Mathematics

Delprov D

1a

Elevens namn och klass/grupp

Skolverket

Instructions – part D

22. Stina has deposited money in to a bank account with a fixed interest rate. The following function can be used to calculate how much money, in SEK, is in her bank account:

$$f(x) = 10\,000 \times 1.04^x$$

where x is the number of years after she has deposited the money into her bank account.

a) What interest rate did she receive from the bank?
Only answer required. (1/0/0)

b) Calculate $f(5)$
Only answer required. (1/0/0)

23. When the wind blows, it feels colder than actually shown on a thermometer. SMHI has published a table showing how the temperature is perceived depending upon actual temperature and wind speed.

	How the temperature is perceived					
Actual temperature °C (at 0 m/s)	**-15**	**-10**	**-5**	**0**	**5**	**10**
2 m/s	-20	-14	-8	-2	3	9
5 m/s	-24	-17	-11	-5	1	8
10 m/s	-27	-20	-14	-7	0	6
15 m/s	-29	-22	-15	-8	-2	5
20 m/s	-31	-23	-16	-9	-2	5

(Wind speed — Perceived temperature)

a) How many degrees colder is a temperature of −15°C perceived if the wind speed increases from 5 m/s to 15 m/s (according to the table)?
Only answer required. (1/0/0)

b) Is the relationship between wind speed and perceived temperature linear for the actual temperature 0°C?
Justify. (1/1/0)

24. Eskil has been offered a job at two different companies. He has been offered a basic salary every month throughout the year. And in addition, he would receive an extra supplement for each month that he is out on assignment.

Employer	Basic salary (SEK/month)	Extra supplement for assignments (SEK/month)
Company A	35 000	10 000
Company B	40 000	3 000

a) Calculate the *annual salary with supplements* for Eskil if he went to work for Company A and Company B respectively, if he is out on assignment for 5 months during one year. (2/0/0)

b) Assume that Eskil would be out on assignment at Company A for as many months as he would be at Company B.
For the *total annual salary* to be higher at Company A, at a *minimum* how many *full* months will Eskil need to be out on assignment during one year? (2/1/0)

25. Aida takes out a loan for SEK 20 000. The monthly interest rate is 3% and she wants to amortise SEK 1 000 each month. For the purpose of calculating how much the monthly payment will be, Aida makes a spreadsheet.

	A	B	C	D	E
1	Month	Remaining loan (SEK)	Interest rate/month (in decimals)	Amortisation/month (SEK)	Monthly payment (interest cost + amortisation in SEK)
2	January	20 000	0.03	1 000	
3	February		0.03	1 000	
4	March				
5	April				
6	May				
7	June				

a) What *value* is displayed in cell E2 when the monthly payment has been calculated? *Only answer required.* (1/0/0)

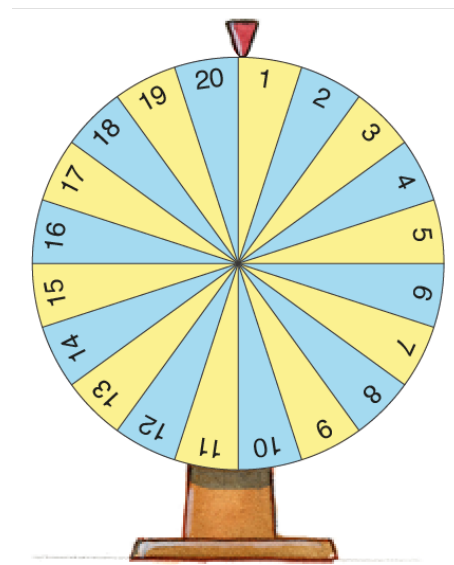Aida wants the spreadsheet to be usable irrespective of interest rate, loan amount and amortisation.

b) What *formula* should then be written in cell B3?
Only answer required. (1/0/0)

c) What *formula* should then be written in cell E3 to calculate the monthly payment? *Only answer required.* (0/1/0)

26. A triangle has the angles *A*, *B* and *C*.
Angle *B* is 72% *smaller* than angle *A*.
Angle *C* is 60% *larger* than angle *A*.
Determine the size of each of the angles. (0/3/0)

27. Samuel and Vera have had dinner together at a restaurant.
They pay a total of SEK 800 with the service charge of 12% included.
Before the service charge, how much did the dinner cost? (0/2/0)

28. Hugo goes to an amusement park and plays on a number on the chocolate wheel.
The chocolate wheel has 20 fields, where one of the fields gives a win on each round of play.

  a) What is the probability that he wins
      two consecutive rounds of play? (1/0/0)

  b) What is the probability that he wins
      at least one time if he plays seven rounds? (0/2/1)

29. A newspaper article presents a formula for calculating the time difference in minutes if one drives the same distance at two different speeds.

$$t = \left(\frac{1}{s_1} - \frac{1}{s_2} \right) \times d \times 60$$

where

t is the time difference in minutes
s_1 is the average speed 1 in km/h
s_2 is the average speed 2 in km/h
d is the distance in kilometres

Kim drives a car to work. The distance to Kim's work is 20 km.

a) Use the formula to calculate the time difference in minutes if one day Kim drives at the average speed of 80 km/h and on the second day instead drives at the average speed of 90 km/h to work (1/1/0)

b) Kim compares two other days' trips to work. Due to traffic, one of the average speeds was twice as high as the other.
The time difference between the two trips to work was 12 minutes.
What average speeds did Kim drive those two days? (0/1/2)

30. In a saline solution weighing 300 g, 12% of the weight is salt.
How many grams of water will need to be added for the solution to instead contain 8% salt? (0/0/2)

31. The number x is somewhere between the numbers 17 and 23.
x is $p\%$ greater than 17 and $p\%$ less than 23.
Determine x. (0/0/3)

PRIM
gruppen