

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



المملكة العربية السعودية
وزارة التعليم العالي
جامعة جازان
عمادة السنة التحضيرية
قسم العلوم - شعبة الرياضيات

Questions Bank for Faculty of Computer Science Students
100 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 :

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

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

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

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

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

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

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

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

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

$$(10) (3x^3 + 2x^2 - x + 2) + (-3x^3 + 2x^2 + x - 2) =$$

$$(11) (2x + 3y)^2 =$$

$$(12) (2x - y)(2x + y) =$$

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

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

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

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

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

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

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

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

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

$$(10) (3x^3 + 2x^2 + x + 2) + (-3x^3 - 2x^2 + x - 2) =$$

$$(11) (2x - 2y)^2 =$$

$$(12) (x - 2y)(x + 2y) =$$

Answer the following questions :

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

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

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

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

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

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

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

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

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

$$(10) (3x^3 + 2x^2 - x + 2) + (3x^3 - 2x^2 + x - 2) =$$

$$(11) (3x + 2y)^2 =$$

$$(12) (3x - y)(3x + y) =$$

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

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

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

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

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

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

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

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

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

$$(10) (-3x^3 - 2x^2 - x + 2) + (3x^3 + 2x^2 + x + 2) =$$

$$(11) (3x - 3y)^2 =$$

$$(12) (x - 3y)(x + 3y) =$$

Answer the following questions :

➤ $\left(-\frac{5}{3}\right) \cdot (\dots\dots\dots) = 1$

➤ $\frac{3}{2} + \dots\dots\dots = 0$

➤ $\left(\frac{b}{a} + \frac{d}{a}\right) =$

➤ $\frac{km}{kn} =$

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

➤ $(u^3 + 3v^2) \cdot 1 =$

➤ $(y^m)^n =$

➤ $4^m \cdot 4^n =$

➤ $(32)^{\frac{3}{5}} =$

➤ $-25^{\frac{1}{2}} =$

➤ $(\sqrt{y} + 3)(\sqrt{y} - 4) =$

➤ $(a + 2b)^2 =$

➤ $\sqrt{4} \cdot \sqrt{5} =$

➤ $(\dots\dots\dots) \cdot \left(-\frac{3}{4}\right) = 1$

➤ $\frac{3}{4} + \dots\dots\dots = 0$

➤ $\left(\frac{b}{c} + \frac{a}{c}\right) =$

➤ $\frac{kx}{ky} =$

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

➤ $(x^3 + 3y^2) \cdot 0 =$

➤ $(x^m)^n =$

➤ $2^m \cdot 2^n =$

➤ $(-32)^{\frac{2}{5}} =$

➤ $-16^{\frac{1}{2}} =$

➤ $(\sqrt{y} - 3)(\sqrt{y} + 5) =$

➤ $(u + 2v)^2 =$

➤ $\sqrt{10} \cdot \sqrt{2} =$

➤ $\sqrt[3]{27z^3} =$

➤ $(x^2 + 5x + 6) - (x^2 - 2x - 4) =$

➤ $(3x + 1)(9x^2 - 3x + 1) =$

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

➤ $9x^2 - y^2 = (\quad) (\quad)$

➤ $\sqrt[3]{8x^3} =$

➤ $(x^2 + 5x + 6) - (x^2 - 2x - 4) =$

➤ $(x - y)(x^2 - xy + y^2) =$

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

➤ $x^2 - 4y^2 = (\quad) (\quad)$

Answer the following questions :

$$\left(\dots \right) \cdot \left(-\frac{3}{4} \right) = 1$$

$$\frac{3}{4} + \dots = 0$$

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

$$\frac{ka}{kb} =$$

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

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

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

$$3^m \cdot 3^n =$$

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

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

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

$$\left(a + 2b \right)^2 =$$

$$\left(-\frac{2}{3} \right) \cdot \left(\dots \right) = 1$$

$$\frac{1}{4} + \dots = 0$$

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

$$\frac{kb}{ka} =$$

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

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

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

$$5^m \cdot 5^n =$$

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

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

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

$$\left(m + 2n \right)^2 =$$

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

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

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

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

$$\text{Factor out: } 3x^3y + 6x^2y^2 - 3xy^3$$

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

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

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

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

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

$$\text{Factor out: } 6x^3y + 3x^2y^2 - 12xy^3$$

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

Answer the following questions :



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

❖ the additive inverse of -6 is

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

❖ $\frac{5}{2} \div \frac{6}{5} =$

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

❖ $(u^3 v^2)^0 =$

❖ $(a^4)^2 =$

❖ $a^m \cdot a^n =$

❖ $(-8)^{\frac{4}{3}} =$

❖ $(-9)^{\frac{1}{2}} =$

❖ $\sqrt{4} \cdot \sqrt{5} =$



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

❖ the additive inverse of 5 is

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

❖ $\frac{4}{3} \div \frac{1}{6} =$

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

❖ $(x^2 y^5)^0 =$

❖ $(a^m)^n =$

❖ $a^3 \cdot a^5 =$

❖ $(-125)^{\frac{2}{3}} =$

❖ $(-4)^{\frac{1}{2}} =$

❖ $\sqrt{2} \cdot \sqrt{20} =$

❖ $\sqrt[3]{27x^6y^9} =$

❖ $(3x^2 + 5x + 6) + (x^2 - 4x - 4) =$

❖ $(x + 3)(x^2 - 3x + 9) =$

❖ factor by grouping :

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

❖ $x^2 - 16 = (\quad)(\quad)$

❖ $\sqrt[3]{8x^9y^3} =$

❖ $(x^3 + 5x + 3) + (2x^2 - 4x - 2) =$

❖ $(x - 3)^2 =$

❖ factor by grouping :

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

❖ $x^2 - 1 = (\quad)(\quad)$

Factor the following

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

(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: $4(x+2) - 8 \leq 3(x-1) + 4$.

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

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

(Q) Express the answer:

(a) $(4+5i)+(-3-2i)=$

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

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

(d) $\frac{1}{2+3i} =$

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

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

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

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

(Q) Express the answer:

(a) $(2-5i)+(-3+2i)=$

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

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

(d) $\frac{1}{3+2i} =$

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

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

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

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

(Q) Express the answer:

(a) $(3+5i)+(-4+2i)=$

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

(c) $(2+3i)(2-3i) =$

(d) $\frac{1}{2+2i} =$

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

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

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

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

(Q) Express the answer:

(a) $(3+4i)+(-5-3i)=$

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

(c) $(3+i)(3-i) =$

(d) $\frac{1}{1-2i} =$

(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) $(x-2)^2 + (y-1)^2 = 25$ (b) $(x+1)^2 + (y-2)^2 = 25$
(c) $(x+2)^2 + (y+1)^2 = 5$ (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) $\frac{1}{2}$ (b) $-\frac{1}{2}$ (c) -2 (d) 2

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

(a) $\frac{3}{2}$

(b) $-\frac{3}{2}$

(c) $-\frac{2}{3}$

(d) $\frac{2}{3}$

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) $\frac{4}{3}$

(b) $-\frac{3}{4}$

(c) $-\frac{4}{3}$

(d) $\frac{3}{4}$

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

(a) $\frac{3}{2}$

(b) $-\frac{3}{2}$

(c) $-\frac{2}{3}$

(d) $\frac{2}{3}$

Choose the correct answer:

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

(a) $(-5, 4)$

(b) $(5, 4)$

(c) $(5, -4)$

(d) $(-5, -4)$

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

(a) 5

(b) 6

(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) $(2, 3)$

(b) $(-2, -3)$

(c) $(2, -3)$

(d) $(-2, 3)$

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

(a) $(x-2)^2 + (y-1)^2 = 36$

(b) $(x+1)^2 + (y-2)^2 = 36$

(c) $(x+2)^2 + (y+1)^2 = 6$

(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

$m =$

$(a) \frac{4}{3}$

$(b) -\frac{3}{4}$

$(c) -\frac{4}{3}$

$(d) \frac{3}{4}$

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

$(a) \frac{3}{2}$

$(b) -\frac{3}{2}$

$(c) -\frac{2}{3}$

$(d) \frac{2}{3}$

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) $\frac{1}{2}$ (b) $-\frac{1}{2}$ (c) -2 (d) 2

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

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

In Problems 5–12, find 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. $C = (-5, 6), r = \sqrt{\pi}$ |
| 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 $f(x) = \frac{12}{x-1}$, then $f(5) = \dots\dots$

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

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

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

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

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

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

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

Choose the correct answer:

(1) If $f(x) = \frac{12}{x-1}$, then $f(-2) = \dots\dots$

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

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

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

(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 $(f \circ g)(x) = \dots\dots\dots$

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

Choose the correct answer:

(1) If $f(x) = \frac{12}{x-1}$, then $f(4) = \dots\dots\dots$

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

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

- (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 $(f \circ g)(x) = \dots\dots\dots$

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

Choose the correct answer:

(1) If $f(x) = \frac{12}{x-1}$, then $f(-3) = \dots\dots\dots$

(a) 3

(b) 4

(c) -3

(d) -4

(2) If $f(x) = \frac{1}{x+1}$, then the domain of f is $D_f = \dots\dots$

(a) R

(b) $[-1, \infty)$

(c) $(-\infty, -1)$

(d) $(-\infty, -1) \cup (-1, \infty)$

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

(a) even function

(b) odd function

(c) neither even nor odd function

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

(a) $3x^2 + 2$

(b) $9x^2 + 2$

(c) $3x^2 + 6$

(d) $3x^2 + 3$

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

(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 $K(x) = \frac{6}{3 - \sqrt{x}}$.

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

(A) $f(x) = \frac{15}{x - 3}$

(B) $g(x) = 16 + 3x - x^2$

(C) $k(x) = \frac{2}{\sqrt{x} - 2}$

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

(A) $F(x) = \frac{4}{2 - x}$

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

(C) $K(x) = \frac{6}{3 - \sqrt{x}}$

- 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.** $M(w) = \frac{w - 5}{\sqrt{3 + 2w^2}}$
- 51.** $h(z) = \frac{2}{4 - z}$ **52.** $k(z) = \frac{z}{z - 3}$
- 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.** $H(u) = \frac{u}{u^2 + 4}$ **58.** $G(u) = \frac{u}{u^2 - 4}$
- 59.** $M(x) = \frac{\sqrt{x + 4}}{x - 1}$ **60.** $N(x) = \frac{\sqrt{x - 3}}{x + 2}$
- 61.** $s(t) = \frac{1}{3 - \sqrt{t}}$ **62.** $r(t) = \frac{1}{\sqrt{t} - 4}$

CHAPTER 5
Exponential and Logarithmic Functions

5-1 Exponential Functions 328

5-3 Logarithmic Functions

5-5 Exponential and Logarithmic Equations

EXPONENTIAL FUNCTION PROPERTIES

For a and b positive, $a \neq 1$, $b \neq 1$, and x and y real:

1. Exponent laws:

$$\begin{aligned} a^x a^y &= a^{x+y} & (a^x)^y &= a^{xy} & (ab)^x &= a^x b^x \\ \left(\frac{a}{b}\right)^x &= \frac{a^x}{b^x} & \frac{a^x}{a^y} &= a^{x-y} & \frac{2^{5x}}{2^{7x}} &= 2^{5x-7x} = 2^{-2x} \end{aligned}$$

2. $a^x = a^y$ if and only if $x = y$. If $6^{4x} = 6^{2x+4}$, then $4x = 2x + 4$, and $x = 2$.

3. For $x \neq 0$, $a^x = b^x$ if and only if $a = b$. If $a^4 = 3^4$, then $a = 3$.

In Problems 33–50, solve for x .

33. $5^{3x} = 5^{4x-2}$

34. $10^{2-3x} = 10^{5x-6}$

35. $7^{x^2} = 7^{2x+3}$

36. $4^{5x-x^2} = 4^{-6}$

37. $\left(\frac{4}{3}\right)^{6x+1} = \frac{5}{4}$

38. $\left(\frac{7}{3}\right)^{2-x} = \frac{3}{7}$

39. $(1-x)^5 = (2x-1)^5$

40. $5^3 = (x+2)^3$

41. $2xe^{-x} = 0$

42. $(x-3)e^x = 0$

43. $x^2 e^x - 5xe^x = 0$

44. $3xe^{-x} + x^2 e^{-x} = 0$

45. $9^{x^2} = 3^{3x-1}$

46. $4^{x^2} = 2^{x+3}$

47. $25^{x+3} = 125^x$

48. $4^{5x+1} = 16^{2x-1}$

49. $4^{2x+7} = 8^{x+2}$

50. $100^{2x+3} = 1,000^{x+5}$

Change each logarithmic form to an equivalent exponential form.

(A) $\log_3 27 = 3$ (B) $\log_{36} 6 = \frac{1}{2}$ (C) $\log_3 \left(\frac{1}{9}\right) = -2$

Logarithmic-Exponential Conversions

Change each exponential form to an equivalent logarithmic form.

(A) $49 = 7^2$ (B) $3 = \sqrt{9}$ (C) $\frac{1}{5} = 5^{-1}$

Solutions of the Equation $y = \log_b x$

Find x , b , or y as indicated.

(A) Find y : $y = \log_4 8$. (B) Find x : $\log_3 x = -2$. (C) Find b : $\log_b 81 = 4$.

Find x , b , or y as indicated.

(A) Find y : $y = \log_9 27$. (B) Find x : $\log_2 x = -3$. (C) Find b : $\log_b 100 = 2$.

THEOREM 2 Properties of Logarithmic Functions

If b , M , and N are positive real numbers, $b \neq 1$, and p and x are real numbers, then

- $\log_b 1 = 0$
- $\log_b b = 1$
- $\log_b b^x = x$
- $b^{\log_b x} = x, x > 0$
- $\log_b M = \log_b N$ if and only if $M = N$
- $\log_b MN = \log_b M + \log_b N$
- $\log_b \frac{M}{N} = \log_b M - \log_b N$
- $\log_b M^p = p \log_b M$

Using Logarithmic Properties

Simplify, using the properties in Theorem 2.

(A) $\log_e 1$ (B) $\log_{10} 10$ (C) $\log_e e^{2x+1}$
(D) $\log_{10} 0.01$ (E) $10^{\log_{10} 7}$ (F) $e^{\log_e x^2}$

Simplify, using the properties in Theorem 2.

(A) $\log_{10} 10^{-5}$ (B) $\log_5 25$ (C) $\log_{10} 1$
(D) $\log_e e^{m+n}$ (E) $10^{\log_{10} 4}$ (F) $e^{\log_e (x^4+1)}$

CHAPTER 6

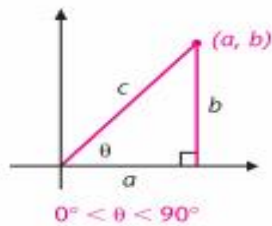
Trigonometric Functions

6-2 Trigonometric Functions

6-3 Solving Right Triangles

6-4 Properties of Trigonometric Functions

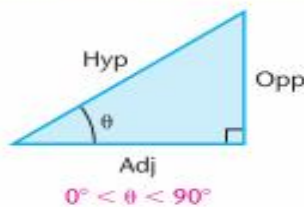
> TRIGONOMETRIC RATIOS



$$\begin{aligned} \sin \theta &= \frac{b}{c} & \csc \theta &= \frac{c}{b} \\ \cos \theta &= \frac{a}{c} & \sec \theta &= \frac{c}{a} \\ \tan \theta &= \frac{b}{a} & \cot \theta &= \frac{a}{b} \end{aligned}$$

Side b is often referred to as the **side opposite** angle θ , a as the **side adjacent** to angle θ , and c as the **hypotenuse**. Using these designations for an arbitrary right triangle removed from a coordinate system, we have the following:

> RIGHT TRIANGLE RATIOS



$$\begin{aligned} \sin \theta &= \frac{\text{Opp}}{\text{Hyp}} & \csc \theta &= \frac{\text{Hyp}}{\text{Opp}} \\ \cos \theta &= \frac{\text{Adj}}{\text{Hyp}} & \sec \theta &= \frac{\text{Hyp}}{\text{Adj}} \\ \tan \theta &= \frac{\text{Opp}}{\text{Adj}} & \cot \theta &= \frac{\text{Adj}}{\text{Opp}} \end{aligned}$$

Using Basic Identities

Use the basic identities to find the values of the other five trigonometric functions given $\sin x = -\frac{1}{2}$ and $\tan x > 0$.

Use the basic identities to find the values of the other five trigonometric functions given $\cos x = 1/\sqrt{2}$ and $\cot x < 0$.

Values of the Trigonometric Functions

If $\sin \theta = 4/7$ and $\cos \theta < 0$, find the values of each of the other five trigonometric functions of θ .

If $\tan \theta = 10$ and $\sin \theta < 0$, find the values of each of the other five trigonometric functions of θ .

Question 1: Choose the correct answer:

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

(a) $\frac{4}{3}$

(b) $\frac{9}{16}$

(c) $\frac{16}{9}$

(d) $\frac{3}{4}$

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

(a) $-\frac{1}{16}$

(b) 16

(c) $\frac{1}{16}$

(d) -16

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

(a) $32x^3$

(b) $22x^3$

(c) $-22x^3$

(d) $-32x^3$

(4) If $y = \log_2 32$, then $y = \dots\dots\dots$

(a) 2

(b) 4

(c) 3

(d) 5

(5) $a^2 \cdot a^3 = \dots\dots\dots$

(a) a^5

(b) a^6

(c) a^8

(d) a^9

(6) $(2x - y)(4x^2 + 2xy + y^2) = \dots\dots\dots$

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

(b) $8x^3 - y^3$

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

(d) $8x^3 + y^3$

Question 2: (A) Factor the following polynomials :

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

.....

.....

.....

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

.....

.....

.....

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

.....

.....

.....

(B) Solve $9^{x-1} = 27$ for x .

.....

.....

.....

Question 3:

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

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

.....

.....

.....

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

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

(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 $(4,7)$.

Question 1: Choose the correct answer:

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

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

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

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

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

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

$$(4) \text{ If } y = \log_2 16, \text{ then } y = \dots\dots\dots$$

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

$$(5) (a^2)^3 = \dots\dots\dots$$

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

$$(6) (2x - y)(4x^2 + 2xy + y^2) = \dots\dots\dots$$

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

.....

.....

.....

(B) Solve $9^{x-3} = 27$ for x .

.....

.....

.....

Question 3:

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

$$|8 - 2x| \geq 4.$$

.....

.....

.....

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

.....

.....

.....

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

(4) Express the answer:

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

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

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

(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) $\left(\frac{-5}{4}\right)^{-1} = \dots\dots\dots$

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

(2) $\frac{a^m}{a^{-n}} = \dots\dots\dots$

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

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

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

(4) $b^{\log_b x} = \dots\dots\dots$

- (a) x (b) $-x$ (c) $\frac{1}{x}$ (d) $-\frac{1}{x}$

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

- (a) $(-2,5)$ (b) $(2,-5)$ (c) $(2,5)$ (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 $L_1 \parallel L_2$ 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

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

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

(9) $\sec \theta = \dots\dots\dots$

- (a) $\frac{1}{\sin \theta}$ (b) $\frac{1}{\cos \theta}$ (c) $\frac{1}{\tan \theta}$ (d) $\frac{1}{\cot \theta}$

Question 2: Simplify the following:

(1) $\frac{a}{b} - \frac{c}{b} = \dots\dots\dots$

.....
.....

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

.....
.....

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

.....

.....

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

.....

.....

$$(5) (x + 2y)^2 = \dots\dots\dots$$

.....

.....

Question 3: (A) Factor the following polynomials :

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

.....

.....

$$(2) a^3 - 27 =$$

.....

.....

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

.....

.....

$$(C) \text{ Solve } 4^{x-1} = 16 \text{ for } x.$$

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

Question 4 :

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

$$|2x - 5| \leq 3.$$

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

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

.....
.....

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

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

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

(a) Find the domain of f

.....
.....

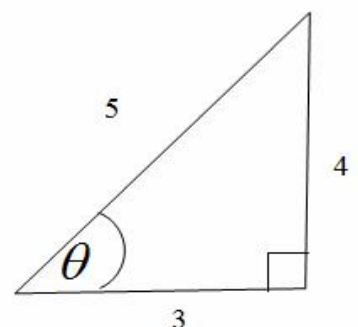
(b) Calculate $f(2).$

.....
.....

(2) Find the following:

(a) $\sin \theta = \dots\dots\dots$

(b) $\cot \theta = \dots\dots\dots$



Sheet (4)

Question 1: Choose the correct answer:

(1) $\left(\frac{4}{5}\right)^{-1} = \dots\dots\dots$

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

(2) $\frac{a^n}{a^m} = \dots\dots\dots$

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

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

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

(4) $e^{\log_e x^2} = \dots\dots\dots$

- (a) $-x^2$ (b) $-\frac{1}{x^2}$ (c) $\frac{1}{x^2}$ (d) x^2

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

- (a) $(-2,5)$ (b) $(2,-5)$ (c) $(2,5)$ (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 $L_1 \parallel L_2$ 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

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

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

(9) $\tan \theta = \dots\dots\dots$

- (a) $\frac{1}{\sin \theta}$ (b) $\frac{1}{\cos \theta}$ (c) $\frac{\cos \theta}{\sin \theta}$ (d) $\frac{\sin \theta}{\cos \theta}$

Question 2: Simplify the following:

(1) $\frac{c}{a} - \frac{b}{a} = \dots\dots\dots$

.....
.....

(2) $\left(\frac{x^3}{y^3 y^{-3}} \right)^2 = \dots\dots\dots$

.....
.....

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

.....

.....

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

.....

.....

$$(5) (2x - y)^2 = \dots\dots\dots$$

.....

.....

Question 3: (A) Factor the following polynomials :

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

.....

.....

$$(2) x^3 + 27 =$$

.....

.....

$$(B) \text{ Express the answer: } (3 + 4i)(2 - 3i) = \dots\dots\dots$$

.....

.....

$$(C) \text{ Solve } 4^{x-4} = 16 \text{ for } x.$$

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

Question 4 :

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

$$|2x - 6| \leq 4.$$

.....

.....

.....

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

.....

.....

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

.....

.....

.....

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

(a) Find the domain of f

.....

.....

(b) Calculate $f(1).$

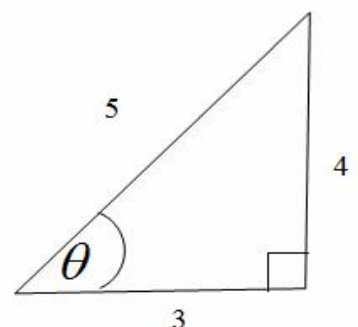
.....

.....

(2) Find the following:

(a) $\cot \theta = \dots\dots\dots$

(b) $\cos \theta = \dots\dots\dots$



Sheet (5)

Question 1: Simplify the following:

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

.....

.....

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

.....

.....

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

.....

.....

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

.....

.....

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

.....

.....

Question 2: (A) Factor the following polynomials :

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

.....

.....

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

.....

.....

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

.....

.....

Question 3 :

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

$$|2 - 2x| \leq 4$$

.....

.....

.....

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

.....

.....

.....

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

.....

.....

.....

(4) Express the answer:

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

.....

.....

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

.....

.....

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 circle 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:

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

.....

.....

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

.....

.....

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

.....

.....

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

.....

.....

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

.....

.....

Question 2: (A) Factor the following polynomials :

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

.....

.....

.....

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

.....

.....

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

.....

.....

Question 3 :

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

$$|4 - 2x| \leq 6$$

.....

.....

.....

.....

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

.....

.....

.....

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

.....

.....

.....

(4) Express the answer:

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

.....

.....

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

.....

.....

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 circle 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) $x \cdot x^{-1} = \dots\dots\dots$

(a) x

(b) x^{-1}

(c) 1

(d) 0

(2) $(a^m)^n = \dots\dots\dots$

(a) a^{m+n}

(b) a^{m-n}

(c) a^{mn}

(d) $a^{\frac{m}{n}}$

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

(a) 27

(b) $\frac{1}{27}$

(c) -27

(d) $-\frac{1}{27}$

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

(a) $(-3,7)$

(b) $(3,-7)$

(c) $(3,7)$

(d) $(-3,-7)$

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

(a) $(x-3)^2 + (y-4)^2 = 16$

(b) $(x+3)^2 + (y-4)^2 = 16$

(c) $(x+3)^2 + (y+4)^2 = 16$

(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) $m_1 = m_2$

(b) $m_1 = -m_2$

(c) $m_1 \cdot m_2 = 1$

(d) $m_1 \cdot m_2 = -1$

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

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

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

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

(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 formulasuch that $x_1 \neq x_2$.

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

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

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

Question 2: Simplify the following:

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

.....
.....

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

.....
.....

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

$$(4) (2x + 3y)(2x - 3y) = \dots\dots\dots$$

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

Question 3: (A) Factor the following polynomials :

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

$$(2) u^3 - 1 =$$

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

Question 4:

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

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

(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 $f(2)$.

Question 1: Choose the correct answer:

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

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

(2) $(a^m)^n = \dots\dots\dots$

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

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

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

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

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

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

- (a) $(x-3)^2 + (y-4)^2 = 16$ (b) $(x+3)^2 + (y-4)^2 = 16$
 (c) $(x+3)^2 + (y+4)^2 = 16$ (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) $m_1 \cdot m_2 = -1$ (b) $m_1 = -m_2$ (c) $m_1 \cdot m_2 = 1$ (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) $-\frac{4}{3}$ (b) $\frac{4}{3}$ (c) $-\frac{3}{4}$ (d) $\frac{3}{4}$

(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 formulasuch that $x_1 \neq x_2$.

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

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

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

Question 2: Simplify the following:

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

.....

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

.....

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

$$(4) (3x + 2y)(3x - 2y) = \dots\dots\dots$$

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

Question 3 : (A) Factor the following polynomials :

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

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

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

Question 4 :

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

$$|2x - 4| \geq 6.$$

(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 $f(2)$.

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