



PRACTICE PROBLEM SET FOR MATH PLACEMENT TEST FOR BUSINESS

Fall 2014

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DEPARTMENT HEAD'S MESSAGE

Dear Student:

While the Department of Mathematics and Statistics at the American University of Sharjah promotes the use of appropriate technology in teaching mathematics it believes that technology should not compromise the development of necessary mathematical thinking. The department faculty members who teach first year mathematics courses have been observing the extensive use of calculators by students in solving the very basic and simple mathematical problems. There was clear evidence that students were unable to demonstrate sufficient understanding of the underlying principles. The failing rates in these courses were rising.

The department took careful measures to examine the use of calculators in first year mathematics courses at AUS and in mathematics placement tests. Several factors were considered in the investigation. As a result, it was decided that calculators should be disallowed in all mathematics placement tests. Consequently the placement test has been redesigned to measure and predict students' success in first year mathematics courses at AUS. It is not formulated after any particular high school curriculum. Students with adequate mathematical skills in algebra and basic mathematics should be able to easily answer the test questions without the aid of calculators.

The attached problem set is for your practice and preparation of the placement test. To increase your chance of passing the test, you are urged to solve the questions without the aid of calculators. You are advised to spend no more than three minutes per question.

Good luck

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IMPORTANT

1. THIS PLACEMENT TEST IS ONLY FOR:

- ✓ All Business and Management majors (Accounting, MIS, Management, Marketing, etc.)
- ✓ Design Management major
- ✓ International Studies
- ✓ Economics/Public Administration

2. INSTRUCTIONS (READ CAREFULLY)

- ✓ The test consists of 30 questions. Each question is followed by five suggested answers designated by (A), (B), (C), (D) and (E).
- ✓ Calculators are not allowed
- ✓ Spend no more than three minutes per question

Question 1: If n is an odd integer, which of the following must be an odd integer?

- A) $n - 1$
- B) $n + 1$
- C) $2n$
- D) $3n + 1$
- E) $4n + 1$

Question 2: Simplify the expression $(7x^3 + 2x^2 - x + 4) - (5x^3 - 4x^2 - 3x + 4)$

- A) $2x(x^2 + 3x)$
- B) $2(x^3 - x^2 - 2x + 4)$
- C) $2x(x^2 + 3x + 1)$
- D) $2x^2(x^4 + 6x^2 + 2)$
- E) $2(x^3 + 3x^2 + x + 4)$

Question 3: Which of the following is equivalent to $(y - 5)(2y^2 + 2y + 3)$?

- A) $2y^3 - 8y^2 - 7y - 15$
- B) $2y^2 + 3y - 2$
- C) $2y^3 - 10y + 3$
- D) $2y^2 + y + 8$
- E) $2y^3 + 2y^2 - 15$

Question 4: Perform the indicated operation and reduce the answer to lowest terms:

$$\frac{2}{x^2 + x - 6} - \frac{1}{x^2 - 9}$$

- A) $\frac{1}{(x + 3)(x - 2)(x - 3)}$
- B) $x^2 - x - 12$
- C) $\frac{(x - 4)}{(x + 3)(x - 2)(x - 3)}$
- D) $\frac{1}{(x^2 + x - 6)(x^2 - 9)}$
- E) $\frac{1}{x + 3}$

Question 5: Divide the following and reduce the answer to the lowest terms:

$$\frac{8a^2 - 6a - 9}{6a^2 - 5a - 6} \div \frac{4a^2 + 11a + 6}{9a^2 - 4}$$

- A) $\frac{(4a + 3)^2}{(3a + 2)^2}$
- B) $\frac{a + 2}{3a + 2}$
- C) $\frac{2a - 3}{a + 2}$
- D) $\frac{4a^2 + 11a + 6}{9a^2 - 4}$
- E) $\frac{4a + 3}{3a + 2}$

Question 6: Simplify the expression

$$\frac{(27a^3b^6)^{1/3}}{(81a^8b^{-4})^{1/4}}$$

- A) $\frac{b}{a}$
- B) $\frac{b^3}{a}$
- C) $\frac{a}{b}$
- D) $\frac{a}{b^3}$
- E) None of these

Question 7: Simplify the expression

$$\sqrt[3]{\frac{27x^6y^3}{2z^2}}$$

- A) $\frac{3x^2y}{2z^2} \sqrt[3]{2x^2}$
- B) $\frac{3x^2y \sqrt[3]{x^2}}{2z^2}$
- C) $\frac{3x^2y \sqrt[3]{4z^2}}{2z^2}$
- D) $\frac{3x^2y \sqrt[3]{4z}}{2z}$
- E) None of these

Question 8: Simplify the expression $\sqrt[3]{81} + 3\sqrt[3]{24}$

- A) 12
- B) $9\sqrt[3]{3}$
- C) $\sqrt[3]{105}$
- D) 9
- E) None of these

Question 9: Rationalize the expression

$$\frac{\sqrt{3} - \sqrt{6}}{\sqrt{3} + \sqrt{6}}$$

- A) $\frac{-1 - 2\sqrt{18}}{3}$
- B) $\frac{-3 - 2\sqrt{18}}{9}$
- C) $-3 + 2\sqrt{2}$
- D) $9 - 2\sqrt{18}$
- E) None of these

Question 10: Which of the following expressions cannot be factored?

- (I) $2x^2 + 9$
 - (II) $x^2 + x + 1$
 - (III) $x^2 - 5x + 6$
 - (IV) $x^2 + 1$
 - (V) $x^2 - 1$
- A) All of them
 - B) III, IV
 - C) I, II, III, V
 - D) I, II, IV
 - E) None of these

Question 11: Factor completely the expression $9x^2 - 25$

- A) $(9x - 5)(9x + 5)$
- B) $(3x - 5)(3x - 5)$
- C) $(3x - 5)(3x + 5)$
- D) $(3x - 5)^2$
- E) None of these

Question 12: The price of a house increased by 7%. If the new price is \$107,000, what was the original cost of the house?

- A) \$100,000
- B) \$114,490
- C) \$99,510
- D) \$93,000
- E) None of these

Question 13: Which of the following equations is (are) linear?

- (I) $x = 6$
- (II) $9x - 6y^2 = 2$
- (III) $7x - 2y = 4$
- (IV) $y = \frac{3}{4}x$
- (V) $\frac{y}{x} = 3x + 2$
- (VI) $y = 2$

- A) I, VI
- B) II, III
- C) VI, V
- D) I, III, IV, VI
- E) II only

Question 14: Solve for x the expression

$$\frac{2}{3}\left(x + \frac{a}{6}\right) - 9 = \frac{1}{9}a - 3\left(\frac{a}{4} - \frac{x}{2}\right)$$

A) $\frac{9a}{10} - \frac{54}{5}$

B) There is no solution

C) $\frac{9a + 54}{10}$

D) $\frac{10x + 108}{9}$

E) None of these

Question 15: Solve for P the equation $P = A - Prt$

A) $P = A - Prt$

B) $P = \frac{A}{rt}$

C) $\frac{A}{1+rt}$

D) $\frac{A}{2rt}$

E) None of these

Question 16: Solve for x the following equation:

$$\frac{1}{3x - 6} = \frac{3}{5x + 1}$$

A) $\frac{19}{4}$

B) $-\frac{7}{2}$

C) $\frac{1}{2}$

D) $\frac{-17}{4}$

E) None of these

Question 17: If $x^2 + 10x = -25$, which of the following is a value for $x^2 - x$?

- A) 5
- B) -20
- C) 30
- D) -5
- E) 20

Question 18: If $t = e^{x+2}$ then $x =$

- A) $2 + \ln(t)$
- B) $\frac{t+2}{e}$
- C) $\frac{t}{e}$
- D) $\ln(t - 2)$
- E) $\ln(t) - 2$

Question 19: Solve the logarithmic equation $\log_2(x) = -3$

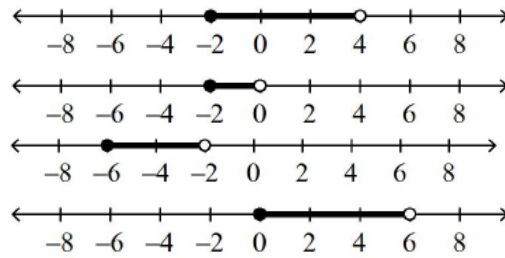
- A) $\frac{1}{6}$
- B) 8
- C) -8
- D) $\frac{1}{8}$
- E) None of these

Question 20: Find the solution of the inequality $\frac{3}{2}(5x - 2) < \frac{4}{3}(2x + 5)$

- A) $x < 2$
- B) $x > 2$
- C) $x < 12$
- D) $x > 12$
- E) None of these

Question 21: Solve the double inequality $-8 \leq 2x - 4 < 4$ and graph the solution set:

- A) $-2 \leq x < 4$
- B) $-2 \leq x < 0$
- C) $-6 \leq x < -2$
- D) $0 \leq x < 6$
- E) None of these



Question 22: Solve the inequality $|12 + 3x| > 21$

- A) $(-\infty, -11) \cup (3, \infty)$
- B) $(-11, 3)$
- C) $(3, \infty)$
- D) $(-\infty, \infty)$
- E) None of these

Question 23: The inequality $x^2 - 14x > 15$ is equivalent to

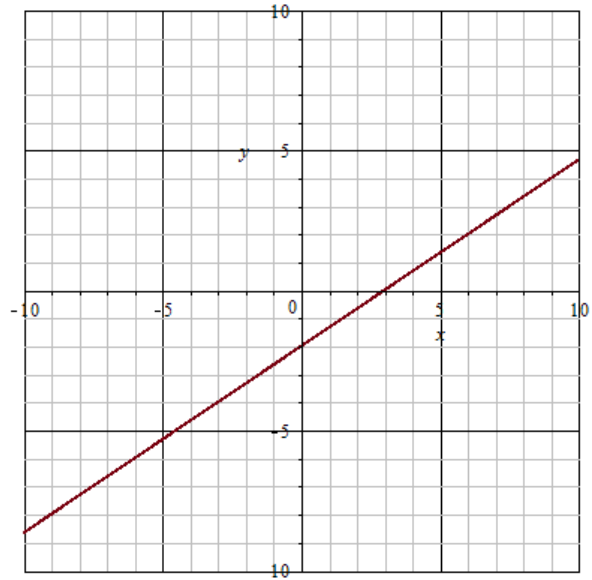
- A) $-3 < x < 5$
- B) $-1 < x < 15$
- C) $3 < x < 5$
- D) $x < -1$ or $x > 15$
- E) $x < 3$ or $x > 5$

Question 24: What is the slope of the line $x = 7$?

- A) 7
- B) 0
- C) undefined
- D) $\frac{1}{7}$
- E) None of these

Question 25: Which of the following equations represents the line graphed?

- A) $2x + 3y = 6$
- B) $3x + 2y = 6$
- C) $3x - 2y = 6$
- D) $2x - 3y = 6$
- E) $3x - 2y = -6$



Question 26: If a car rental agency charges \$15 per day plus \$0.30 per kilometer, which of the following is an expression for the total charges in dollars of renting a car for one day and driving m kilometers?

- A) $15 + 0.30m$
- B) $15m + 0.30$
- C) $15.30m$
- D) $15 + 3m$
- E) $0.30m$

Question 27: $9x(4x - 1)(3x + 2) = 0$ then $x =$

- A) $-\frac{2}{3}, 0, \frac{1}{4}$
- B) $-\frac{2}{3}, \frac{1}{4}$
- C) $-\frac{3}{2}, 0, 4$
- D) $-\frac{3}{2}, 0, \frac{1}{4}$
- E) None of these

Question 28: If $f(x) = 3x^2 + 3x + 7$ then $f(k - 1) =$

- A) $3k^2 + 24k + 13$
- B) $-3k^2 + 3k + 7$
- C) $3k^2 - 3k + 7$
- D) $3k^2 - 3k + 13$
- E) None of these

Question 29: The function $f(x) = \frac{x+2}{(x-1)(3x+4)}$ is defined for

- A) All real numbers except for $x = -2$, $x = -\frac{4}{3}$ and $x = 1$
- B) All real numbers except $x = -\frac{4}{3}$ and $x = 1$
- C) All real numbers except $x = -2$ and $x = -\frac{4}{3}$
- D) All real numbers except $x = -2$ and $x = 1$
- E) None of these

Question 30: A car salesman received a weekly salary of W dollars plus a 6% commission on his total sales S , which expression best describes his weekly pay?

- A) $W + S$
- B) $0.6(W + S)$
- C) $0.06W + S$
- D) $W + 0.06S$
- E) $W + 6S$

ANSWERS

Question #	Answer
1	E
2	C
3	A
4	C
5	C
6	B
7	D
8	B
9	C
10	D
11	C
12	A
13	D
14	A
15	C
16	A
17	C
18	E
19	D
20	A
21	A
22	A
23	D
24	C
25	D
26	A
27	A
28	C
29	B
30	D