Charles d. a.a.	Western Leading Control of 2024 Control	
	Wednesday, 8 December 2021, 6:01 AM	
State		
·	Wednesday, 8 December 2021, 8:36 AM	
	2 hours 35 mins	
	22.00/25.00	
Grade	8.80 out of 10.00 (88%)	
Question 1		
Correct		
Mark 1.00 out of 1.00		
	95	
Suppose that X ha	s the probability density function $f(x) = 1.5x^2$ for $-1 < x < 1$. Determine $P(-0.5 < X < 0.5)$.	loc
a. 5.4	-0,5	
o b. 1		
c. 2.35		
⊚ d. 0.125 .	-1 C51 3	
The correct answe	$P(52 \times 23) = \frac{1}{2} \times 5$	5 05
_	$=\int_{0.5}^{1}f(x)dx$	

Question 2	
Correct	
Mark 1.00 out of 1.00	
The manufacturing of semiconductor chips produces 2% defective chips. Assume the chips are independent and that a lot contains 1000 chips. Approximate the probability that more than 25 chips are defective. Let $P(Z \le 1.24) = 0.893$; $P(Z \le 1.42) = 0.922$.	
a. None of the others	
○ b. 0.893	
○ c. 0.078	
⊚ d. 0.107	
○ e. 0.929	

Correct	
Mark 1.00 out of 1.00	
In the textile industry, a manufacturer is interested in the number of blemishes or flaws occurring in each 100 feet of material. The probability distribution that has the greatest chance of applying to this situation is the	
a. Poisson distributionb. uniform distributionc. binomial distribution	•
od. normal distribution	

Question 3

The correct answer is: Poisson distribution

Incorrect	
Mark 0.00 out of 1.00	
Let X be a continuous random variable with expected value $E(X) = 10$ and variance $V(X) = 4$. Find $E(X^2)$.	
a. <u>None of the others</u>	
○ b. 104	
○ c. 6	
⊚ d. 14	×
○ e. 96	

The correct answer is:

104

Question 4

Correct

Mark 1.00 out of 1.00

$$f(x) = 1 - e^{-5x} = \int_{0}^{x} f(x) dx$$

Let X be a continuous random variable that has the cumulative distribution function given by

$$F(x) = 0, x <= 0$$

$$F(x) = 1-e^{-5x}, x>0$$

Find the density function of X.

(i)
$$f(x) = 0$$
, $x \le 0$ and $f(x) = 5e^{-5x}$, $x \ge 0$

(ii)
$$f(x)=1$$
, $x \le 0$ and $f(x) = 5e^{-(-5x)}$, $x \ge 0$

(iii)
$$f(x)=0$$
, $x<=0$ and $f(x)=1+e^{-5x}$, $x>0$

(iv)
$$f(x)=0$$
, $x \le 0$ and $f(x) = 1 - e^{(-5x)}$, $x \ge 0$

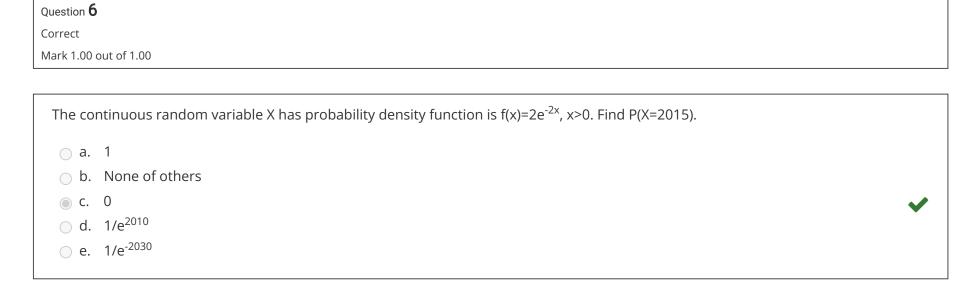
$$F(x) = \begin{cases} 0, & \infty \leq 0 \\ 1 - e^{-5x}, & \infty \end{cases}$$

$$\rightarrow f(x) = 0$$
, $x \in G$

Your answer is correct.

The correct answer is:

(i)



Question 7	
Incorrect	
Mark 0.00 out of 1.00	
Let X be a continuous uniform distribution over the interval [2.4; 5.2]. Find the mean and standard deviation of X.	
a. 3.8 and 0.653	×
○ b. 3.8 and 0.808	•
oc. None of the others.	

The correct answer is: 3.8 and 0.808

od. 0.38 and 0.653

Question 8
Correct
Mark 1.00 out of 1.00
An engineering professional body estimates that 70% of the students taking undergraduate engineering courses are in favour of studying of statistics as part of their studies. If this estimate is correct, use the normal formula for Binomial distributions to approximate the probability that more than 700 undergraduate engineers out of a random sample of 1000 will be in favour of studying statistics. Let $P(Z < 0.035) = 0.514$; $P(Z < 0) = 0.5$.
○ b. 0.5
○ c. 0.514
od. 0.643
● e. 0.486

Question 9	
Correct	
Mark 1.00 out of 1.00	
If x is a normally-distributed random variable with a mean of 100 and a standard deviation of 15, what is $p(x < 115)$?	
a. 0.8813	
○ b. 0.7113	
⊚ c. 0.8413	~
od. 0.9113	

Mark 1.00 out of 1.00

A probability density function is given by
$$f(x) = \frac{b}{x^2}$$
 when $1 < x < 5$. What is the value of b ?

- a. None of the other choices is correct
- o b. 2.5
- c. 4
- (a) d. 1.25
- e. 2

Your answer is correct.

The correct answer is:

1.25

Correct

Mark 1.00 out of 1.00

Suppose the cumulative distribution function of the random variable \boldsymbol{X} is

$$F(x) = \begin{cases} 0 & x < 0 \\ 0.2x & 0 \le x < 4 \\ 0.04x + 0.64 & 4 \le x < 9 \\ 1 & 9 \le x \end{cases}$$

Determine $P(X \le 3)$.

- a. 0.6
- b. 0.76
- oc. None of the other choices is correct
- od. 1
- e. 0

Your answer is correct.

The correct answer is:

0.6

Mark 1.00 out of 1.00

A study of the amount of time it takes a mechanic to rebuild the transmission for a 1992 Chevrolet Cavalier shows that the mean is 8.4 hours and the standard deviation is 1.8 hours. If 40 mechanics are randomly selected, find the probability that their mean rebuild time exceeds 8.7 hours. F= 1,8

Let P(Z<0.86) = 0.8054

P(Z<1.05) = 0.8531

P(Z<1.10) = 0.8654

P(Z<1.13) = 0.8715

- a. 0.1285
- b. 0.1946
- oc. None of the other choices is correct
- od. 0.1469
- e. 0.1346

Your answer is correct.

Question 13
Correct
Mark 1.00 out of 1.00

A continuous uniform random variable x has a lower bound of a = -3, an upper bound of b = 5. What is p(x > -1)?

- a. 0.75
- o b. 0.5
- o. 0.25
- d. 0.125

Your answer is correct.

Question **14**Incorrect

Mark 0.00 out of 1.00

For a continuous random variable x, the probability density function f(x) represents

- o a. the area under the curve to the right of x
- b. the area under the curve at x
- o. the probability at a given value of x
- od. the height of the function at x

Your answer is incorrect.

The correct answer is: the height of the function at x

×

Correct	
Mark 1.00 out of 1.00	
Let X be a uniform random variable over the interval [1, 9]. What is the probability that the random variable X has a value less than 6?	
a. None of the other choices is correct	
o b. 0.875	
o. 0.500	
⊚ d. 0.625	
e. 0.400	

Question 15

Correct

Mark 1.00 out of 1.00

Let X be a random variable with density function

$$f(x) = \begin{cases} \frac{x^2}{3} & if \quad -1 < x < 2, \\ 0 & elsewhere \end{cases}$$

Find the expected value of Y = 4X + 3.

- a. 9
- ob. None of the other choices is correct
- oc. 10
- od. 7
- e. 8



Your answer is correct.

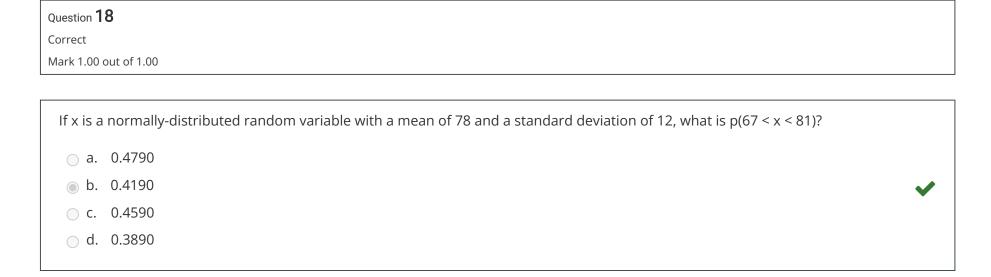
The correct answer is:

8

Question 17	
Correct	
Mark 1.00 out of 1.00	
If z is the standard normal random variable, what is $p(z > -1.787)$?	
a. 0.8530	
b. 0.9630	~

c. 0.8230

d. 0.7730



Question 19
Correct

Mark 1.00 out of 1.00

A continuous uniform random variable x has a lower bound of a = -21, an upper bound of b = -6. What value of x provides an area in the upper tail equal to 0.20?

- a. -12
- b. -9
- c. -18
- od. -15

Your answer is correct.

The correct answer is:

-9

Correct

Mark 1.00 out of 1.00

Let X represent the amount of time it takes a student to park in the library parking lot at the university. If we know that the distribution of parking times can be modelled using an exponential distribution with a mean of 4 minutes, find the probability that it will take a randomly selected student more than 10 minutes to park in the library lot. a. 0.670320

- b. 0.329680
- oc. None of the other choices is correct
- d. 0.082085
- e. 0.917915

Your answer is correct.

Question Z I	
Correct	
Mark 1.00 out of 1.00	
If z is the standard normal random variable, what is $p(z < 0.275)$?	
○ a. 0.5683	
⊚ b. 0.6083	•

c. 0.6983

d. 0.7983

Correct

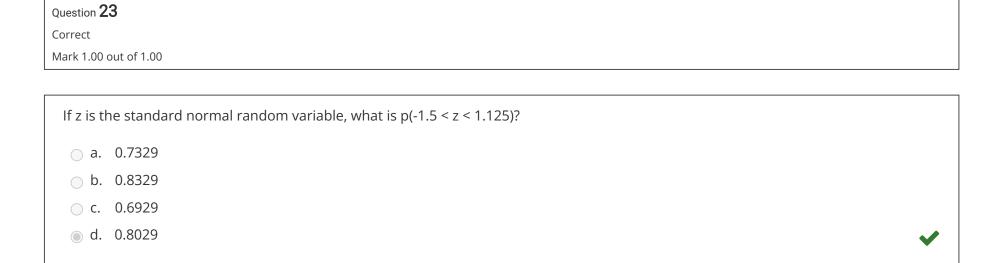
Mark 1.00 out of 1.00

A salesperson knows that 20% of her presentations result in sales. Use the normal approximation formula for the Binomial distribution to find the probabilities that in the next 60 presentations at least 9 result in sales.

Let P(Z < -1.13) = 0.1268 and P(Z < -0.81) = 0.2089.

- a. None of the other choices is correct
- b. 0.8732
- c. 0.6421
- d. 0.7911
- e. 0.1241

Your answer is correct.



Correct

Mark 1.00 out of 1.00

At a computer manufacturing company, the actual size of computer chips is normally distributed with a mean of 1 centimeter and a standard deviation of 0.1 centimeter. A random sample of 12 computer chips is taken. What is the probability that the sample mean will be below 0.95 centimeters?

Let P(Z < -1.73) = 0.04, P(Z < -0.34) = 0.36 and P(Z < 0) = 0.5.

- a. 0.64
- b. 0.96
- oc. None of the other choices is correct
- d. 0.04
- e. 0.36



Your answer is correct.

Question 25	
Correct	
Mark 1.00 out of 1.00	
The continuous random variable X has probability density function is $f(x)=e^{-x}$, x>0. Find P(X=2010).	
a. None of the others.	
○ b. 1	
	~
○ d. 1/e ⁻²⁰¹⁰	
The correct answer is: 0	
«	>>