

Determine the value of k.

Determine $P(3 < x \le 4.5)$

Determine $P(3 \le x < 10)$

1

a)

b)

c)

ATMAM Mathematics Methods

SHENTON	Test 3		Calculator Assumed		
	Name:				
	Teacher:	Friday	Smith		
Time	Allowed:	25 min	utes	Marks	/31
Materials allowed: Classpad, Formula Sheet.					
Where appropri should be given Marks may not i	to <u>four</u> decimal pl be awarded for un ndom variable can	be given to laces. tidy or poorl	t <u>wo</u> decimal plac y arranged work.	es, except for prob	
y					
k		1			
	2 4	6	8 x		

(1)

(1)

(1)

d) Determine
$$P(x < 4 \mid x > 1.8)$$

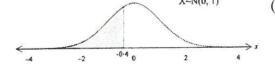
(2)

e) Determine the value t such that
$$P(x < t | 3 < x) = \frac{3}{8}$$

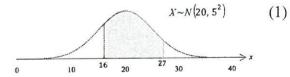
(3)

2 Determine the probability indicated by the shaded region on the following normal probability distributions.

a)

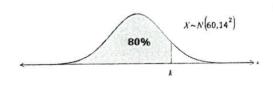


(1) b)

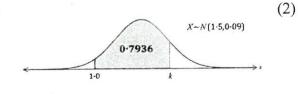


3 Determine the value of k in for the normal distributions shown below.

a)



(1) b)



By calculating the standard z scores associated with the tail probabilities above, then writing equations for their equivalent z scores using the given boundaries, determine the values of the mean and standard deviation to one decimal place.

- Fabrics treated with water proofing spray are able to repel a proportion of incidental water such as rain. The proportion of water absorbed by a fabric which has been protected by x coats of water proofing spray can be modelled by the equation $W = W_0 e^{kx}$, where W_0 is the water absorbed by an unprotected sample of the fabric.
 - a) If each coat of a particular brand of spray reduces the water absorption to 60% of its previous value, find
 - (i) The value of k for that brand, correct to four decimal places. (1)

(ii) Determine the minimum number of coats to reduce the absorption to less than $0.01W_0$. Show use of natural logarithms in your working. (3)

Popular sports clothing company GallopinterTM manufacture the red-and-white striped 6 jumpers sold to fans of the local Floreat Fuchsiaphobes rugby team. They need to pay particular attention to the quality of the red dye used, so the dye is mixed using an automated mixing machine. The mass of powder added to 1L of solvent is normally distributed with a mean of 0.4g and standard deviation of 0.02g

> If the amount of red powder is more than 1.2 standard deviations below the mean, the colour looks pink, which considered abhorrent by the extremely prejudiced Fuchsiaphobe fans. On the other hand, if the concentration of the red dye is more than 0.43g/L, the red dye leeches out in the wash, causing the white stripes to be stained pink, which also upsets the fans.

What is the probability that...

A randomly selected jumper will look pink before it is washed. (1)a)

A randomly selected jumper that has been washed does not look pink. (2)b)

A randomly selected jumper will look pink after it has been washed, given that the dye (3)c) concentration was at least 0.37g/L.