

Mathematics and Statistics

Homework 1: Basic Algebraic Operations

Student Name:

Student ID:

Q1: Select the correct classification for each number

The number	The number set				
	N :Natural	Z :Integer	Q :Rational	I :Irrational	R :Real
7	☒ N	☒ Z	☒ Q	☐ I	☒ R
-15	☐ N	☒ Z	☒ Q	☐ I	☒ R
$\frac{5}{7}$	☐ N	☐ Z	☒ Q	☐ I	☒ R
3.75	☐ N	☐ Z	☒ Q	☐ I	☒ R
$\sqrt{3}$	☐ N	☐ Z	☐ Q	☒ I	☒ R

Q2: Answer True or False

For all real numbers x, y, z, m and n , then

- $x + y = y + x$ (☒) الجمع عملية إبدال
- $(xy)z = (xy)z$ (☒)
- $(x \div y) \div z = (x \div y) \div z$ (☒)
- $\frac{x}{y} \cdot \frac{y}{x} = 1$ (☒) ضرب عدد مع مقلوبه إخراج يساوي 1
- The additive inverse of $\frac{x}{y}$ is $-\frac{y}{x}$ (☒) المقلوب جمع - $\frac{x}{y}$ = $\frac{x}{y}$
- $(x^m)^n = x^{m+n}$ (☒) قوى مرتفعة لقوى تضرب الأسس
- $\frac{x^m}{x^n} = x^{m-n}$, where $x \neq 0$ (☒) الأساسيات بينهم قسمه نخرج الأس
- $\sqrt{x+y} = \sqrt{x} + \sqrt{y}$, where x and y are positive. (☒)
- $\sqrt{xy} = \sqrt{x} \cdot \sqrt{y}$, where x and y are positive. (☒)
- $(x+y)^3 = x^3 + y^3$ (☒) مفكوك الحجب $x^3 + 3x^2y + 3xy^2 + y^3$ الاسم

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Q3: Select the correct answer:

1. The additive identity of the real number is

- (a) 1 (b) 0 (c) -1 (d) none of these
-

2. The multiplicative identity of the real numbers is

- (a) 1 (b) 0 (c) -1 (d) none of these
-

3. The additive inverse of 5 is *المعكوس الجمعي للعدد 5 هو -5*

- (a) -5 (b) 0 (c) 0.5 (d) none of these
-

4. The multiplicative inverse of $\frac{3}{2}$ is *المعكوس الضربي $\frac{3}{2}$ هو $\frac{2}{3}$*

- (a) $\frac{3}{2}$ (b) $\frac{1}{2}$ (c) $\frac{2}{3}$ (d) none of these
-

5. $-100(1 - 3x) = \dots\dots\dots$

- (a) $-100 + 3x$ (b) $300 + x$ (c) $100 - 300x$ (d) $-100 + 300x$
-

6. $\frac{100}{0} = \dots\dots\dots$ *المقام صفر.. إذن القيمة غير معروفة*

- (a) 100 (b) 0 (c) $\frac{1}{100}$ (d) ∞
-

7. $(\frac{3}{8})^{-1} = \dots\dots\dots$ *نقلب الكسر*

- (a) $\frac{3}{8}$ (b) $\frac{8}{3}$ (c) 0 (d) ∞
-

8. $(x^2)^0 = \dots\dots\dots$ *حرفه لا يس حعفر.. إذن = 1*

- (a) x^2 (b) 0 (c) 1 (d) x^{20}
-

9. $2^{-4} = \dots\dots\dots$ *$\frac{1}{2^4}$*

- (a) 16 (b) $\frac{1}{16}$ (c) 8 (d) none of these
-

10. $\sqrt[3]{-27} = \dots\dots\dots$

- (a) 3 (b) -3 (c) -1 (d) It is not a real number
-

11. $\sqrt[4]{-16} = \dots\dots\dots$

- (a) 2 (b) -2 (c) -1 (d) It is not a real number
-

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12. Which of the following is not a polynomial?

- (a) $x^2 + 2x$ (b) $x^3 + x^2$ (c) $x^{-2} + \sqrt{x}$ (d) $x^3 + 1$
-

13. The degree of the polynomial $x^3 + 4x^2 + 5x + 1$ is

- (a) 2 (b) 3 (c) 4 (d) 5
-

14. The degree of the polynomial $xy + x^2y^2 + x^2y^3$ is

- (a) 2 (b) 3 (c) 4 (d) 5
-

15. Simplify: $\frac{2}{3} + \frac{4}{5} = \dots\dots\dots$

- (a) $\frac{22}{15}$ (b) $\frac{10}{15}$ (c) $\frac{8}{15}$ (d) none of these
-

16. Simplify: $5 - \frac{2}{3} = \dots\dots\dots$

- (a) $\frac{13}{3}$ (b) $\frac{15}{3}$ (c) $\frac{10}{3}$ (d) none of these
-

17. Simplify: $\frac{3}{4} \cdot \frac{2}{5} = \dots\dots\dots$

- (a) $\frac{6}{20}$ (b) $\frac{3}{10}$ (c) $\frac{5}{8}$ (d) none of these
-

18. Simplify: $\frac{3}{4} \div \frac{2}{5} = \dots\dots\dots$

- (a) $\frac{3}{8}$ (b) $\frac{15}{8}$ (c) $\frac{8}{3}$ (d) none of these
-

19. Simplify: $(\frac{1}{2} + \frac{3}{4})^{-1} = \dots\dots\dots$

- (a) $\frac{4}{5}$ (b) $\frac{5}{4}$ (c) $\frac{1}{5}$ (d) none of these
-

20. Simplify: $\sqrt{\frac{9}{25}} = \dots\dots\dots$

- (a) $\frac{3}{5}$ (b) $\frac{5}{3}$ (c) 1 (d) none of these
-

21. Simplify: $\sqrt{32} + \sqrt{8} - \sqrt{2} = \dots\dots\dots$

- (a) $3\sqrt{2}$ (b) $4\sqrt{2}$ (c) $5\sqrt{2}$ (d) none of these
-

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22. Simplify: $\frac{\sqrt{50}+\sqrt{2}}{\sqrt{18}} = \dots\dots\dots$

(a) $\frac{1}{2}$

(b) 2

(c) $\sqrt{2}$

(d) none of these

23. Simplify: $(2x^3y^{-3})(3x^2y^3) = \dots\dots\dots$

(a) $6x^5$

(b) $6x^5y^{-6}$

(c) $6x^5y$

(d) none of these

24. Simplify: $\frac{8x^4y^3z}{4x^2y^5z^{-1}} = \dots\dots\dots$

(a) $\frac{2x^2y^2}{z^2}$

(b) $\frac{2x^2z^2}{y^2}$

(c) $2x^2y^2z^2$

(d) none of these

25. Simplify: $\sqrt{16x^4y^6} = \dots\dots\dots$

(a) $4x^2y^3$

(b) $4x^2y^2$

(c) $4xy^3$

(d) none of these

26. Factor: $x^2 - 16 = \dots\dots\dots$

فرق بين مربعين

(a) $(x - 3)(x - 3)$

(b) $(x + 3)(x + 3)$

(c) $(x - 3)(x + 3)$

(d) none of these

27. Factor: $x^3 - 8 = \dots\dots\dots$

فرق بين مكعبين

(a) $(x - 2)(x + 4)$

(b) $(x - 2)(x^2 + 2x + 4)$

(c) $(x - 2)(x^2 - 2x + 4)$

(d) none of these

28. Factor: $x^2 + 4x + 4 = \dots\dots\dots$

تحليل من الدرجة الثانية
مربع كامل

(a) $(x + 2)^2$

(b) $(x + 2)(x + 4)$

(c) $(x - 2)(x + 2)$

(d) none of these

29. Factor: $x^2 - 5x + 6 = \dots\dots\dots$

تحليل من الدرجة الثانية

(a) $(x - 3)(x - 2)$

(b) $(x + 3)(x - 2)$

(c) $(x - 3)(x + 2)$

(d) none of these

30. Factor: $2x^2 + 5x - 12 = \dots\dots\dots$

تحليل من الدرجة الثانية

(a) $(2x - 3)(x + 4)$

(b) $(2x + 4)(x - 3)$

(c) $(2x + 3)(x + 4)$

(d) none of these
