1. The solution to the following linear programming problem
Minimize

Ex. 7.3 Q #1

$$Z = 6x + 14y$$

subject to the constraints

$$\begin{aligned} 14x + 7y &\geq 43 \\ 3x + 7y &\geq 21 \\ -x + y &\geq -5 \\ x, y &\geq 0 \end{aligned}$$

is

(a) $x = 2\left(1 + \frac{9}{5}t\right),\ y = \frac{1}{7}\left(15 - \frac{54}{5}t\right),\ 0 \leq t \leq 1$ _____(correct)

(b) $x = 2\left(\frac{9}{5} + t\right),\ y = \frac{1}{7}\left(\frac{54}{5} - 15t\right),\ 0 \leq t \leq 1$

(c) $x = \frac{1}{7}\left(\frac{54}{5} - 15t\right),\ y = \left(\frac{9}{5} + t\right),\ 0 \leq t \leq 1$

(d) $x = \left(15 - \frac{54}{5}t\right),\ y = \left(7t + \frac{9}{5}\right),\ 0 \leq t \leq 1$

(e) $x = 2(1 - t),\ y = \frac{1}{7}(15 - t),\ 0 \leq t \leq 1$

2. The solution to the following linear programming problem
Maximize

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$$Z = 2x + 4y$$

subject to the constraints

$$\begin{aligned} x - 4y &\leq -8 \\ x + 2y &\leq 16 \\ x, y &\geq 0 \end{aligned}$$

is

(a) $x = 8 - 8t,\ y = 4 + 4t,\ 0 \leq t \leq 1$ _____(correct)

(b) $x = 8 + 8t,\ y = 1 + t,\ 0 \leq t \leq 1$

(c) $x = 1 + t,\ y = 1 - t,\ 0 \leq t \leq 1$

(d) $x = 8 - t,\ y = 4 + t,\ 0 \leq t \leq 1$

(e) $x = 8,\ y = 4,$ or $x = 0,\ y = 8$

3. If the simplex tableau for standard **maximization problem** is set as shown below

	x_1	x_2	s_1	s_2	s_3	R
s_1	0	1	2	-1	0	5
x_1	1	$\frac{1}{2}$	0	$\frac{1}{2}$	0	$\frac{35}{2}$
s_3	0	$\frac{5}{2}$	0	$\frac{3}{2}$	1	$\frac{129}{2}$
Z	0	$\frac{-3}{2}$	0	$\frac{5}{2}$	0	$\frac{175}{2}$

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then Z has maximum value at $(x_1, x_2, s_1, s_2, s_3) =$

(a) $(15, 5, 0, 0, 52)$ _____ (correct)
(b) $(5, 15, 0, 0, 52)$
(c) $(3, 1, 52, 0, 0)$
(d) $(15, 0, 52, 0, 0)$
(e) $(52, 0, 15, 0, 0)$

4. Consider the following linear programming problem
Maximize

$$Z = 2x_1 + x_2$$

subject to

$$-x_1 + x_2 \leq 4$$
$$x_1 + x_2 \leq 6$$
$$x_1, x_2 \geq 0$$

Q #2
Ex. 7.4

If $x_1 = A$, and $x_2 = B$ then $A + B =$

(a) 6 _____ (correct)
(b) 4
(c) 8
(d) 9
(e) 10

5. If the last simplex tableau for a **dual maximization problem** is set as

	y_1	y_2	y_3	s_1	s_2	R
y_2	0	1	$\frac{-20}{9}$	$\frac{4}{9}$	$\frac{-1}{9}$	$\frac{2}{3}$
y_1	1	0	$\frac{13}{9}$	$\frac{1}{9}$	$\frac{2}{9}$	$\frac{2}{3}$
w	0	0	20	4	6	20

Exercise 7.8 Q # 10

then the solution for **Primal minimization** problem is

(a) $x_1 = 4,\ x_2 = 6$ _____(correct)

(b) $x_1 = \frac{2}{3},\ x_2 = \frac{2}{3}$

(c) $x_1 = 20,\ x_2 = 4$

(d) $x_1 = 6,\ x_2 = 4$

(e) $x_1 = 4,\ x_2 = 20$

6. Consider the following linear programming problem
minimize

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

Exercise 7.8 Q # 14

subject to

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

In the initial-simplex tableau of **dual problem**, the entering and departing variables are respectively

(a) y_2 and s_3 _____(correct)

(b) y_2 and s_1

(c) y_1 and s_3

(d) y_1 and s_2

(e) y_2 and s_2

7. How many years will it take for money to triple at the effective rate of r?

(a) $\dfrac{\ln(3)}{\ln(1+r)}$ (correct)

(b) $\dfrac{\ln(1+r)}{\ln(3)}$

(c) $\ln(3)\ln(1+r)$

(d) $\ln(3)\ln(r)$

(e) $\ln(3+r)$

Q # 14
Exercise 5.1

8. An investor has a choice of investing a sum of money at 8% compounded annually or at 7.8% compounded semiannually. Which of the following statement(s) is (are) **True**?

I. The investment at 8% compounded annually is better
II. The investment at 7.8% compounded semiannually is better
III. 7.8% gives high effective rate
IV. 8% gives high effective rate

(a) I and IV (correct)

(b) only I

(c) only IV

(d) only II

(e) I and III

Q # 21
Exercise 5.1

9. A debt of \$3500 due in four years and \$5000 due in six years is to be repaid by a single payment of \$1500 now and three equal payments that are due each consecutive year from now. If the interest rate is 7% compounded annually, how much are each of the equal payments?

Exercise 5.2 Q # 8

(a) \$1715.44 (correct)

(b) \$1175.44

(c) \$7115.44

(d) \$5117.44

(e) \$7551.44

10. Suppose that you can invest \$25000 in a business that guarantees you cash flow \$8000, \$10,000, \$14000 at the end of years 6,8 and 12 respectively.
Assume an interest rate of 2.5% compounded annually. Then which of the following statement(s) is (are) **True**?

I. Net present value is positive
II. Net present value is negative
III. Investment is profitable
IV. Investment is not profitable

Exercise 5.2 Q # 19

(a) I and III (correct)

(b) II and III

(c) I and IV

(d) III is only

(e) I is only

11. What approximate annual rate compounded continuously is equivalent to nominal rate of 6% compounded monthly.

(a) 5.99% _____ (correct)

(b) 5.91%

(c) 0.5%

(d) 5.90%

(e) 5.0%

Exercise 5.3
Q # 16

12. A trust fund is being set up by a single payment so that at the end of n years there will be \$A in the fund. If interest is compounded continuously at annual rate of 4.5%, then how much money should be paid into the fund initially?

(a) $Ae^{-0.045n}$ _____ (correct)

(b) $ne^{-0.045A}$

(c) $Ae^{0.045n}$

(d) $A(1.045)^n$

(e) $A(1.045)^{-n}$

Exercise 5.3
Example 3

13. What is the approximate the present value of an annuaity of \$1500 per month for 1.25 years at the rate of 9% compounded monthly?

(a) \$21,205.49 Exercise 5.4 Q # 8 (correct)
(b) \$3779.83
(c) \$22,105.94
(d) \$502,21.49
(e) \$49.21205

14. For an interest rate of 4% compounded monthly find the present value of an annuity of \$150 at the end of each month for eight months and \$175 thereafter at the end of each month for further two years.

(a) \$5106.27 Exercise 5.4 Q # 17 (correct)
(b) \$4121.10
(c) \$5500.33
(d) \$5421.10
(e) \$4521.27

15. A combination lock has 26 different letters, and a sequence of three different letters must be selected for the lock to open. How many combinations are possible?

(a) 15600 _____ (correct)

(b) 2600

(c) 10,626

(d) 1771

(e) 3654

Q #26
Exercise 8-1

16. A university issues a questionnaire whereby each student must rank the four items with which he or she is most satisfied. The items are: tuition fees, parking fees, class sizes, dormitory rooms, cafeteria food and library. The rank is to be indicated by the numbers 1,2,3 and 4. Where 4 indicates the item involving the greatest satisfaction and 1 the least. In how many ways can a student answer the questionnaire?

(a) 360 _____ (correct)

(b) 15

(c) 24

(d) 210

(e) 36

Q #27
Exercise 8-1

17. In how many different ways can a exam be answered? The exam consists of five MCQ's with five choices for each MCQ and five true-false questions.

(a) 100000 _____(correct)

(b) 78125

(c) 2048

(d) 2500

(e) 10000

Example 3
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18. In a horse race, a horse is said to finish in the money if it finishes in first, second or third place. For an eight-horse race, in how many ways can the horses finish in the money? Assume no ties.

(a) 56 _____(correct)

(b) 336

(c) 60

(d) 10

(e) 65

Q # 10
Exercise 8-2

19. In a 20-question examination, each question is worth 5 points and is graded right or wrong. Considering the individual questions, in how many ways can a student score more than 80 points?

(a) 1351 (correct)
(b) 1350
(c) 6201
(d) 5311
(e) 1331

Question #15
Exercise 8-2

20. A committee has three male and five female members. In how many ways can a subcommittee of four be selected if at least two females are to serve on it?

Q # 34
Exercise 8-2

(a) 65 (correct)
(b) 25
(c) 41
(d) 52
(e) 55