

1. A fence is to be placed around a rectangular plot so that the enclosed area is 800 ft^2 and the length of the plot is twice the width. How many feet of fencing must be used?

- (a) 120 _____(correct)
(b) 100
(c) 135
(d) 125
(e) 144

2. A new television depreciates \$120 per year, and it is worth \$340 after four years. Find the value of this television when it was new.

- (a) 820 _____(correct)
(b) 810
(c) 890
(d) 780
(e) 800

3. If supply: $p = \sqrt{q + 10}$, demand: $p = 20 - q$, where p in dollars and q is the number of units. If (a, b) is the equilibrium point. Then $a + b = \dots$

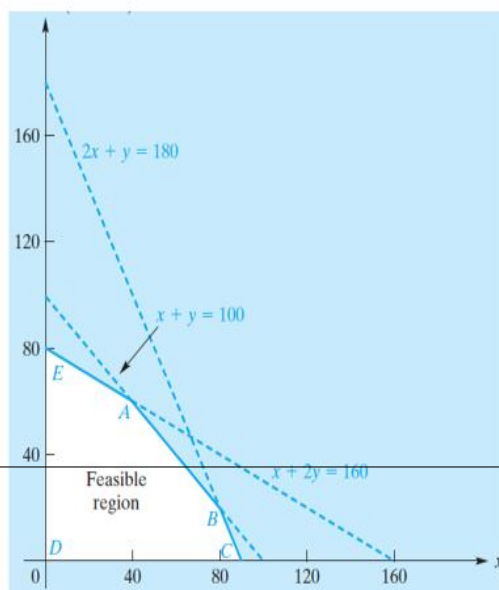
- (a) 20 _____(correct)
(b) 32
(c) 18
(d) 24
(e) 25

4. Using matrix reduction, solve
$$\begin{cases} x + 2y + 4z - 6 = 0 \\ 2z + y - 3 = 0 \\ x + y + 2z - 1 = 0 \end{cases}$$

The system has

- (a) no solution _____(correct)
(b) exactly one solution
(c) solution with one parameter
(d) solution with two parameters
(e) solution with three parameters

5. For the feasible region in the graph below. The maximum value of the objective function $P = 4x + y$ is



- (a) 360 _____ (correct)
 (b) 220
 (c) 340
 (d) 120
 (e) 80

6. Using the dual and the simplex method
 Minimize

$$Z = 2x_1 + x_2 + x_3$$

Subject to

$$\begin{aligned} 2x_1 - x_2 - x_3 &\leq 2 \\ -x_1 - x_2 + 2x_3 &\geq 4 \\ x_1, x_2, x_3 &\geq 0 \end{aligned}$$

$Z = \dots$

- (a) 2 _____ (correct)
 (b) 0
 (c) 4
 (d) 6
 (e) 8

7. A debt of \$5000 due five years from now and \$5000 due ten years from now is to be repaid by a payment of \$2000 in two years, a payment of \$4000 in four years, and a final payment at the end of six years. If the interest rate is 2.5% compounded annually, how much is the final payment?

- (a) 3244.63 _____(correct)
(b) 3243.96
(c) 3244.15
(d) 3243.73
(e) 3243.18

8. If \$10,000 is used to purchase an annuity consisting of equal payments at the end of each year for the next four years and the interest rate is 6% compounded annually, find the amount of each payment.

- (a) 2885.91 _____(correct)
(b) 2885.51
(c) 2884.15
(d) 2885.11
(e) 2884.43

9. A waiter takes the following order from a table with seven people: three hamburgers, two cheeseburgers, and two steak sandwiches. Upon returning with the food, he forgets who ordered what item and simply places an item in front of each person. In how many ways can the waiter do this?

- (a) 210 _____(correct)
(b) 200
(c) 220
(d) 230
(e) 240

10. If E and F are events for an experiment, then

$$(E \cap F) \cup (E \cap F') = \dots$$

- (a) E _____(correct)
(b) \emptyset
(c) F
(d) E'
(e) F'

11. If $P(E) = 0.2$, $P(F) = 0.3$, and $P(E \cap F) = 0.1$, then $P(E \cup F') = \dots$.

- (a) 0.8 _____(correct)
- (b) 0.9
- (c) 0.6
- (d) 0.2
- (e) 0.1

12. A manufacturer of toys has four assembly lines: A , B , C , and D . The percentage of output produced by the lines are 30%, 20%, 35%, and 15%, respectively, and the percentages of defective units they produce are 6%, 3%, 2%, and 5%. If a toy is randomly selected from stock, what is the probability that it is defective?

- (a) 0.0385 _____(correct)
- (b) 0.0415
- (c) 0.0396
- (d) 0.0422
- (e) 0.0429

13. If events E and F are independent with $P(E) = 1/7$ and $P(E \cup F) = 7/9$. Then $P(F) = \dots$

- (a) $\frac{20}{27}$ _____(correct)
- (b) $\frac{33}{45}$
- (c) $\frac{31}{54}$
- (d) $\frac{30}{49}$
- (e) $\frac{36}{49}$

14. If two fair coins are tossed. Let E be the event "at most one head" and F be the event "exactly one head." Then

- (a) E and F are dependent _____(correct)
- (b) E and F are independent
- (c) E and F are mutually exclusive
- (d) $P(E) = 1/2$
- (e) $P(F) = 1/4$

15. The random variable X has the following distribution:

x	$P(X=x)$
2	0.1
4	$5a$
6	$4a$

Find μ .

- (a) 4.6 _____(correct)
- (b) 5.6
- (c) 6.4
- (d) 6.5
- (e) 5.5

16. A landscaper earns \$200 per day when working and loses \$30 per day when not working. If the probability of working on any day is $4/7$, find the landscaper's expected daily earnings.

- (a) 101.43 _____(correct)
- (b) 110.26
- (c) 105.32
- (d) 99.62
- (e) 115.52

17. If X is binomial random variable, $n = 6$ is the number of trials, and $p = 2/3$ is the probability of success on any trial. $P(X \geq 2) = \dots$

- (a) 0.982 _____(correct)
- (b) 0.912
- (c) 0.843
- (d) 0.849
- (e) 0.892

18. In a large production lot of electronic devices, it is believed that one-fifth are defective. If a sample of six is randomly selected, find the probability that no more than one will be defective.

- (a) 0.655 _____(correct)
- (b) 0.698
- (c) 0.565
- (d) 0.566
- (e) 0.617

19. If X is normally distributed with $\mu = 200$ and $\sigma = 40$, find $P(190 < X < 250)$.
- (a) 0.4931 _____(correct)
(b) 0.4921
(c) 0.4892
(d) 0.4822
(e) 0.4911
20. The scores on a national achievement test are normally distributed with mean 500 and standard deviation 100. What percentage of those who took the test had a score between 300 and 700?
- (a) 95% _____(correct)
(b) 90%
(c) 89%
(d) 88%
(e) 68%

21. The set of data that has mean=median=mode is

- (a) 3,3,3,1,5 _____(correct)
- (b) 3,1,1,1,9
- (c) 8,1,1,3,2
- (d) 1,2,3,4,5
- (e) 3,3,4,4,1

22. A class of ten students had a math exam out of 100. Three of them got 70, another three got 80 and four got 90. The class standard deviation is= ...

- (a) 8.3 _____(correct)
- (b) 3.5
- (c) 1.3
- (d) 6.5
- (e) 4.7