KINGDOM OF SAUDI ARABIA
MINSTRY OF HIGHER EDUCATION
JAZAN UNIVERSITY
Preparatory Year Deanship
Department of *Science-mathematics school*

المملكـة العربية السـعودية
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عمادة السنة التحضيرية
قسم العلوم - شعبة الرياضيات

Questions Bank for Faculty of Science Students
101 Math. Level I

CHAPTER R

Basic Algebraic Operations

R-1 Algebra and Real Numbers

R-2 Exponents and Radicals

R-3 Polynomials: Basic Operations

R-3 Factoring

Answer the following questions :

(1) $\left(\dfrac{2}{3}+\dfrac{3}{4}\right)^{-1} =$

(2) $\left(-\dfrac{2}{7}\right)\left(-\dfrac{7}{2}\right) =$

(3) $x^{-2}x^4 =$

(4) $-2x^2-(-2x)^2 =$

(5) $\left(\dfrac{x^{-2}}{y^2 y^{-2}}\right)^{-2} =$

(6) $\left(\dfrac{9}{25}\right)^{-\frac{1}{2}} =$

(7) $\left(9a^8 b^6 c^4\right)^{\frac{1}{2}} =$

(8) $(-8)^{\frac{4}{3}} =$

(9) $\left(\sqrt{x}+3\right)\left(\sqrt{x}-2\right) =$

(10) $\left(3x^3+2x^2-x+2\right)+\left(-3x^3+2x^2+x-2\right) =$

(11) $\left(2x+3y\right)^2 =$

(12) $\left(2x-y\right)\left(2x+y\right) =$

(1) $\left(\dfrac{4}{5}+\dfrac{3}{2}\right)^{-1} =$

(2) $\left(-\dfrac{6}{4}\right)\left(-\dfrac{4}{6}\right) =$

(3) $m^{-1}m^4 =$

(4) $-4x^2-(-4x)^2 =$

(5) $\left(\dfrac{y^{-2}}{x^2 x^{-2}}\right)^{-2} =$

(6) $\left(\dfrac{9}{16}\right)^{-\frac{1}{2}} =$

(7) $\left(25a^4 b^2 c^6\right)^{\frac{1}{2}} =$

(8) $(-27)^{\frac{2}{3}} =$

(9) $\left(\sqrt{m}+2\right)\left(\sqrt{m}-3\right) =$

(10) $\left(3x^3+2x^2+x+2\right)+\left(-3x^3-2x^2+x-2\right) =$

(11) $\left(2x-2y\right)^2 =$

(12) $\left(x-2y\right)\left(x+2y\right) =$

Answer the following questions :

(1) $\left(\dfrac{3}{2}+\dfrac{4}{3}\right)^{-1} =$

(2) $\left(-\dfrac{8}{5}\right)\left(-\dfrac{5}{8}\right) =$

(3) $y^{-3}y^4 =$

(4) $-3x^2 - (-3x)^2 =$

(5) $\left(\dfrac{x^{-3}}{y^3 y^{-3}}\right)^{-2} =$

(6) $\left(\dfrac{25}{9}\right)^{-\frac{1}{2}} =$

(7) $\left(27a^6 b^3 c^9\right)^{\frac{1}{3}} =$

(8) $(-8)^{\frac{5}{3}} =$

(9) $\left(\sqrt{y}+4\right)\left(\sqrt{y}-2\right) =$

(10) $\left(3x^3 + 2x^2 - x + 2\right) + \left(3x^3 - 2x^2 + x - 2\right) =$

(11) $\left(3x + 2y\right)^2 =$

(12) $\left(3x - y\right)\left(3x + y\right) =$

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(1) $\left(\dfrac{5}{4}+\dfrac{2}{3}\right)^{-1} =$

(2) $\left(-\dfrac{5}{2}\right)\left(-\dfrac{2}{5}\right) =$

(3) $u^{-4}u^6 =$

(4) $-5x^2 - (-5x)^2 =$

(5) $\left(\dfrac{y^{-3}}{x^3 x^{-3}}\right)^{-2} =$

(6) $\left(\dfrac{16}{9}\right)^{-\frac{1}{2}} =$

(7) $\left(8a^3 b^6 c^3\right)^{\frac{1}{3}} =$

(8) $(-27)^{\frac{4}{3}} =$

(9) $\left(\sqrt{n}+3\right)\left(\sqrt{n}-1\right) =$

(10) $\left(-3x^3 - 2x^2 - x + 2\right) + \left(3x^3 + 2x^2 + x + 2\right) =$

(11) $\left(3x - 3y\right)^2 =$

(12) $\left(x - 3y\right)\left(x + 3y\right) =$

Answer the following questions :

> $\left(-\dfrac{5}{3}\right) \cdot (\ldots\ldots) = 1$

> $\left(\ldots\ldots\right) \cdot \left(-\dfrac{3}{4}\right) = 1$

> $\dfrac{3}{2} + \ldots\ldots = 0$

> $\dfrac{3}{4} + \ldots\ldots = 0$

> $\left(\dfrac{b}{a} + \dfrac{d}{a}\right) =$

> $\left(\dfrac{b}{c} + \dfrac{a}{c}\right) =$

> $\dfrac{km}{kn} =$

> $\dfrac{kx}{ky} =$

> $\left(\dfrac{x^{-1}}{y^3 \cdot y^{-5}}\right)^{-1} =$

> $\left(\dfrac{x^{-1}}{y^5 \cdot y^{-2}}\right)^{-3} =$

> $\left(u^3 + 3v^2\right) \cdot 1 =$

> $\left(x^3 + 3y^2\right) \cdot 0 =$

> $\left(y^m\right)^n =$

> $\left(x^m\right)^n =$

> $4^m \cdot 4^n =$

> $2^m \cdot 2^n =$

> $(32)^{\frac{3}{5}} =$

> $(-32)^{\frac{2}{5}} =$

> $-25^{\frac{1}{2}} =$

> $-16^{\frac{1}{2}} =$

> $(\sqrt{y} + 3)(\sqrt{y} - 4) =$

> $(\sqrt{y} - 3)(\sqrt{y} + 5) =$

> $(a + 2b)^2 =$

> $(u + 2v)^2 =$

> $\sqrt{4} \cdot \sqrt{5} =$

> $\sqrt{10} \cdot \sqrt{2} =$

5

- $\sqrt[3]{27z^3} =$

- $(x^2 + 5x + 6) - (x^2 - 2x - 4) =$

- $(3x+1)(9x^2 - 3x + 1) =$

- Factor out: $5x^3y + 10x^2y^2 - 20xy^3$

- $9x^2 - y^2 = ($ $)($ $)$

- $\sqrt[3]{8x^3} =$

- $(x^2 + 5x + 6) - (x^2 - 2x - 4) =$

- $(x - y)(x^2 - xy + y^2) =$

- Factor out: $4x^3y + 6x^2y^2 - 8xy^3$

- $x^2 - 4y^2 = ($ $)($ $)$

- $\sqrt[3]{27z^3} =$

- $(x^2 + 5x + 6) - (x^2 - 2x - 4) =$

- $\sqrt[3]{8x^3} =$

- $(x^2 + 5x + 6) - (x^2 - 2x - 4) =$

Answer the following questions :

$(\ldots\ldots) \cdot \left(-\dfrac{3}{4}\right) = 1$

$\left(-\dfrac{2}{3}\right) \cdot (\ldots\ldots) = 1$

$\dfrac{3}{4} + \ldots\ldots\ldots = 0$

$\dfrac{1}{4} + \ldots\ldots\ldots = 0$

$\left(\dfrac{b}{a} + \dfrac{d}{c}\right) =$

$\left(\dfrac{b}{a} - \dfrac{d}{a}\right) =$

$\dfrac{ka}{kb} =$

$\dfrac{kb}{ka} =$

$\left(\dfrac{x^{-2}}{y^2 \cdot y^{-5}}\right)^{-3} =$

$\left(\dfrac{x^{-1}}{y^4 \cdot y^{-5}}\right)^{-2} =$

$\left(u^3 + 3v^2\right)^0 =$

$0 \div \left(u^3 + 3v^2\right) =$

$\left(a^m\right)^n =$

$\left(a^n\right)^m =$

$3^m \cdot 3^n =$

$5^m \cdot 5^n =$

$(-32)^{\frac{3}{5}} =$

$(-32)^{\frac{2}{5}} =$

$-9^{\frac{1}{2}} =$

$-36^{\frac{1}{2}} =$

$(\sqrt{y} + 3)(\sqrt{y} - 4) =$

$(\sqrt{y} + 2)(\sqrt{y} - 4) =$

$(a + 2b)^2 =$

$(m + 2n)^2 =$

7

$\sqrt{10}.\sqrt{5} =$

$\sqrt{2}.\sqrt{20} =$

$\sqrt[3]{-27x^3} =$

$\sqrt[3]{-8y^3} =$

$(x^2 + 5x + 6) - (x^2 - 2x - 4) =$

$(2x^2 - 5x + 2) - (x^2 - 2x + 2) =$

$(2x+1)(4x^2 - 2x + 1) =$

$(x+y)(x^2 - xy + y^2) =$

Factor out: $3x^3y + 6x^2y^2 - 3xy^3$

Factor out: $6x^3y + 3x^2y^2 - 12xy^3$

$4x^2 - y^2 = ($ $)($ $)$

$x^2 - 9y^2 = ($ $)($ $)$

Answer the following questions :

❖

❖ The multiplicative inverse of $\frac{3}{4}$ is

❖ the additive inverse of –6 is

❖ $\left(\frac{2}{3}+\frac{1}{2}\right)=$

❖ $\frac{5}{2}\div\frac{6}{5}=$

❖ $\left(\frac{x^{-4}}{y^5\cdot y^{-5}}\right)^{-1}=$

❖ $\left(u^3 v^2\right)^0=$

❖ $\left(a^4\right)^2=$

❖ $a^m\cdot a^n=$

❖ $(-8)^{\frac{4}{3}}=$

❖ $(-9)^{\frac{1}{2}}=$

❖ $\sqrt{4}.\sqrt{5}=$

❖

❖ The multiplicative inverse of $\frac{2}{7}$ is

❖ the additive inverse of 5 is

❖ $\left(\frac{1}{4}+\frac{3}{2}\right)=$

❖ $\frac{4}{3}\div\frac{1}{6}=$

❖ $\left(\frac{x^3}{y^5\cdot y^{-5}}\right)^{-4}=$

❖ $\left(x^2 y^5\right)^0=$

❖ $\left(a^m\right)^n=$

❖ $a^3\cdot a^5=$

❖ $(-125)^{\frac{2}{3}}=$

❖ $(-4)^{\frac{1}{2}}=$

❖ $\sqrt{2}.\sqrt{20}=$

❖ $\sqrt[3]{27x^6y^9} =$

❖ $(3x^2+5x+6)+(x^2-4x-4) =$

❖ $(x+3)(x^2-3x+9) =$

❖ factor by grouping :

$2x^2+6x+5x+15 =$

❖ $x^2-16 = ($ $)($ $)$

❖ $\sqrt[3]{8x^9y^3} =$

❖ $(x^3+5x+3)+(2x^2-4x-2) =$

❖ $(x-3)^2 =$

❖ factor by grouping :

$2x^2+6x+5x+15 =$

❖ $x^2-1 = ($ $)($ $)$

Factor the following

$(a)\,6xy^3+3x^2y^2+9x^3y =$

$(b)\,4b^2-9a^2 =$

$(c)\,8x^3+27 =$

$(d)\,6x^2+17x+7 =$

$(a)\,2x^3y+4x^2y^2+8xy^3 =$

$(b)\,9a^2-4b^2 =$

$(c)\,27x^3-8 =$

$(d)\,6x^2+11x-7 =$

$(a)\,3x^3y+6x^2y^2+9xy^3 =$

$(b)\,4a^2-9b^2 =$

$(c)\,8x^3-27 =$

$(d)\,6x^2-19x-7 =$

$(a)\,4xy^3+2x^2y^2+8x^3y =$

$(b)\,9b^2-4a^2 =$

$(c)\,27x^3+8 =$

$(d)\,6x^2+23x+7 =$

CHAPTER 1

Equations and Inequalities

1-1 Linear Equations

1-2 Linear Inequalities

1-3 Absolute Value in Equations and Inequalities

1-4 Complex Numbers

1-5 Quadratic Equations

Answer the following questions :

(Q)(a) Solve: $4(x+4)-2=3(x-5)$.

(b) Solve and graph: $4(x+2)-8 \le 3(x-1)+4$.

(c) Solve: $|2x-3|=6$.

(d) Solve, and write solution in both inequality and interval notation: $|3x-3| \le 7$.

(Q) Express the answer:
(a) (4+5i)+(-3-2i)=
(b) $(1+4i)(2-2i)=$
(c) $(2+4i)(2-4i)=$
(d) $\dfrac{1}{2+3i}=$

(Q)(a) Solve: $2(3x+2)-3=5(x+4)$.

(b) Solve and graph: $5(x+4)-20 \le 4(x-2)+9$.

(c) Solve: $|3x+2|=4$.

(d) Solve, and write solution in both inequality and interval notation: $|3x-1| \le 5$.

(Q) Express the answer:
(a) (2-5i)+(-3+2i)=
(b) $(2+3i)(3-4i)=$
(c) $(1+3i)(1-3i)=$
(d) $\dfrac{1}{3+2i}=$

$(Q)(a)$ Solve: $3(2x+1)-5 = 4(x+3)$.

(b) Solve and graph: $3(x+1)-3 \le 2(x-1)+3$.

(c) Solve: $|2x+3| = 6$.

(d) Solve, and write solution in both inequality and interval notation: $|2x-2| \le 4$.

(Q) Express the answer:
(a) $(3+5i)+(-4+2i)=$
(b) $(3+4i)(2-3i) =$
(c) $(2+3i)(2-3i) =$
(d) $\dfrac{1}{2+2i} =$

$(Q)(a)$ Solve : $5(x+1)+4 = 6(x+2)$.

(b) Solve and graph: $3(x+2)-6 \le 2(x-2)+5$.

(c) Solve: $|3x-2| = 4$.

(d) Solve, and write solution in both inequality and interval notation: $|2x-3| \ge 6$.

(Q) Express the answer:
(a) $(3+4i)+(-5-3i)=$
(b) $(4+2i)(2-3i) =$
(c) $(3+i)(3-i) =$
(d) $\dfrac{1}{1-2i} =$

(Q) Express the answer:

(1) $(-4 + 3i) + (-2 + 3i) =$

(2) $(6 - 5i) - (5 - 2i) =$

(3) $(5 - 2i)^2 =$

(4) $(2 + 2i)(2 - 2i) =$

(Q) Solve : $6(2x - 1) + 5 = 11(x + 1)$

(Q) Solve and graph: $2 - x \geq 6(2 - x)$

(Q) Solve and write solution in both inequality and interval notation: $|4x + 3| \geq 9$

(Q) Solve by using factoring or by quadratic formula: $3x^2 - 11x - 20 = 0$

Solve each equation or inequality. For inequalities, write solutions in both inequality and interval notation.

(A) $|2x - 1| = 8$ (B) $|x| \leq 7$ (C) $|3x + 3| \leq 9$ (D) $|5 - 2x| < 9$

Solve, and write solutions in both inequality and interval notation.

(A) $|x| \geq 5$ (B) $|4x - 3| > 5$ (C) $|6 - 5x| > 16$

Solve by factoring:

(A) $(2x + 4)(x - 7) = 0$ (B) $3x^2 + 7x - 20 = 0$

(C) $4x^2 + 12x + 9 = 0$ (D) $4x^2 = 5x$

In Problems 7–12, solve by factoring.

7. $2x^2 = 8x$

8. $3y^2 = y + 10$

9. $-8 = 22t - 6t^2$

10. $25z^2 = -10z$

11. $3w^2 + 13w = 10$

12. $36x^2 = -12x - 1$

In Problems 13–24, solve by using the square root property.

13. $m^2 - 25 = 0$

14. $n^2 + 16 = 0$

15. $c^2 + 9 = 0$

16. $d^2 - 36 = 0$

17. $4y^2 + 9 = 0$

18. $9x^2 - 25 = 0$

19. $25z^2 - 32 = 0$

20. $16w^2 + 27 = 0$

21. $(2k - 5)^2 = 16$

22. $(t - 2)^2 = -3$

23. $(n - 3)^2 = -4$

24. $(5m - 6)^2 = 7$

In Problems 25–32, use the discriminant to determine the number of real roots of each equation and then solve each equation using the quadratic formula.

25. $x^2 - 2x - 1 = 0$

26. $y^2 - 4y + 7 = 0$

27. $x^2 - 2x + 3 = 0$

28. $y^2 - 4y + 1 = 0$

29. $2t^2 + 8 = 6t$

30. $9s^2 + 2 = 12s$

31. $2t^2 + 1 = 6t$

32. $9s^2 + 7 = 12s$

CHAPTER 2 Graphs

2-1 Cartesian Coordinate Systems

2-2 Distance in the Plane

2-3 Equation of a Line

Choose the correct answer:

(1) The reflection through the origin of the point $(-2, 3)$ **is the point ......**

$(a)\ (-2, 3)$ $(b)\ (2, 3)$ $(c)\ (2, -3)$ $(d)\ (-2, -3)$

(2) The distance between $P_1 = (-4, 3)$ and $P_2 = (-8, 6)$ is ....

$(a)\ 6$ $(b)\ 5$ $(c)\ 10$ $(d)\ 7$

(3) The midpoint M **of the line segment joining** $P_1 = (3, 2)$ and $P_2 = (-7, -4)$ is $M = ...$

$(a)\ (2, 1)$ $(b)\ (-2, -1)$ $(c)\ (-4, -2)$ $(d)\ (-4, 2)$

(4) The equation of a circle with radius 5 **and center at** $(-2, 1)$ is ....

$(a)\ (x-2)^2 + (y-1)^2 = 25$ $\qquad$ $(b)\ (x+1)^2 + (y-2)^2 = 25$

$(c)\ (x+2)^2 + (y+1)^2 = 5$ $\qquad$ $(d)\ (x+2)^2 + (y-1)^2 = 25$

(5) If a line passes through two distinct points $P_1 = (6, -2)$ and $P_2 = (8, -6)$ **, then its slope**

$m = ...$

$(a)\ \dfrac{1}{2}$ $\qquad$ $(b)\ -\dfrac{1}{2}$ $\qquad$ $(c)\ -2$ $\qquad$ $(d)\ 2$

(6) Given the line $3x + 2y = 5$, then its slope is ....

$(a)\ \dfrac{3}{2}$ $(b)\ -\dfrac{3}{2}$ $(c)\ -\dfrac{2}{3}$ $(d)\ \dfrac{2}{3}$

Choose the correct answer:

(1) The reflection through the x **axis of the point** $(2, -3)$ **is the point ....**

$(a)\ (-2, 3)$ $(b)\ (2, 3)$ $(c)\ (2, -3)$ $(d)\ (-2, -3)$

(2) The distance between $P_1 = (4, -3)$ and $P_2 = (8, -6)$ is ....

$(a)\ 5$ $(b)\ 6$ $(c)\ 4$ $(d)\ 8$

(3) The midpoint M **of the line segment joining** $P_1 = (2, 4)$ and $P_2 = (-6, 8)$ is $M = ...$

$(a)\ (-2, 6)$ $(b)\ (-4, -6)$ $(c)\ (-4, 12)$ $(d)\ (4, -12)$

(4) The equation of a circle with radius 4 **and center at** $(1, -2)$ is ....

$(a)(x+1)^2 + (y-2)^2 = 16$ $(b)\ (x-1)^2 + (y+2)^2 = 16$

$(c)(x+1)^2 + (y+2)^2 = 4$ $(d)\ (x+1)^2 + (y-2)^2 = 4$

(5) If a line passes through two distinct points $P_1 = (-3, 4)$ and $P_2 = (-6, 8)$ **, then its slope**

$m = ...$

$(a)\ \dfrac{4}{3}$ $(b)\ -\dfrac{3}{4}$ $(c)\ -\dfrac{4}{3}$ $(d)\ \dfrac{3}{4}$

(6) Given the line $2x - 3y = 6$, then its slope is ....

$(a)\ \dfrac{3}{2}$ $\qquad\qquad (b)\ -\dfrac{3}{2}$ $\qquad\qquad (c)\ -\dfrac{2}{3}$ $\qquad\qquad (d)\ \dfrac{2}{3}$

Choose the correct answer:

(1) The reflection through the y **axis of the point** $(-5,4)$ **is the point ....**

$(a)\ (-5,4)$ $\qquad (b)\ (5,4)$ $\qquad (c)\ (5,-4)$ $\qquad (d)\ (-5,-4)$

(2) **The distance between** $P_1 = (3,6)$ and $P_2 = (7,9)$ is ....

$(a)\ 5$ $\qquad\qquad (b)\ 6$ $\qquad\qquad (c)\ 10$ $\qquad\qquad (d)\ 7$

(3) The midpoint M **of the line segment joining** $P_1 = (-3,-2)$ and $P_2 = (7,-4)$ is $M = $ ....

$(a)\ (2,3)$ $\qquad (b)\ (-2,-3)$ $\qquad (c)\ (2,-3)$ $\qquad\qquad (d)\ (-2,3)$

(4) The equation of a circle with radius 6 **and center at** $(2,1)$ is ....

$(a)\ (x-2)^2 + (y-1)^2 = 36$ $\qquad\qquad (b)\ (x+1)^2 + (y-2)^2 = 36$
$(c)\ (x+2)^2 + (y+1)^2 = 6$ $\qquad\qquad (d)\ (x+2)^2 + (y-1)^2 = 36$

(5) If a line passes through two distinct points $P_1 = (3,8)$ and $P_2 = (6,4)$ **, then its slope**

$m = ...$

$(a)\ \dfrac{4}{3}$ $(b)\ -\dfrac{3}{4}$ $(c)\ -\dfrac{4}{3}$ $(d)\ \dfrac{3}{4}$

(6) Given the line $-3x+2y=5$, then its slope is ……….

$(a)\ \dfrac{3}{2}$ $(b)\ -\dfrac{3}{2}$ $(c)\ -\dfrac{2}{3}$ $(d)\ \dfrac{2}{3}$

Choose the correct answer:

(1) The reflection through the y **axis of the point** $(-2,3)$ **is the point** …….

$(a)\ (2,3)$ $(b)\ (-2,3)$ $(c)\ (2,-3)$ $(d)\ (-2,-3)$

(2) The distance between $P_1=(-2,3)$ and $P_2=(6,-3)$ is……...

$(a)\ 10$ $(b)\ 6$ $(c)\ 8$ $(d)\ 7$

(3) The midpoint M **of the line segment joining** $P_1=(4,6)$ and $P_2=(-6,8)$ is $M=$ ……..

$(a)\ (2,14)$ $(b)\ (-2,-7)$ $(c)\ (-1,7)$ $(d)\ (-1,14)$

(4) The equation of a circle with radius 3 **and center at** $(-1,2)$ is …….

$(a)(x-1)^2+(y-2)^2=9$ $(b)(x+1)^2+(y-2)^2=3$

$(c)(x+1)^2+(y+2)^2=3$ $(d)\ (x+1)^2+(y-2)^2=9$

(5) If a line passes through two distinct points $P_1 = (-2, 6)$ and $P_2 = (-6, 8)$ **, then its slope**

$m = \dots$

$(a)\ \dfrac{1}{2}$ $\qquad\qquad (b)\ -\dfrac{1}{2}$ $\qquad\qquad (c)\ -2$ $\qquad\qquad (d)\ 2$

(6) Given the line $3x - 2y = 5$, then its slope is $\dots\dots$

$(a)\ \dfrac{3}{2}$ $\qquad\qquad (b)\ -\dfrac{3}{2}$ $\qquad\qquad (c)\ -\dfrac{2}{3}$ $\qquad\qquad (d)\ \dfrac{2}{3}$

In Problems 5–12, ☐nd the distance between each pair of points and the midpoint of the line segment joining the points. Leave distance in radical form, if applicable.

5. $(1, 0), (4, 4)$ **6.** $(0, 1), (3, 5)$

7. $(0, -2), (5, 10)$ **8.** $(3, 0), (-2, -3)$

9. $(-6, -4), (3, 4)$ **10.** $(-5, 4), (6, -1)$

11. $(-6, -3), (-2, -1)$ **12.** $(-5, -2), (-1, 2)$

In Problems 13–20, write the equation of a circle with the indicated center and radius.

13. $C = (0, 0), r = 7$ **14.** $C = (0, 0), r = 5$

15. $C = (2, 3), r = 6$ **16.** $C = (5, 6), r = 2$

17. $C = (-4, 1), r = \sqrt{7}$ **18.** $C = (-5, 6), r = \sqrt{11}$

19. $C = (-3, -4), r = \sqrt{2}$ **20.** $C = (4, -1), r = \sqrt{5}$

Find the slope of the line through each pair of points. Do not graph.

(A) $(-3, -3), (2, -3)$

(B) $(-2, -1), (1, 2)$

(C) $(0, 4), (2, -4)$

(D) $(-3, 2), (-3, -1)$

Write the slope–intercept form of the line with slope $\frac{5}{4}$ and y intercept -2. Graph the equation.

(A) Find an equation for the line that has slope $-\frac{2}{5}$ and passes through the point $(3, -2)$. Write the final answer in the form $Ax + By = C$.

(B) Find an equation for the line that passes through the two points $(-3, 1)$ and $(7, -3)$. Write the final answer in the form $y = mx + b$.

Given the line L: $4x + 2y = 3$ and the point $P = (2, -3)$, find an equation of a line through P that is

(A) Parallel to L (B) Perpendicular to L

Write the final answers in the slope–intercept form $y = mx + b$.

CHAPTER 3

Functions

Choose the correct answer:

(1) If $f(x) = \dfrac{12}{x-1}$, **then** $f(5) = \ldots\ldots$

$(a)\ 3$ $\qquad\qquad (b)\ 4$ $\qquad\qquad (c)\ -3$ $\qquad\qquad (d)\ -4$

(2) If $f(x) = \dfrac{3}{x-2}$, **then the domain of** f **is** $D_f = \ldots\ldots$

$(a)\ R$ $\qquad (b)\ (-\infty, 2) \cup (2, \infty)$ $\qquad (c)\ (-\infty, 2)$ $\qquad (d)\ [2, \infty)$

(3) If $f(x) = x^4 + 4x$, **then the function** f **is** $\ldots\ldots$

(a) even function $\qquad (b)$ odd function $\qquad (c)$ neither even nor odd function

(14) If $f(x) = x^2 + 1$ **and** $g(x) = 2x$, **then** $(g \circ f)(x) = \ldots\ldots$

$(a)\ 2x^2 + 2$ $\qquad (b)\ 4x^2 + 1$ $\qquad (c)\ 2x^2 + 1$ $\qquad (d)\ 4x^2 + 4$

Choose the correct answer:

(1) If $f(x) = \dfrac{12}{x-1}$, **then** $f(-2) = \ldots\ldots$

$(a)\ 3$ $\qquad\qquad (b)\ 4$ $\qquad\qquad (c)\ -3$ $\qquad\qquad (d)\ -4$

(2) If $f(x) = \dfrac{4}{x-3}$, **then the domain of** f **is** $D_f = \ldots\ldots$

$(a)\ (-\infty, 3) \cup (3, \infty)$ $\qquad (b)\ R$ $\qquad (c)\ (-\infty, 3)$ $\qquad (d)\ [3, \infty)$

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(3) If $f(x) = x^5 + 2x$, **then the function** f is ....

(a) even function (b) odd function (c) neither even nor odd function

(4) If $f(x) = x^2 + 2$ and $g(x) = 3x$, then $(f \circ g)(x) = $ ....

$(a)\ 3x^2 + 2$ $(b)\ 9x^2 + 2$ $(c)\ 9x^2 + 3$ $(d)\ 3x^2 + 3$

<u>**Choose the correct answer:**</u>

(1) If $f(x) = \dfrac{12}{x-1}$, **then** $f(4) = $ ....

$(a)\ 3$ $(b)\ 4$ $(c)\ -3$ $(d)\ -4$

(2) If $f(x) = \dfrac{2}{x-1}$, **then the domain of** f is $D_f = $ ....

$(a)\ R$ $(b)\ [1, \infty)$ $(c)\ (-\infty, 1)$ $(d)\ (-\infty, 1) \cup (1, \infty)$

(3) If $f(x) = x^4 + 3x^2$, **then the function** f is ....

(a) even function (b) odd function (c) neither even nor odd function

(4) If $f(x) = x^2 + 1$ and $g(x) = 2x$, then $(f \circ g)(x) = $ ....

$(a)\ 2x^2 + 2$ $(b)\ 4x^2 + 1$ $(c)\ 2x^2 + 1$ $(d)\ 4x^2 + 4$

<u>**Choose the correct answer:**</u>

(1) If $f(x) = \dfrac{12}{x-1}$, **then** $f(-3) = $ ....

$(a)\,3$ $\qquad\qquad (b)\,4$ $\qquad\qquad (c)\,-3$ $\qquad\qquad (d)\,-4$

(2) If $f(x) = \dfrac{1}{x+1}$, **then the domain of** f **is** $D_f = \text{........}$

$(a)\,R$ $\qquad (b)\,[-1,\infty)$ $\qquad (c)\,(-\infty,-1)$ $\qquad (d)\,(-\infty,-1)\cup(-1,\infty)$

(3) If $f(x) = x^2 + 2$, **then the function** f **is** ....

(a) even function $\qquad (b)$ odd function $\qquad (c)$ neither even nor odd function

(4) If $f(x) = x^2 + 2$ **and** $g(x) = 3x$, **then** $(g \circ f)(x) = \text{.........}$

$(a)\,3x^2 + 2$ $\qquad (b)\,9x^2 + 2$ $\qquad (c)\,3x^2 + 6$ $\qquad (d)\,3x^2 + 3$

(A) Find $F(4)$, $F(4 + h)$, and $F(4) + F(h)$ for $F(x) = \dfrac{4}{2 - x}$.

(B) Find $G(3)$, $G(h)$, and $G(3 + h)$ for $G(x) = x^2 + 5x - 2$.

(C) Find $K(4)$, $K(9x)$, and $9K(x)$ for $K(x) = \dfrac{6}{3 - \sqrt{x}}$.

Find the domain of each of the following functions. Express the answer in both set notation and inequality notation.*

(A) $f(x) = \dfrac{15}{x - 3}$ $\qquad$ (B) $g(x) = 16 + 3x - x^2$ $\qquad$ (C) $k(x) = \dfrac{2}{\sqrt{x} - 2}$

Find the domain of each of the following functions. Express the answer in both set notation and inequality notation.

(A) $F(x) = \dfrac{4}{2 - x}$ $\qquad$ (B) $G(x) = x^2 + 5x - 2$ $\qquad$ (C) $K(x) = \dfrac{6}{3 - \sqrt{x}}$

27. Let $f(x) = 3x - 5$. Find
   (A) $f(3)$ (B) $f(h)$
   (C) $f(3) + f(h)$ (D) $f(3 + h)$

28. Let $g(y) = 7 - 2y$. Find
   (A) $g(4)$ (B) $g(h)$
   (C) $g(4) + g(h)$ (D) $g(4 + h)$

29. Let $F(w) = -w^2 + 2w$. Find
   (A) $F(4)$ (B) $F(-4)$
   (C) $F(4 + a)$ (D) $F(2 - a)$

30. Let $G(t) = 5t - t^2$. Find
   (A) $G(8)$ (B) $G(-8)$
   (C) $G(-1 + h)$ (D) $G(6 - t)$

31. Let $f(t) = 2 - 3t^2$. Find
   (A) $f(-2)$ (B) $f(-t)$
   (C) $-f(t)$ (D) $-f(-t)$

32. Let $k(z) = 40 + 20z^2$. Find
   (A) $k(-2)$ (B) $k(-z)$
   (C) $-k(z)$ (D) $-k(-z)$

33. Let $F(u) = u^2 - u - 1$. Find
   (A) $F(10)$ (B) $F(u^2)$
   (C) $F(5u)$ (D) $5F(u)$

34. Let $G(u) = 4 - 3u - u^2$. Find
   (A) $G(-8)$ (B) $G(u^2)$
   (C) $G(-2u)$ (D) $-2G(u)$

In Problems 47–62, find the domain of the indicated function.
Express answers in both interval notation and inequality notation.

47. $f(x) = 4 - 9x + 3x^2$ **48.** $g(t) = 1 + 7t - 2t^2$

49. $L(u) = \sqrt{3u^2 + 4}$ **50.** $M(w) = \dfrac{w - 5}{\sqrt{3 + 2w^2}}$

51. $h(z) = \dfrac{2}{4 - z}$ **52.** $k(z) = \dfrac{z}{z - 3}$

53. $g(t) = \sqrt{t - 4}$ **54.** $h(t) = \sqrt{6 - t}$

55. $k(w) = \sqrt{7 + 3w}$ **56.** $j(w) = \sqrt{9 + 4w}$

57. $H(u) = \dfrac{u}{u^2 + 4}$ **58.** $G(u) = \dfrac{u}{u^2 - 4}$

59. $M(x) = \dfrac{\sqrt{x + 4}}{x - 1}$ **60.** $N(x) = \dfrac{\sqrt{x - 3}}{x + 2}$

61. $s(t) = \dfrac{1}{3 - \sqrt{t}}$ **62.** $r(t) = \dfrac{1}{\sqrt{t} - 4}$

Systems of Equations and Matrices

Solve by graphing:
$$x - y = 3$$
$$x + 2y = -3$$

Solving a System by Substitution

Use substitution to solve the coffee shop problem:
$$x + y = 7$$
$$2x + 3y = 18$$

Solve by substitution and check:
$$x - y = 3$$
$$x + 2y = -3$$

Solving a System Using Elimination by Addition

Solve using elimination by addition:
$$3x - 2y = 8$$
$$2x + 5y = -1$$

Solve using elimination by addition:
$$6x + 3y = 3$$
$$5x + 4y = 7$$

Solving a System Using Gauss–Jordan Elimination

Solve by Gauss–Jordan elimination:
$$2x_1 - 2x_2 + x_3 = 3$$
$$3x_1 + x_2 - x_3 = 7$$
$$x_1 - 3x_2 + 2x_3 = 0$$

Solve by Gauss–Jordan elimination:
$$3x_1 + x_2 - 2x_3 = 2$$
$$x_1 - 2x_2 + x_3 = 3$$
$$2x_1 - x_2 - 3x_3 = 3$$

Add:

(A) $\begin{bmatrix} 3 & 2 \\ -1 & -1 \\ 0 & 3 \end{bmatrix} + \begin{bmatrix} -2 & 3 \\ 1 & -1 \\ 2 & -2 \end{bmatrix}$ (B) $\begin{bmatrix} 1 & -2 & 7 \end{bmatrix} + \begin{bmatrix} -2 & 4 & 3 & -1 \end{bmatrix}$

Matrix Subtraction

Subtract: $\begin{bmatrix} 3 & -2 \\ 5 & 0 \end{bmatrix} - \begin{bmatrix} -2 & 2 \\ 3 & 4 \end{bmatrix}$

Matrix Equations

Find a, b, c, and d so that

$$\begin{bmatrix} a & b \\ c & d \end{bmatrix} - \begin{bmatrix} 2 & -1 \\ -5 & 6 \end{bmatrix} = \begin{bmatrix} 4 & 3 \\ -2 & 4 \end{bmatrix}$$

Find a, b, c, and d so that

$$\begin{bmatrix} a & b \\ c & d \end{bmatrix} - \begin{bmatrix} -4 & 2 \\ 1 & -3 \end{bmatrix} = \begin{bmatrix} -2 & 5 \\ 8 & 2 \end{bmatrix}$$

Multiply: $\begin{bmatrix} -1 & 0 & 3 & 2 \end{bmatrix} \begin{bmatrix} 2 \\ 3 \\ 4 \\ -1 \end{bmatrix}$

Matrix Multiplication

Given

$A = \begin{bmatrix} 2 & 1 \\ 1 & 0 \\ -1 & 2 \end{bmatrix}$ $B = \begin{bmatrix} 1 & -1 & 0 & 1 \\ 2 & 1 & 2 & 0 \end{bmatrix}$ $C = \begin{bmatrix} 2 & 6 \\ -1 & -3 \end{bmatrix}$ $D = \begin{bmatrix} 1 & 2 \\ 3 & 6 \end{bmatrix}$

Find each product that is defined:

(A) AB (B) BA (C) CD (D) DC

Find each product, if it is defined:

(A) $\begin{bmatrix} -1 & 0 & 3 & -2 \\ 1 & 2 & 2 & 0 \end{bmatrix} \begin{bmatrix} -1 & 1 \\ 2 & 3 \\ 1 & 0 \end{bmatrix}$
(B) $\begin{bmatrix} -1 & 1 \\ 2 & 3 \\ 1 & 0 \end{bmatrix} \begin{bmatrix} -1 & 0 & 3 & -2 \\ 1 & 2 & 2 & 0 \end{bmatrix}$

(C) $\begin{bmatrix} 1 & 2 \\ -1 & -2 \end{bmatrix} \begin{bmatrix} -2 & 4 \\ 1 & -2 \end{bmatrix}$
(D) $\begin{bmatrix} -2 & 4 \\ 1 & -2 \end{bmatrix} \begin{bmatrix} 1 & 2 \\ -1 & -2 \end{bmatrix}$

Question 1: Choose the correct answer:

(1) $\left(\dfrac{9}{16}\right)^{\frac{-1}{2}} = \ldots\ldots$

$(a)\ \dfrac{4}{3}$ $\qquad$ $(b)\ \dfrac{9}{16}$ $\qquad$ $(c)\ \dfrac{16}{9}$ $\qquad$ $(d)\ \dfrac{3}{4}$

(2) $(-8)^{-\frac{4}{3}} = \ldots\ldots$

$(a)\ -\dfrac{1}{16}$ $\qquad$ $(b)\ 16$ $\qquad$ $(c)\ \dfrac{1}{16}$ $\qquad$ $(d)\ -16$

(3) $-5x^3 - (-3x)^3 = \ldots\ldots$

$(a)\ 32x^3$ $\qquad$ $(b)\ 22x^3$ $\qquad$ $(c)\ -22x^3$ $\qquad$ $(d)\ -32x^3$

(4) $a^2 . a^3 = \ldots\ldots$

$(a)\ a^5$ $\qquad$ $(b)\ a^6$ $\qquad$ $(c)\ a^8$ $\qquad$ $(d)\ a^9$

(5) $(2x - y)(4x^2 + 2xy + y^2) = \ldots\ldots$

$(a)\ 2x^3 + y^2$ $\qquad$ $(b)\ 8x^3 - y^3$ $\qquad$ $(c)\ x^2 + 8y^3$ $\qquad$ $(d)\ 8x^3 + y^3$

Question 2 : **(A)** Factor the following polynomials :

(1) $6pr + 3ps - qr - qs =$

(2) $9x^2 - 6xy + y^2 =$

(3) $9m^2 - n^2 =$

Question 3 :

(1) Solve, and write solutions in both inequality and interval notion:
$$|3 - 2x| \geq 7.$$

(2) Solve : $4 - x = 3(2 - x)$

(3) Solve by factoring : $6x^2 + 14x + 4 = 0.$

(4) Express the answer:

(a) $(3-2i)^2 =$

(b) $\dfrac{2-3i}{1-2i} =$

Question 4: (1) $Let\ f(x) = \dfrac{2}{\sqrt{x}-4}$

(a) Find the domain of f

(b) Calculate $f(4)$

(2) Let $f(x) = 2x-1$ and $g(x) = 4x^2+3,$ find the function $(g \circ f)(x)$.

Question 5:

(1) Find an equation of a line L that passes through the point $(2,4)$ and parallel to $L_1:\ 5x+3y = 15$.

(2) Find the center and the radius of a circle whose equation is :

$$(x+2)^2 + (y+3)^2 = 25 \ .$$

(3) Find the midpoint M of the line segment joining $A = (4,3)$ *and* $B = (2,-1)$.

(4) Find the reflection through $x -$ axis of the point $(2,-3)$.

(5) Find the distance between the points (-1,3) and (4,7).

Sheet (2)

Question 1: Choose the correct answer:

(1) $\left(\dfrac{25}{9} \right)^{\frac{-1}{2}} = \ldots\ldots\ldots$

(a) $\dfrac{9}{25}$ (b) $\dfrac{5}{3}$ (c) $\dfrac{25}{9}$ (d) $\dfrac{3}{5}$

(2) $(-27)^{-\frac{4}{3}} = \ldots\ldots\ldots$

(a) $\dfrac{1}{9}$ (b) 81 (c) -9 (d) $\dfrac{1}{81}$

(3) $-4x^3 - (-4x)^3 = \ldots\ldots\ldots$

(a) $-60x^3$ (b) $8x^3$ (c) $60x^3$ (d) $-8x^3$

(4) $(a^2)^3 = \ldots\ldots\ldots$

(a) a^5 (b) a^6 (c) a^8 (d) a^9

(5) $(2x - y)(4x^2 + 2xy + y^2) = \ldots\ldots\ldots$

(a) $2x^3 + y^2$ (b) $x^2 - y^3$ (c) $8x^3 - y^3$ (d) $8x^3 + y^3$

Question 2 : **(A)** Factor the following polynomials :

(1) $2pr + ps - 6qr - 3qs =$

....
....
....
....

(2) $x^2 - 6xy + 9y^2 =$

....
....
....

(3) $a^2 - 9b^2 =$

....
....

Question 3 :

(1) Solve, and write solutions in both inequality and interval notion:
$$|8 - 2x| \geq 4.$$

....
....
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....

(2) Solve : $3 - x = 4(2 - x)$

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....
....

(3) Solve by factoring : $6x^2 - 11x + 4 = 0.$

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....

(4) Express the answer:

(a) $(3+2i)^2 =$

(b) $\dfrac{-2+3i}{1+2i} =$

Question 4: (1) $Let\ f(x) = \dfrac{2}{\sqrt{x}-5}$

(a) Find the domain of f

(b) Calculate $f(4)$

(2) Let $f(x) = 2x-1$ and $g(x) = 4x^2+3,$ find the function $(f \circ g)(x)$.

Question 5:

(1) Find an equation of a line L that passes through the point $(4,2)$ and parallel to $L_1 :\ 3x+5y=15$.

(2) Find the center and the radius of a circle whose equation is :
$$(x - 2)^2 + (y + 3)^2 = 4 .$$

....
....
....
....

(3) Find the midpoint M of the line segment joining $A = (3,4)$ *and* $B = (-1,2)$.

....
....
....
....
....

(4) Find the reflection through $x -$ axis of the point $(2,3)$.

....
....
....

(5) Find the distance between the points $(2,4)$ and $(5,6)$.

....
....
....

Question 1: Choose the correct answer:

(1) $\left(\dfrac{-5}{4} \right)^{-1} = \ldots\ldots\ldots$

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

(2) $\dfrac{a^m}{a^{-n}} = \ldots\ldots\ldots$

$(a) a^{m+n}$ $\qquad$ $(b) a^{n-m}$ $\qquad$ $(c) a^{mn}$ $\qquad$ $(d) a^{m-n}$

(3) $\left(\dfrac{8}{27} \right)^{-\frac{1}{3}} = \ldots\ldots\ldots$

$(a) \dfrac{2}{3}$ $\qquad$ $(b) \dfrac{3}{2}$ $\qquad$ $(c) -\dfrac{2}{3}$ $\qquad$ $(d) -\dfrac{3}{2}$

(4) Given the line $-7x + 3y = 5$, then its slope is $\ldots\ldots\ldots$

$(a) -\dfrac{7}{3}$ $\qquad$ $(b) \dfrac{7}{3}$ $\qquad$ $(c) -\dfrac{3}{7}$ $\qquad$ $(d) \dfrac{3}{7}$

(5) The reflection through the $x-$axis of the point (-2,-5) is the point $\ldots\ldots\ldots$

$(a) (-2,5)$ $\qquad$ $(b) (2,-5)$ $\qquad$ $(c) (2,5)$ $\qquad$ $(d) (-2,-5)$

(6) The distance between $P_1 = (3, 6)$ and $P_2 = (7, 9)$ is ....

(a) 7   (b) 6   (c) 10   (d) 5

(7) Given two nonvertical lines L_1 and L_2 with slopes m_1 and m_2, respectively, then $L_1 \backslash\backslash L_2$ if and only if ....

(a) $m_1 = m_2$ (b) $m_1 = -m_2$ (c) $m_1 \cdot m_2 = 1$ (d) $m_1 \cdot m_2 = -1$

(8) If $f(x) = 3x^4 + 1$, then the function f is ....

(a) even and odd   (b) odd   (c) even   (d) neither even nor odd

Question 2: Simplify the following:

(1) $\dfrac{a}{b} - \dfrac{c}{b} = $ ....

(2) $\left(\dfrac{x^{-2}}{y^6 y^{-6}} \right)^{-3} = $ ....

(3) $(8)^{-\frac{5}{3}} = $ ....

(4) $\left(16a^8 c^2 \right)^{\frac{1}{2}} = $ ....

(5) $(x+2y)^2 = $ ....

Question 3 : **(A)** Factor the following polynomials :

(1) $9x^2 - 4 = $

(2) $a^3 - 27 = $

(B) Express the answer: $(2+3i)(3-2i) = $ ....

Question 4 :

(1) Solve, and write solutions in both inequality and interval notion:
$$|2x-5| \le 3.$$

(2) Solve : $6 - 2x = 6(3-x)$

(3) Solve by factoring or by quadratic formula: $4x^2 + 12x + 9 = 0.$

Question 5: (1) $Let\ f(x) = \dfrac{5}{x+1}$

(a) Find the domain of f

....

....

(b) Calculate $f(2)$.

....

....

(a) Find the domain of f

Sheet (4)

Question 1 : Choose the correct answer:

(1) $\left(\dfrac{4}{5}\right)^{-1} = \ldots\ldots\ldots$

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

(2) $\dfrac{a^{n}}{a^{m}} = \ldots\ldots\ldots$

$(a)\ a^{m+n}$ $\qquad$ $(b)\ a^{mn}$ $\qquad$ $(c)\ a^{n-m}$ $\qquad$ $(d)\ a^{m-n}$

(3) $\left(\dfrac{-27}{8}\right)^{-\frac{1}{3}} = \ldots\ldots\ldots$

$(a)\ \dfrac{2}{3}$ $\qquad$ $(b)\ \dfrac{3}{2}$ $\qquad$ $(c)\ -\dfrac{2}{3}$ $\qquad$ $(d)\ -\dfrac{3}{2}$

(4) Given the line $-3x + 7y = 5$, then its slope is $\ldots\ldots\ldots$

$(a)\ \dfrac{7}{3}$ $\qquad$ $(b)\ -\dfrac{7}{3}$ $\qquad$ $(c)\ -\dfrac{3}{7}$ $\qquad$ $(d)\ \dfrac{3}{7}$

(5) The reflection through the $x-$ axis of the point (-2,5) is the point $\ldots\ldots\ldots$

$(a)\ (-2,5)$ $\qquad$ $(b)\ (2,-5)$ $\qquad$ $(c)\ (2,5)$ $\qquad$ $(d)\ (-2,-5)$

(6) The distance between $P_1 = (7, 9)$ and $P_2 = (1, 1)$ is ....

(a) 5   (b) 10   (c) 7   (d) 6

(7) Given two nonvertical lines L_1 and L_2 with slopes m_1 and m_2, respectively, then $L_1 \backslash\backslash L_2$ if and only if ....

(a) $m_1 \cdot m_2 = -1$ (b) $m_1 = -m_2$ (c) $m_1 \cdot m_2 = 1$ (d) $m_1 = m_2$

(8) If $f(x) = 3x^4 + 1$, then the function f is ....

(a) even   (b) odd   (c) even and odd   (d) neither even nor odd

Question 2: Simplify the following:

(1) $\dfrac{c}{a} - \dfrac{b}{a} = $ ....

....
....

(2) $\left(\dfrac{x^3}{y^3 y^{-3}}\right)^2 = $ ....

....
....
....
....

(3) $(-27)^{\frac{2}{3}} = $ ....

....
....
....
....

(4) $\left(16c^8b^2\right)^{\frac{1}{2}} = $ ....

(5) $(2x-y)^2 = $ ....

Question 3 : **(A)** Factor the following polynomials :

(1) $4y^2 - 9 =$

(2) $x^3 + 27 =$

(B) Express the answer: $(3+4i)(2-3i) = $ ....

Question 4 :

(1) Solve, and write solutions in both inequality and interval notion:
$$|2x-6| \le 4.$$

(2) Solve : $6 - 5x = 6(2 - x)$

(3) Solve by factoring or by quadratic formula: $9x^2 - 12x + 4 = 0.$

Question 5: (1) $Let\ f(x) = \dfrac{6}{x+4}$

(a) Find the domain of f

....

....

(b) Calculate $f(1)$.

....

....

....

Question 1: Simplify the following:

(1) $\left(\dfrac{3}{2}+\dfrac{4}{3}\right)^{-1} =$

....

....

(2) $-3x^3-(-3x)^3 =$

....

....

(3) $\left(\dfrac{m^3 m^{-3}}{n^2}\right)^{-2} =$

....

....

(4) $\left(16a^4 b^6 c^8\right)^{\frac{1}{2}} =$

....

....

(5) $\left(\sqrt[3]{a^2}-\sqrt[3]{b^2}\right)\left(\sqrt[3]{a}+\sqrt[3]{b}\right) =$

....

....

Question 2 : **(A)** Factor the following polynomials :

(1) $6x^2 +10xy-4y^2 =$

....

....

....

(2) $27x^3 - y^3 =$

....

....

(3) $9b^2 - 4a^2 =$

....
....

(B) Solve : $\quad 3x - y = 5$

$\qquad\quad 2x + 2y = 6$

....
....
....

Question 3 :

(1) Solve, and write solutions in both inequality and interval notion:

$|2 - 2x| \le 4$

....
....
....
....
....

(2) Solve and graph: $3 - x \ge 5(3 - x)$

....
....

(3) Solve by quadratic formula : $x^2 - 2x + 3 = 0.$

....
....
....

(4) Express the answer:

(a) $(4 + 3i)(4 - 3i) =$

....
....

(b) $\dfrac{1}{1 + 3i} =$

Question 4: (1) Let $f(x) = \sqrt{x-3}$ and $g(x) = 3x^2 + 1$

(a) Calculate $f(4)$

(b) Find the domain of f

(c) Find the function $(g \circ f)(x)$

(2) Determine the function f is even, odd or neither.

$$f(x) = 2x^3 + x$$

Question 5:

(1) Find an equation for the line that passes through the two points (-2,2) and (4,5).

(2) Find the slope and y-intercept of the line: $3x + 4y = 8$.

(3) Find the equation of a circule with radius 4 and center $C = (-2, -4)$

(4) Find the distance between the points $(1,6)$ and $(4,7)$.

(5) Find the reflection through $y - $axis of the point $(-5,6)$.

Question 1: Simplify the following:

(1) $\left(\dfrac{1}{3}+\dfrac{3}{2}\right)^{-1} =$

(2) $-4x^3 - (-2x)^3 =$

(3) $\left(\dfrac{x^2 x^{-2}}{y^{-3}}\right)^{-1} =$

(4) $\left(36a^2 b^8 c^4\right)^{\frac{1}{2}} =$

(5) $\left(\sqrt[3]{c^2} - \sqrt[3]{d^2}\right)\left(\sqrt[3]{c} + \sqrt[3]{d}\right) =$

Question 2 : **(A)** Factor the following polynomials :

(1) $6x^2 + 14xy + 4y^2 =$

(2) $x^3 + 8y^3 =$

(3) $9a^2 - 4b^2 =$

(B) Solve : $\quad 4x - 2y = 0$

$\qquad\qquad 3x + 2y = 7$

Question 3 :

(1) Solve, and write solutions in both inequality and interval notion:

$|4 - 2x| \le 6$

(2) Solve and graph: $1 - x \ge 5(1 - x)$.

(3) Solve by quadratic formula : $2x^2 - 2x + 1 = 0$.

(4) Express the answer:

(a) $(1+3i)(1-3i) =$

$(b)\ \dfrac{1}{1-i} =$

Question 4: (1) *Let* $f(x) = \sqrt{x-2}$ and $g(x) = 4x^2 - 1$

(*a*) Calculate $g(2)$

(b) Find the domain of f

(c) Find the function $(g \circ f)(x)$

(2) Determine the function f is even, odd or neither.

$$f(x) = x^2 - 2x$$

....

....

Question 5:

(1) Find an equation for the line that passes through the two points (4,3) and (5,6).

....

....

....

(2) Find the slope and y-intercept of the line: $2x - 5y = 10$.

....

....

....

....

(3) Find the equation of a circule with radius 5 and center $C = (-4, -1)$.

....

....

....

....

....

(4) Find the distance between the points (2,-4) and (-1,1).

....

....

....

....

(5) Find the reflection through $y - $ axis of the point (-7,-4).

....

....

....

Question 1: **Choose the correct answer:**

(1) $x \cdot x^{-1} = \ldots\ldots\ldots$

(a) x $\qquad$ (b) x^{-1} $\qquad$ (c) 1 $\qquad$ (d) 0

(2) $\left(a^{m}\right)^{n} = \ldots\ldots\ldots$

(a) a^{m+n} $\qquad$ (b) a^{m-n} $\qquad$ (c) a^{mn} $\qquad$ (d) $a^{\frac{m}{n}}$

(3) $9^{-\frac{3}{2}} = \ldots\ldots\ldots$

(a) 27 $\qquad$ (b) $\dfrac{1}{27}$ $\qquad$ (c) -27 $\qquad$ (d) $-\dfrac{1}{27}$

(4) The reflection through the $y-$axis of the point $(3,7)$ is the point $\ldots\ldots\ldots$

(a) $(-3,7)$ $\qquad$ (b) $(3,-7)$ $\qquad$ (c) $(3,7)$ $\qquad$ (d) $(-3,-7)$

(5) The equation of a circle with radius 4 and center at $(3,-4)$ is$\ldots\ldots\ldots$

(a) $(x-3)^2 + (y-4)^2 = 16$ $\qquad$ (b) $(x+3)^2 + (y-4)^2 = 16$
(c) $(x+3)^2 + (y+4)^2 = 16$ $\qquad$ (d) $(x-3)^2 + (y+4)^2 = 16$

(6) Given two nonvertical lines L_1 and L_2 with slopes m_1 and m_2, respectively, then $L_1 \perp L_2$ if and only if $\ldots\ldots\ldots$

(a) $m_1 = m_2$ $\qquad$ (b) $m_1 = -m_2$ $\qquad$ (c) $m_1 \cdot m_2 = 1$ $\qquad$ (d) $m_1 \cdot m_2 = -1$

(7) If $f(x) = x^4 + 2x$, then the function f is ....

(a) even and odd $\qquad$ (b) odd $\qquad$ (c) even $\qquad$ (d) neither even nor odd

(8) Given the line $-4x + 3y = 5$, then its slope is ....

(a) $-\dfrac{4}{3}$ $\qquad$ (b) $\dfrac{4}{3}$ $\qquad$ (c) $-\dfrac{3}{4}$ $\qquad$ (d) $\dfrac{3}{4}$

(9) If the line passes through two distinct points $P_1 = (x_1, y_1)$ and $P_2 = (x_2, y_2)$, then its slope m is given by formula ....such that $x_1 \neq x_2$.

(a) $m = \dfrac{y_2 + y_1}{x_2 - x_1}$ $\qquad$ (b) $m = \dfrac{y_2 + y_1}{x_2 + x_1}$ $\qquad$ (c) $m = \dfrac{y_2 - y_1}{x_2 - x_1}$ $\qquad$ (d) $m = \dfrac{y_2 - y_1}{x_2 + x_1}$

(10) If $f(x) = x^2 + 1$ and $g(x) = 2x$, then $(f \circ g)(x) = $ ....

(a) $4x^2 + 4$ $\qquad$ (b) $4x^2 + 1$ $\qquad$ (c) $4x^2 + 2$ $\qquad$ (d) $4x^2 + 3$

Question 2: Simplify the following:

(1) $\left(\dfrac{x^{-3}}{y^5 y^{-5}} \right)^{-1} = $ ....

....

....

(2) $(32)^{-\frac{2}{5}} = $ ....

....

....

(3) $\sqrt[3]{27a^6 b^3} = $ ....

....

(4) $(2x+3y)(2x-3y) = \text{......................}$

(5) $(3 \div 4) \div 5 = \text{...................}$

Question 3 : **(A)** Factor the following polynomials :

(1) $x^2 - 4y^2 =$

(2) $u^3 - 1 =$

(B) Express the answer: $(2+3i)(2-3i) = \text{........}$

(C) Solve by using any method: $2x + 3y = 13$

$3x - y = -3$

Question 4 :

(1) Solve, and write solutions in both inequality and interval notion:

$|3x - 6| \geq 3.$

(2) Solve : $|2x - 4| = 6$

(3) Solve by factoring or by quadratic formula: $16x^2 - 24x + 9 = 0$.

Question 5: (1) $Let \ f(x) = 2x^2 - 3x + 5$

(a) Find the domain of f

(b) Calculate $f(2)$.

(2) Given $A = \begin{bmatrix} 2 & 4 \\ 0 & 1 \end{bmatrix}$ and $B = \begin{bmatrix} 2 & 1 \\ 3 & 0 \end{bmatrix}$

Find (1) AB (2) $A + B$ (3) $3A$

Sheet (8)

<u>Question 1</u>: Choose the correct answer:

(1) $x \cdot x^{-1} = \ldots\ldots\ldots$

$(a)\ 1$ $\qquad\qquad (b)\ x^{-1}$ $\qquad\qquad (c)\ x$ $\qquad\qquad (d)\ 0$

(2) $\left(a^m\right)^n = \ldots\ldots\ldots$

$(a)\ a^{m+n}$ $\qquad (b)\ a^{mn}$ $\qquad (c)\ a^{m-n}$ $\qquad (d)\ a^{\frac{m}{n}}$

(3) $9^{\frac{3}{2}} = \ldots\ldots\ldots$

$(a)\ 27$ $\qquad\qquad (b)\ \dfrac{1}{27}$ $\qquad\qquad (c)\ -27$ $\qquad\qquad (d)\ -\dfrac{1}{27}$

(4) The reflection through the $y-$ axis of the point (-3,7) is the point ....

$(a)\ (-3,7)$ $\qquad (b)\ (3,-7)$ $\qquad (c)\ (3,7)$ $\qquad (d)\ (-3,-7)$

(5) The equation of a circle with radius 4 and center at (-3,-4) is.........

$(a)\ (x-3)^2 + (y-4)^2 = 16$ $\qquad\qquad (b)\ (x+3)^2 + (y-4)^2 = 16$
$(c)\ (x+3)^2 + (y+4)^2 = 16$ $\qquad\qquad (d)\ (x-3)^2 + (y+4)^2 = 16$

(6) Given two nonvertical lines L_1 and L_2 with slopes m_1 and m_2, respectively,
then $L_1 \perp L_2$ if and only if ....

$(a)\ m_1 \cdot m_2 = -1$ $\qquad (b)\ m_1 = -m_2$ $\qquad (c)\ m_1 \cdot m_2 = 1$ $\qquad (d)\ m_1 = m_2$

(7) If $f(x) = x^5 + 2x$, then the function f is ....

(a) even and odd   (b) odd   (c) even   (d) neither even nor odd

(8) Given the line $3x + 4y = 5$, then its slope is ....

(a) $-\dfrac{4}{3}$ (b) $\dfrac{4}{3}$ (c) $-\dfrac{3}{4}$ (d) $\dfrac{3}{4}$

(9) If the line passes through two distinct points $P_1 = (x_1, y_1)$ and $P_2 = (x_2, y_2)$, then its slope m is given by formula ....such that $x_1 \neq x_2$.

(a) $m = \dfrac{y_2 - y_1}{x_2 - x_1}$ (b) $m = \dfrac{y_2 + y_1}{x_2 + x_1}$ (c) $m = \dfrac{y_2 + y_1}{x_2 - x_1}$ (d) $m = \dfrac{y_2 - y_1}{x_2 + x_1}$

(10) If $f(x) = x^2 + 2$ and $g(x) = 2x$, then $(f \circ g)(x) =$ ....

(a) $4x^2 + 4$ (b) $4x^2 + 1$ (c) $4x^2 + 2$ (d) $4x^2 + 3$

Question 2: Simplify the following:

(1) $\left(\dfrac{y^5 y^{-5}}{x^{-3}} \right)^{-1} = $ ....

....

....

(2) $(32)^{-\frac{3}{5}} = $ ....

....

....

(3) $\sqrt[3]{27a^3b^6} = $ ....

....

....

(4) $(3x + 2y)(3x - 2y) = $ ....

(5) $3 \div (4 \div 5) = $ ....

Question 3 : **(A)** Factor the following polynomials :

(1) $4x^2 - y^2 = $

(2) $x^3 - 1 = $

(B) Express the answer: $(3 + 4i)(3 - 4i) = $ ....

(C) Solve by using any method: $3x + 2y = 10$

$x + 4y = 14$

Question 4 :

 (1) Solve, and write solutions in both inequality and interval notion:
$| 2x - 4 | \geq 6.$

(2) Solve : $|2x - 2| = 8$

(3) Solve by factoring or by quadratic formula: $16x^2 + 24x + 9 = 0.$

Question 5: (1) $Let\ f(x) = 3x^2 - 2x + 4$

(a) Find the domain of f

(b) Calculate $f(2)$.

(2) Given $A = \begin{bmatrix} 2 & 4 \\ 0 & 1 \end{bmatrix}$ and $B = \begin{bmatrix} 2 & 1 \\ 3 & 0 \end{bmatrix}$

Find (1) BA (2) $A - B$ (3) $2A$