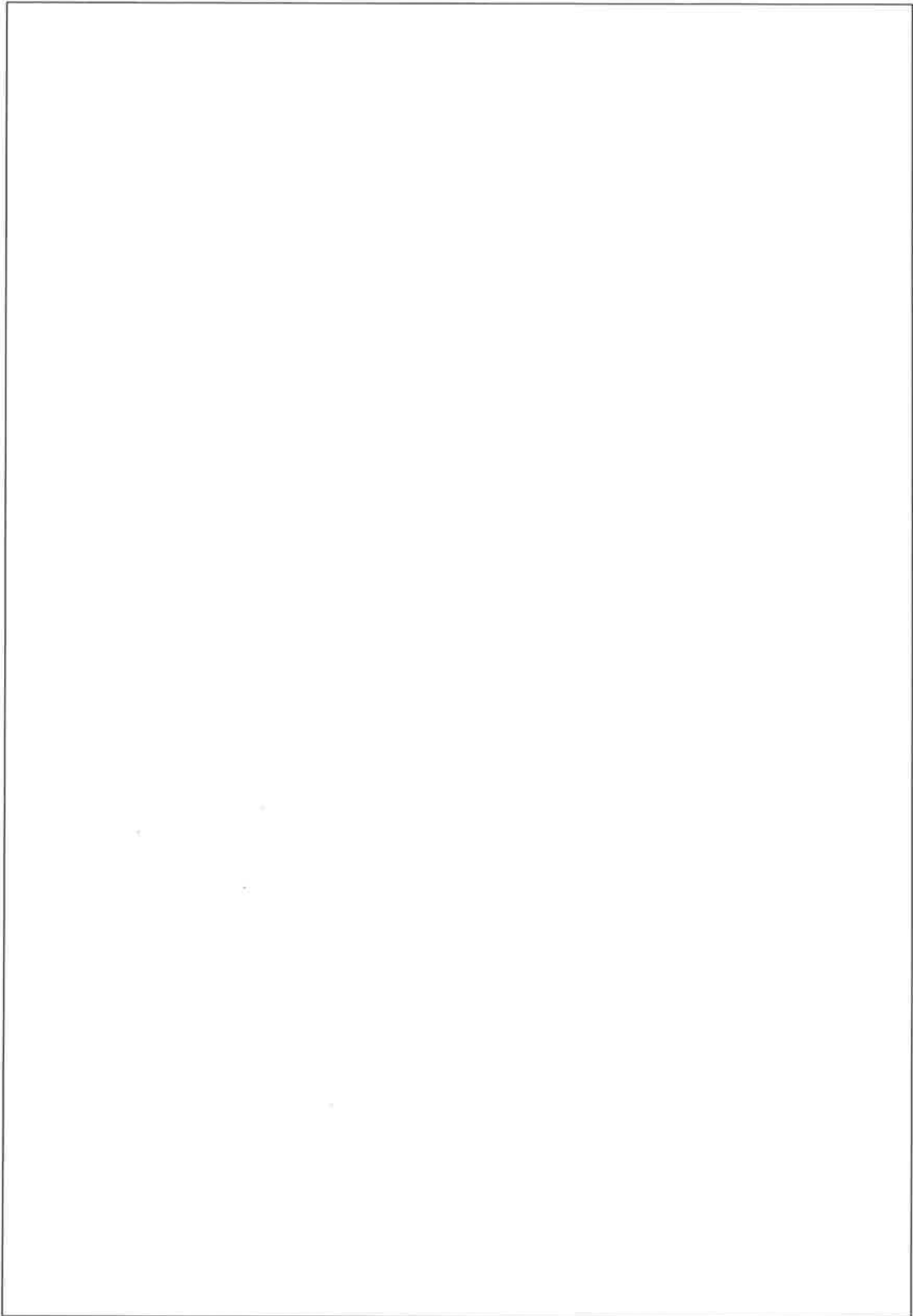
- A. It is **possible** to build an intersection detection module **using** some method of straight edge detection in the image.
- B. It is **impossible** to build an intersection detection module **without using** some method of straight edge detection in the image.
- C. It is **impossible** to build an intersection detection module **using only** grayscale images (images that have only black or white or shades shades of gray).
- D. It is **impossible** to build an intersection detection module **without reading** the value of every pixel in every image frame generated by the camera.
- E. None of the above is true

9. (8 points) Describe the image processing module that your team implemented during this past semester. Consider that this module is expected to work on the following track:



- Your answer should not be longer than two pages.
- Your answer should give:
 - The way to represent each lane.
 - The basic idea behind computing the number of lanes present in the camera frame
 - How you decide whether or not the camera frame has an intersection
 - How you decide whether or not the camera frame has lane mergings or lane splittings
- You can write your answer in English or in Norwegian.





Begrep	Formel
Egenkapital rentabilitet	$\frac{\text{Ordinært resultat før skatt}}{\text{Gjennomsnittlig egenkapital}}$
Totalkapital rentabilitet	$\frac{(\text{Ord. Res. Før skatt} + \text{finanskostn.})}{\text{Gjennomsnittlig totalkapital}}$
Resultatgrad	$\frac{\text{Ord. res før skatt.} + \text{rentekostnad}}{\text{Driftsinntekt}}$
Driftsmargin	$\frac{\text{Driftsresultat}}{\text{Sum driftsinntekt}}$
Bruttofortjeneste	I kroner: Sum driftsinntekt – varekostnad I %: $\frac{\text{Bruttofortjeneste i kr}}{\text{Sum driftsinntekt}}$
Likviditets grad 1	$\frac{\text{Omløpsmidler}}{\text{Kortsiktig gjeld}}$
Likviditets grad 2	$\frac{(\text{Omløpsmidler} - \text{varer})}{\text{Kortsiktig gjeld}}$
Arbeidskapital i kr	1.Omløpsmidler – kortsiktig gjeld 2.Langsigtig kapital – anleggsmidler (2 forskjellige beregningsmåter som gir likt svar)
Arbeidskapital i %	$\frac{\text{Arbeidskapital i kr}}{\text{Omsetning}}$
Lagringstid	$\frac{\text{Gjennomsnittlig varelager} * 360}{\text{Varekostnad}}$
Kapitalbinding i kundefordringer	$\frac{\text{Varesalg på kreditt} * \text{kredittid} * 1,25}{360}$
Gjennomsnittlig leverandørgjeld	$\frac{\text{Varekjøp på kreditt} * \text{kredittid} * 1,25}{360}$
Kredittid kunder	$\frac{\text{Gjennomsnittlig kundefordringer} * 360}{\text{Kreditsalg med mva.}}$
Kredittid leverandører	$\frac{\text{Gjennomsnittlig leverandørgjeld} * 360}{\text{Kredittkjøp med mva.}}$
Andel langsiktig kapital	$\frac{(\text{Egenkapital} + \text{langsiktig gjeld})}{\text{Anleggsmidler} + \frac{1}{2} \text{ varelager}}$
Egenkapital prosent	$\frac{\text{Egenkapital}}{\text{Totalkapital}}$
Nåverdi	$NV = - \text{investering} + \sum \frac{S}{(1 + r)^n}$
Dekningsbidrag	Driftsinntekter – Variable kostnader
Dekningsgrad	$\frac{\text{Dekningsbidrag}}{\text{Driftsinntekter}}$
Dekningspunkt (nullpunkt/ break even)	$\frac{\text{Faste kostnader}}{\text{Dekningsgrad}}$
Sikkerhetsmargin (risikomargin)	Driftsinntekter - dekningspunkt