

1. A random variable  $X$  is normally distributed with mean  $\mu = 30$  and standard deviation  $\sigma = 4$ . Find
  - (a)  $P(x < 40)$
  - (b)  $P(x > 21)$
  - (c)  $P(30 < x < 35)$
2. A radar unit is used to measure speeds of cars on a motorway. The speeds are normally distributed with a mean of 90 km/h and a standard deviation of 10 km/h. What is the probability that a car picked at random is travelling at more than 100 km/h?
3. For certain types of computers, the length of time between charges of the battery is normally distributed with a mean of 50 hours and a standard deviation of 15 hours. What is the probability that the length of time between charges is more than 48 and less than 72 hours?
4. Entry to Pascal U is determined by a national test. The scores on this test are normally distributed with a mean of 500 and a standard deviation of 100. Yasmin wants to be admitted to Pascal U and knows she must score better than 70% of all the students who took the test. If Yasmin scores 585, will she be admitted?
5. After production, the lengths of axles for drone motors are approximated by a normal distribution model with a mean of 5 cm and a standard deviation of 0.02 cm. If an axle is chosen at random from the assembly line, what is the probability that its length
  - (a) between 4.98 and 5.02 cm?
  - (b) less than 4.96 cm or greater than 5.04 cm?
6. The lifespan of a tool produced by Machine Inc. can be modelled by a normal distribution with a mean of 12 months and a standard deviation of 2 months. Find the probability that a tool will last
  - (a) less than 7 months.
  - (b) more than 9 months.
  - (c) between 9 and 15 months.

7. The time taken to assemble a new electric car is a normally distributed random variable. Its mean is 20 hours and its standard deviation is 2 hours. What is the probability that a car can be assembled in
- (a) less than 19.5 hours?
  - (b) between 20 and 22 hours?
  - (c) Fill in the blank: 90% of all cars can be assembled in less than \_\_\_\_ hours.
8. A large group of students took a test in physics and their grades have a mean of 70 and a standard deviation of 10. If the grades can be approximated by a normal distribution, what percent of students
- (a) scored higher than 82.5?
  - (b) passed the test (grade  $\geq 60$ )?
  - (c) should fail the test (grade  $\leq 60$ )?