بسم الله الرحمن الرحيم

تدريبات (٢) للامتحان النهائي

Question 1: (40 points)

Choose the correct answer, write your answer in the table below:

1. The degree of the polynomial $4x-5$ is:

   a) 4   b) 5   c) 0   d) 1

2. One of the following numbers hasn't a reciprocal:

   a) 1   b) 0   c) $\sqrt{2}$ d) $-\dfrac{1}{2}$

3. The **y − intercept** for the line $y=5$ is:

   a) $(0,5)$ b) $(5,0)$ c) $(0,0)$ d) $(5,5)$

4. $(a-b)^2 =$

   a) a^2-b^2 b) $a^2-2ab+b^2$ c) a^2+b^2 d) $a^2+2ab+b^2$

5. The equation of the line passing through the points $(2,2)$ and $(3,3)$ is:

   a) $y=3x+3$ b) $y=2x+2$ c) $y=x$ d) $y=5x+5$

6. The solution set for the equation $2|x| = -4$ is :

a) ϕ

b) $\{-2\}$

c) $\{2\}$

d) $\{2, -2\}$

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7. The second coordinate is always negative in quadrants:

a) I and II

b) II and III

c) I and IV

d) III and IV

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8. The simplification of $8^{\frac{1}{3}}$ is:

a) $\dfrac{8}{3}$

b) 2

c) $\dfrac{3}{8}$

d) $\dfrac{1}{8^3}$

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9. The set of numbers for which the rational expression $\dfrac{x^2 + 4}{x^2 - 4}$ is not defined is:

a) $\{4, -4\}$

b) $\{0, -4\}$

c) $\{2, -2\}$

d) $\{0, 4\}$

10. The result of $\sqrt{-8}$ is :

a) $2\sqrt{2}$ 　　　　b) $-2\sqrt{2}$ 　　　　c) $-2\sqrt{2}i$ 　　　　d) $2\sqrt{2}i$

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11. The factorization of x^2+5x+4 is:

a) $(x+4)(x+1)$ 　　b) $(x+5)(x-1)$ 　　c) $(x+4)(x+5)$ 　　d) $(x-4)(x-1)$

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12. The Least common multiple (LCM) of $12x^6$ and $20x^2$ is:

a) $240x^8$ 　　　　b) $2x$ 　　　　c) $4x^2$ 　　　　d) $60x^6$

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13. The domain of the function $f(x)=\dfrac{\sqrt{2x-8}}{5}$ is:

a) $\{x \mid x$ is a real number and $x>4\}$ 　　　　b) $\{x \mid x$ is a real number and $x\neq 5\}$

c) $\{x \mid x$ is a real number and $x\geq 4\}$ 　　　　d) $\{x \mid x$ is a real number and $x\leq 4\}$

14. The interval notation for the set $\{x \mid -2 < x\}$ is:

a) $(-2, \infty)$

b) $(-\infty, -2]$

c) $(-\infty, -2)$

d) $[-2, \infty)$

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15. The solution set of the equation $x^2 - 3x - 18 = 0$:

a) $\{3, 6\}$

b) $\{-3, -6\}$

c) $\{-3, 6\}$

d) $\{3, -6\}$

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16. The result of the multiplication $(\sqrt{x} + 1)(\sqrt{x} - 1)$ is:

a) $x + 1$

b) $x - 1$

c) $\sqrt{x} - 1$

d) $2\sqrt{x}$

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17. If $f(x) = x^3 - x^2$, then $f(-1)$ is equal to:

a) 0

b) -1

c) -2

d) 2

18. The set $\left\{\dfrac{a}{b} \mid a \; \& \; b \in Z \text{ and } b \neq 0 \right\}$ is called the set of :

a) Integers   b) Whole numbers   c) Natural numbers   d) Rational numbers

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19. The opposite of $-\dfrac{4}{5}$ is:

a) $\dfrac{4}{5}$ b) $-\dfrac{4}{5}$ c) $\dfrac{5}{4}$ d) $-\dfrac{5}{4}$

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20. The scientific notation of the number 0.000541 is:

a) 5.41×10^{-4} b) 54.1×10^{-5} c) 5.41×10^{4} d) 54.1×10^{5}

Question 2: (6 points)

Perform and simplify the following:

1. $\dfrac{16}{x^2-1} + \dfrac{8}{x+1} - \dfrac{7}{x-1}$

$$= \dfrac{16 + 8(x-1) - 7(x+1)}{x^2-1}$$

$$= \dfrac{16 + 8x - 8 - 7x - 7}{x^2-1}$$

$$= \dfrac{x + 1}{x^2-1} = \dfrac{1}{x-1}$$

$$x^2 + 4x + 4 \qquad -2x - 2$$

$$= \frac{3(x+1)(x-2)(x+2)}{(x+2)(x+2)(-2)(x+1)}$$

$$= \frac{3(x-2)}{-2(x+2)}$$

Question 3: (8 points)

Solve the following equations:

1. $3x + 4(x+2) = 11 + 7x$

$$3x + 4x + 8 = 11 + 7x$$

$$3x + 4x - 7x = 11 - 8$$

$$0 = 3$$

$$x = \emptyset$$

2. $2x^2 + 2x + 5 = 0$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$= \frac{-2 \pm \sqrt{4 - 4(2)(5)}}{4}$$

$$= \frac{-2 \pm \sqrt{-36}}{4} \qquad = \frac{-2 \pm 6i}{4}$$

$$= \frac{-2}{4} + \frac{6i}{4} \quad , \quad \frac{-2 - 6i}{4}$$

$$x = -\frac{1}{2} + \frac{3}{2}i \quad , \quad -\frac{1}{2} - \frac{3}{2}i$$

Question 4: (8 points)

Solve the following inequalities:

1. $\dfrac{2}{3}x - \dfrac{1}{6} + \dfrac{1}{2}x \leq \dfrac{7}{6} + 2x$

$$\frac{4x + 3x - 12x}{6} \leq \frac{8}{6}$$

$$\frac{-5x}{6} \leq \frac{8}{6} \cdot \frac{6}{5}$$

$$-x \leq \frac{8}{5} \rightarrow x \geq -\frac{8}{5}$$

2. $|-2x-3| \geq 7$

$-2x-3 \geq 7$ or $-2x-3 \leq -7$

$-2x \geq 10$ $\qquad$ $-2x \leq -4$

$\dfrac{-2x}{-2} \leq \dfrac{10}{-2}$ $\qquad$ $\dfrac{-2x}{-2} \geq \dfrac{-4}{-2}$

$x \leq -5$ $\qquad$ $x \geq 2$

$(-\infty, -5]$ $\qquad$ $(2, \infty)$

Question 5: (8 points)

1. Graph the solution of the system
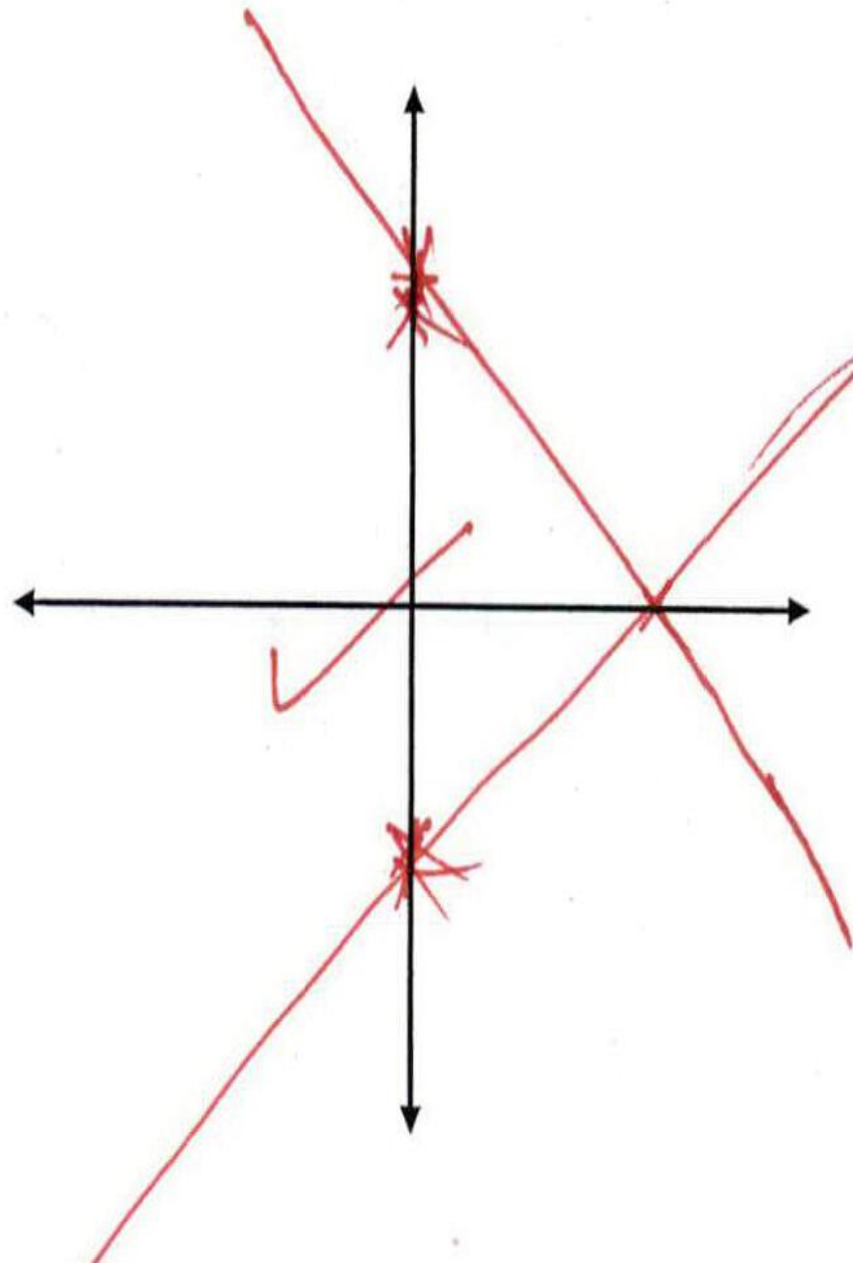
$$\begin{cases} x + y \leq 4 \\ x - y \leq 4 \end{cases}$$

$x + y \leq 4$

$(0, 4), (4, 0)$

$x - y \leq 4$

$(0, -4), (4, 0)$

2. Solve the system $\begin{cases} 2x - 3y = 5 \\ 4x + 5y = 6 \end{cases}$ using the <u>Elimination</u> method.

$$2(2x - 3y = 5)$$

$$-(4x + 5y = 6)$$

$$4x - 6y = 10$$

$$-4x - 5y = -6$$

$$0 - 11y = 4$$

$$\boxed{y = \frac{-4}{11}}$$

$$\left(\frac{43}{22} , \frac{-4}{11} \right)$$

$$4x + 5y = 6$$

$$4x + 5\left(\frac{-4}{11}\right) = 6$$

$$4x + \frac{-20}{11} = 6$$

$$4x = \frac{66}{11} + \frac{20}{11}$$

$$\frac{1}{4} \cdot 4x = \frac{86}{11} \cdot \frac{1}{4}$$

$$\boxed{x = \frac{86}{44} = \frac{43}{22}}$$