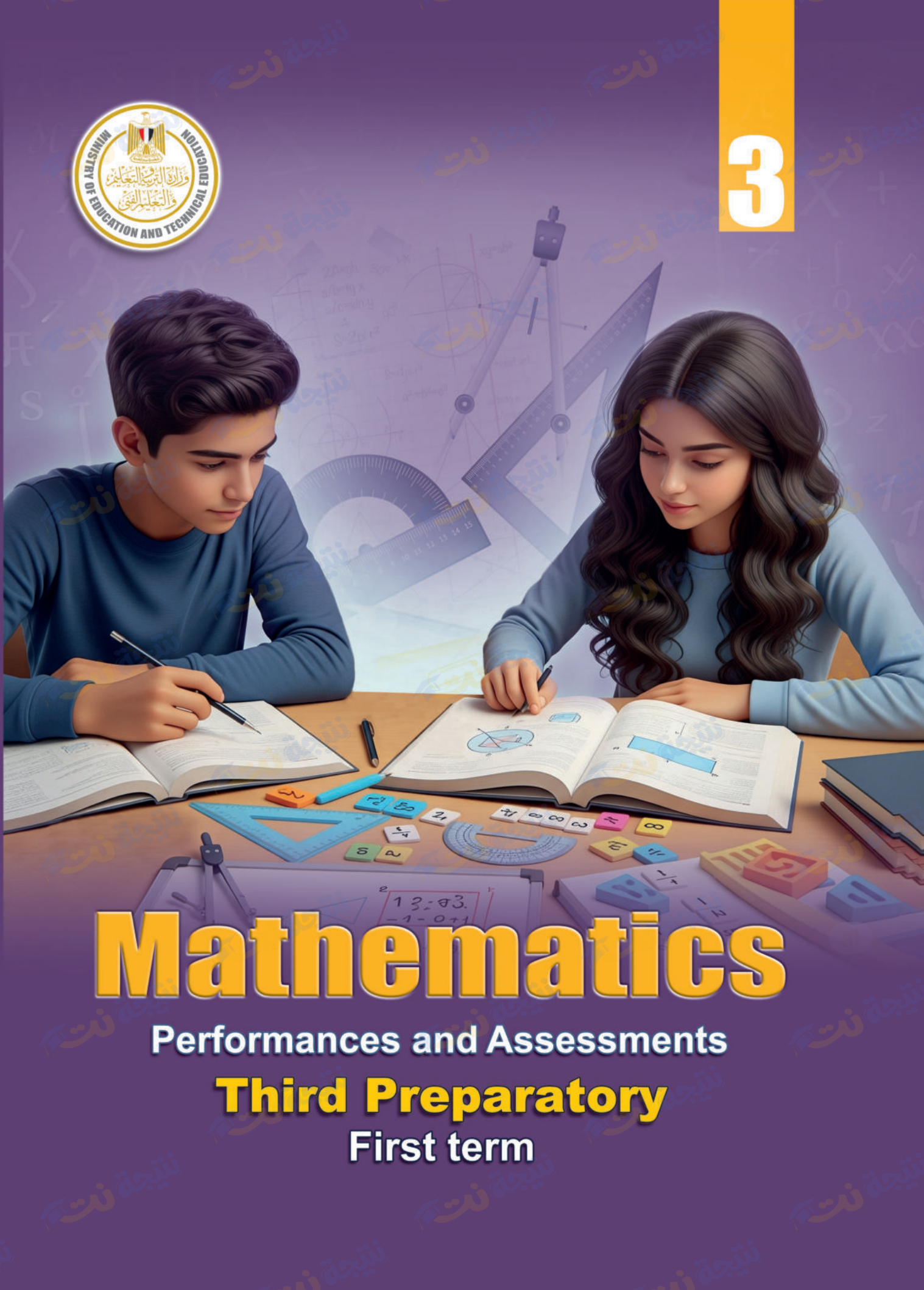

MINISTRY OF EDUCATION AND TECHNICAL EDUCATION
وزارة التربية والتعليم والتعليم الفني
3
Mathematics
Performances and Assessments
Third Preparatory
First term

The Ministry of Educataion and Technical Education
dedicates this book, with love to the students, teachers,
and families of the Arab Republic of Egypt



MATHEMATICS

Performances and Assessments

Third Preparatory

First term

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Name : .....

Class : .....

School : .....

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Introduction

The Ministry of Education and Technical Education recognizes the importance of empowering teachers with effective tools that elevate classroom performance, enhance the quality of education, and improve its outcomes. This is a real response to the voices of teachers, interacting with the feedback channels from the educational field, and meeting the needs of teachers for flexible and comprehensive educational tools that assist them in fulfilling their noble educational mission.

This book has been designed to serve as an integrated educational support for teachers, helping them in planning and executing their teaching tasks efficiently. It also facilitates continuous assessment processes. The content has been designed to offer diverse models of effective classroom performance and educational activities created based on an interactive methodology that enhances active learning. It contributes to a qualitative shift in teaching practices, clearly focusing on the student as the core of the educational process.

The book includes formative and diagnostic questions, as well as purposeful learning tasks that students can complete as homework, enhancing the integration of learning inside and outside the classroom and contributing to the sustainable construction of learning for students. These tools help develop critical and creative thinking, deepen understanding, and support and enhance student motivation, giving them a sense of achievement and excellence.

It also includes short weekly tests and periodic assessments, allowing teachers to measure the extent of learning outcomes and address learning gaps early, providing feedback on the initial results. The performances at the end of each month are concluded with immediate training sessions that help improve student performance. These assessments are gradual, taking into account individual differences and targeting various levels of cognitive development, within a framework of diversity, depth, and integration, preparing students for monthly tests efficiently.

This book is a true translation of the Ministry's directions to ease the burdens on parents, provide supporting educational content that enriches the classroom environment, and allow teachers more time for educational innovation and productive interaction with their students. It also forms an effective tool in supporting the Ministry's direction to enhance learning outcomes, achieving a real transformation in the learning environment—from memorization to understanding, from rote learning to application, and from passive reception to active participation.

When we place this work in the hands of teachers and students, we hope it will be a valuable contribution to improving academic performance, enhancing the quality of education, and becoming an additional cornerstone in building a generation that is aware and knowledgeable, equipped with the skills and competencies needed for success in a world that demands creativity and innovation. It aims to have a tangible impact in realizing an ambitious educational vision for the future of education in our beloved country.

Allah is the one sought for help, and He guides to the right path...

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Unit One	Week	Lesson 1: Power of Powers	Date: / /

Class performance:

Activity (1): Equivalent Powers:

You have a set of cards, each carries an algebraic expression. Choose all cards that carry an expression equivalent to the expression on the red card. Discuss your solution steps with your classmates:

$(x^5y^6)^3$ | x^8y^9 | $x^{53}y^{63}$ | $x^{15}y^{18}$

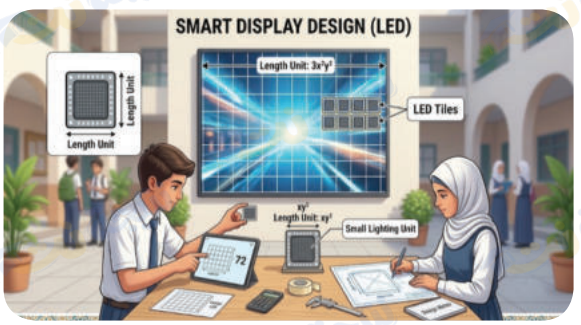
$x^{35}y^{36}$ | $y^{18}x^{15}$ | $(x^5)^3(y^6)^3$ | $(x^{10}\ y^8)(x^5\ y^{10})$

.....

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.....

Activity (2): Smart Display Board (LED):



Students decided to design a square-shaped smart electronic bulletin board in the school courtyard to display daily activities. If the side length of this board is $3x^2y^4$ length units, and it is to be constructed using small square LED lighting units, each with a side length of xy^2 length units. Collaborate with your classmate to find the following:

1) Write a mathematical expression representing the total area of the display board.

.....

2) Write a mathematical expression representing the area of a single small LED unit.

.....

3) Find the number of LED lighting units required to completely cover the display board, in simplest form.

.....

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Home performance (Homework):

1) What is the value of $(n^2 m^3)^3$ when n = m = 2?

.....

Put each of the following in simplest form:

2) $\frac{(x^4)^5}{(-x^3)^4}$

.....

3) $-a^5 \times (-a^6)^2$

.....

4) Find the value of the expression $\frac{5^m \times (7)^{m-1}}{35^m}$ when m = 1.

.....

5) If $= 3^y = 5$, what is the value of 27^y?

.....

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Weekly Assessment (Week.....)

Group (A)

First: Choose the correct answer:

1) Which of the following is equivalent to $(b^2)^3$?

(a) b^5 (b) b^{23} (c) b^{32} (d) b^6

Second: Answer the following:

2) What is the value of $(x^{11})^6$ when x = 1?

3) What is the result of $y^8 \times (y^3)^4$ in simplest form?

4) What is the result of $(-m^3n)^2$ in simplest form?

5) If = 2, what is the value of ?

Group (B)

First: Choose the correct answer:

1) Which of the following is equivalent to $(b^3)^4$?

(a) b^7 (b) b^{43} (c) b^{12} (d) b^{34}

Second: Answer the following:

2) What is the value of $(x^{11})^5$ when x = 1?

3) What is the result of $y^6 \times (y^5)^3$ in simplest form?

4) What is the result of $(-m^5n)^2$ in simplest form?

5) If = 3, what is the value of ?

Group (C)

First: Choose the correct answer:

1) Which of the following is equivalent to $(b^5)^4$?

(a) b^9 (b) b^{20} (c) b^{54} (d) b^{45}

Second: Answer the following:

2) What is the value of $(n^6)^{11}$ when x = 1?

3) What is the result of $y^4 \times (y^7)^3$ in simplest form?

4) What is the result of $(-m^7n)^3$ in simplest form?

5) If $5^y = 3$, what is the value of 25^y?

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Unit One | Week ..... | Lesson 1: Exponential Equations | Date: / /

Class performance:

Activity: Exponential Growth in Social Media Platforms:

Social media platforms are an ultra-fast medium for spreading news and information. If a student posts an educational video on their page, and 3 of their friends share it in the first hour, and in each subsequent hour, each new person shares the video with 3 other new friends, assuming this pattern continues regularly:



After how many hours will the number of new people sharing the video in that specific hour reach 243 people? Discuss your solution steps with your classmates.

.....

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Home performance (Homework):

Solve each of the following equations in R:

1) $4^{x+1} = 2^{x}$

2) $25^{x^2-9} = 1$

3) $3^{x^2} = 81^{3-x}$

Find the value of n in the following:

4) $\frac{7^{n} \times 27^{n+1}}{21^{n}} = 3^{n}$

5) $\frac{15^{2n-1}}{3^{n} \times 5^{n}} = 1$

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Weekly Assessment (Week.....)

Group (A)

First: Choose the correct answer:

1) If $11^{x-3} = 1$, what is the value of x?

(a) 1 (b) 2 (c) 3 (d) 4

Second: Answer the following:

2) Solve the equation: , where $x \in R$. $2^{2x-1} = 8$.

3) Find the solution set in R: $5^{2x-1} = \frac{1}{125}$

4) Find the solution set in R: $(\frac{1}{8})^{x-2} = 128$

5) Find the solution set in R: $\frac{5^n \times 49^n}{35^n} = 343$

Group (B)

First: Choose the correct answer:

1) If $11^{x-6} = 1$, what is the value of x?

(a) 7 (b) 6 (c) 5 (d) 4

Second: Answer the following:

2) Solve the equation: , where $x \in R$. $6^{2x-1} = 36$.

3) Find the solution set in R: $7^{2x-1} = \frac{1}{49}$

4) Find the solution set in R: $(\frac{1}{9})^{x-2} = 81$

5) Find the solution set in R: $\frac{16^n \times 9^n}{36^n} = 64$

Group C

First: Choose the correct answer:

1) If $11^{x-5} = 1$, what is the value of x?

(a) 6 (b) 5 (c) 4 (d) 3

Second: Answer the following:

2) Solve the equation: , where $x \in R$. $6^{2x-1} = 36$.

3) Find the solution set in R: $9^{2x-1} = \frac{1}{81}$

4) Find the solution set in R: $(\frac{1}{4})^{x-2} = 64$

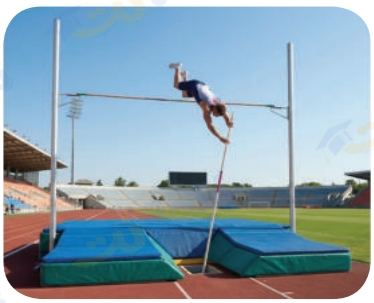
5) Find the solution set in R: $\frac{7^n \times 27^n}{21^n} = 81$

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Unit One | Week ..... | Lesson 1: Quadratic Functions | Date: / /

Class performance:

Activity: The Decisive Vault



In a school athletics competition, the school champion is preparing for a decisive pole vault jump to break the record. The athlete's movement forms a curved path in the air that can be modeled by the quadratic function: $f(x) = -x^2 - 8x - 11$, where x is the horizontal distance in meters covered by the athlete from the moment their feet leave the ground, and f(x) is the athlete's height above the ground in meters. Collaborate with your classmate and answer the following:

1) Determine the coordinates of the point at which the athlete reaches the highest point of their jump.

.....

.....

2) If the record bar is set at a height of 4.8 meters, based on the maximum value of the function, will the athlete be able to break the record and clear the bar safely?

.....

.....

Home performance (Homework):

Graph the following quadratic functions. Show on the graph the axis of symmetry, the maximum or minimum value, and the coordinates of the vertex for each function:

1) $f(x) = x^2 + 2x + 1$
2) $g(x) = -x^2 + 2x + 6$
3) $n(x) = 2x - x^2$
4) $m(x) = (x + 2)^2 + 4$
5) $z(x) = (x - 1)^2 - 2$

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Weekly Assessment (Week.....)

Group (A)

First: Choose the correct answer:

1) Which of the following is the y-intercept of the curve of the function $f(x) = x^2 - 3x - 4$?

(a) (0, -4) (b) (0, -3) (c) (0, 3) (d) (0, 4)

Second: Answer the following:

2) Find the minimum value of the function $f(x) = x^2 - 6x + 14$.

3) If (h, k) is the vertex of the curve for the function f where $f(x) = 2x^2 - 8x + 7$, what is the value of h?

4) If -2 is the x-coordinate of the vertex of the curve for the function f where $f(x) = ax^2 + 12x + 7$, what is the value of a?

5) Graph the function $f(x) = x^2 - x - 2$ and find the maximum or minimum value of the function.

Group (B)

First: Choose the correct answer:

1) Which of the following is the y-intercept of the curve of the function $f(x) = x^2 - 3x - 5$?

(a) (0, 5) (b) (0, -3) (c) (0, 3) (d) (0, -5)

Second: Answer the following:

2) Find the maximum value of the function $f(x) = -x^2 + 6x - 5$.

3) If (h, k) is the vertex of the curve for the function f where $f(x) = -3x^2 - 12x + 5$, what is the value of h?

4) If -2 is the x-coordinate of the vertex of the curve for the function f where $f(x) = ax^2 + 14x + 7$, what is the value of a?

5) Graph the function $f(x) = x^2 + 3x + 2$ and find the maximum or minimum value of the function.

Group (C)

First: Choose the correct answer:

1) Which of the following is the y-intercept of the curve of the function $f(x) = x^2 - 3x - 6$?

(a) (0, -3) (b) (0, 6) (c) (0, -6) (d) (0, 3)

Second: Answer the following:

2) Find the minimum value of the function $f(x) = x^2 - 6x - 5$.

3) If (h, k) is the vertex of the curve for the function f where $f(x) = -4x^2 - 8x + 5$, what is the value of h?

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4) If -2 is the x-coordinate of the vertex of the curve for the function f where $f(x) = ax^2 + 16x + 7$, what is the value of a?

5) Graph the function $f(x) = x^2 - 3x - 4$ and find the maximum or minimum value of the function.

Unit One | Week ..... | Lesson 2: Set of Real Zeros of Polynomial Functions | Date: / /

Class performance:

Activity: The Winning Shot:



During a basketball game, a player shoots the ball toward the hoop. The ball follows a curved trajectory in the air until it enters the hoop. If the path of the ball is modeled by the quadratic function: $f(x) = x^2 + 6x - 5$, where x is the horizontal distance of the ball from the player in meters, and f(x) is the height of the ball above the ground in meters, collaborate with your classmates and answer the following:

1) What value of x that makes the height of the ball above the ground equals zero?

.....

2) Write the coordinates of the vertex of the trajectory taken by the ball when shot.

.....

3) If the ball is at a height of 3 meters while ascending (at a certain distance), at what horizontal distance will the ball be at the same height while descending?

.....

.....

Home performance (Homework):

Find the set of real zeros for each of the following functions:

1) $f(x) = -2x - 16$

2) $g(x) = x^2 - 36$

3) $n(x) = x^2 - x - 20$

4) $m(x) = 5x^2 + 40$

5) $z(x) = x^3 - 125$

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Weekly Assessment (Week.....)

Group (A)

First: Choose the correct answer:

1) What is the set of real zeros of the function f(x) = x - 4?

(a) {-4} (b) {4} (c) {-2} (d) {2}

Second: Answer the following:

2) What is the set of real zeros of the function g(x) = -5?

3) What is the set of real zeros of the function p(x) = -11x?

4) Find the set of real zeros of the function $f(x) = x^2 - x - 2$.

5) If -2 is one of the zeros of the function $f(x) = x^2 + bx - 14$, what is the value of b?

Group (B)

First: Choose the correct answer:

1) What is the set of real zeros of the function f(x) = x + 5?

(a) {-5} (b) {5} (c) {0} (d) {1}

Second: Answer the following:

2) What is the set of real zeros of the function g(x) = 10?

3) What is the set of real zeros of the function p(x) = -12x?

4) Find the set of real zeros of the function $f(x) = x^2 + 2x + 1$.

5) If -2 is one of the zeros of the function $f(x) = x^2 + bx - 10$, what is the value of b?

Group (C)

First: Choose the correct answer:

1) What is the set of real zeros of the function f(x) = x - 2?

(a) {-2} (b) {2} (c) {4} (d) {-4}

Second: Answer the following:

2) What is the set of real zeros of the function g(x) = 15?

3) What is the set of real zeros of the function p(x) = 8x?

4) Find the set of real zeros of the function $f(x) = x^2 + 2x - 3$.

5) If -2 is one of the zeros of the function $f(x) = x^2 + bx - 8$, what is the value of b?

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Unit One | Week ..... | Lesson 3: Rational Algebraic Functions | Date: / /

Class performance:

Activity : Smart Calculator Code

In collaboration with your classmate, imagine that you own a smart calculator, but it has a serious software bug: there are certain numbers that, if entered into the rational function shown on the screen, cause the calculator to stop working completely and display an "Error" message because the denominator becomes zero. There are other numbers that make the screen display the result (zero). Your task as a smart programmer is to accurately determine these numbers to protect the machine.

If the programmed function stored in the machine is: $f(x) = \frac{x^2-9}{x^2-5x+6}$

.....

1) Find the values of that make the denominator equal to zero, and then write the safe domain for the calculator.

.....

2) Determine the numbers that make the function equal to zero.

.....

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Home performance (Homework):

Answer the following questions:

1) Find the set of values of that make the following rational algebraic fraction undefined: $\frac{x-3}{x^2-3x+2}$
2) Determine the domain of the following rational algebraic function, then find $f(0)$ if possible: $f(x) = \frac{x^2-2x}{x^2+x-6}$
3) Write the function f in its simplest form, and state its domain: $f(x) = \frac{x^2+2x-15}{x^2-5x+6}$
4) Find the set of zeroes of the function f , where: $f(x) = \frac{x^2-7x+12}{x^2-x-6}$
5) If $f(x) = \frac{x^2-4}{x-2}$, find the solution set of the equation $f(x) = 5$ in $\mathbb{R}$.

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Weekly Assessment (Week.....)

Group (A)

First: Choose the correct answer from the given choices:

1) If the domain of the rational algebraic function $f(x) = \frac{2x}{x-a}$ is $\mathbb{R} - \{-2\}$, what is the value of a?

(a) 1 (b) -1 (c) 2 (d) -2

Second: Answer the following questions:

2) Find the set of values of $\frac{2x+7}{x^2-x-12}$ that make the rational fraction $g(1)$ undefined in R.

3) Find the domain of the function $g(x) = \frac{x^2-4}{x^2-x-2}$, then find if possible.

4) Simplify the following function to its simplest form and state its domain: $f(x) = \frac{x^2+5x+6}{x^2-x-6}$

5) Find the set of zeroes of the function: $f(x) = \frac{x^2-5x}{x^2-25}$

Model (B)

First: Choose the correct answer from the given choices:

1) If the domain of the function $f(x) = \frac{3}{x-a}$ is $R - \{5\}$, then the value of a equals:

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

Second: Answer the following questions:

2) Determine the values that make the fraction $\frac{x^2+x}{x^2-16}$ undefined in R.

3) Find the domain of the function $f(x) = \frac{x^2-16}{x^2-6x+8}$, then find $f(4)$ if possible.

4) Simplify the following function $h(x) = \frac{x^3-1}{x^2-1}$ to its simplest form and state its domain

5) Find the set of zeroes of the function: $f(x) = \frac{2x^2+5x-3}{x^2+x-6}$

Model (C)

First: Choose the correct answer from the given choices:

1) The set of zeroes of the function $f(x) = \frac{x-2}{x^2-4}$ is:

(a) $\{2\}$ (b) $\emptyset$ (c) $\{-2, 2\}$ (d) $\{-2\}$

Second: Answer the following questions:

2) Find the set of values of that make the fraction $\frac{5x-1}{x^2+4}$ undefined in R.

3) Determine the domain of the function $f(x) = \frac{2x}{x^2-2x}$, then find $f(2)$ if possible.

4) Simplify the following function to its simplest form and state its domain: $f(x) = \frac{3x-15}{x^2-10x+25}$

5) If $g(x) = \frac{x^2-9}{x-3}$, find the solution set of the equation $g(x) = 8$ in R.

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Unit One | Week ..... | Lesson 4: Common Domain and Equivalent Rational Algebraic Functions | Date: / /

Class performance:

Activity (1): Simplest Form

In the table below, put the algebraic fractions in their correct places:

$\frac{7x}{(x^2-3x)}$ ، $\frac{x+3}{(x^2-9)}$ ، $\frac{x+3}{x(x+1)}$ ، $\frac{x}{x(x+1)}$

Algebraic Fraction in Simplest Form	Algebraic Fraction NOT in Simplest Form

Activity (2): Searching for the Identical Twin

You have two algebraic fractions that look completely different from the outside, but they are said to be equivalent fractions

To prove this, you must test them through two basic steps: first, comparing their domains, and second, simplifying each of them to its simplest form.

» **First Fraction:** $f_1(x) = \frac{2x}{2x+4}$ **Second Fraction:** $f_2(x) = \frac{x^2+2x}{x^2+4x+4}$

.....

.....

Home performance (Homework):

Answer the following questions:

1) Find the common domain of the two functions f and g, where:
$g(x) = \frac{x^2-9}{x^2-5x+6}$ ،$f(x) = \frac{x^2-4x+3}{x^2-x-6}$

2) If $f(x) = \frac{x^2-3x}{x^2-6x+9}$, $g(x) = \frac{4x}{4x-12}$ prove that . $f = g$

3) If $f(x) = \frac{4}{4x-20}$ and ،$g(x) = \frac{x+5}{x^2-25}$, prove that for all values of $f(x) = g(x)$ belonging to the common domain, then find this domain.

4) Determine the values of x that make $f(x) = g(x)$ if : $f(x) = \frac{x-1}{x^2-1}$, $g(x) = \frac{1}{x+1}$

5) If the common domain of the two functions $f(x) = \frac{x}{x-k}$ and $g(x) = \frac{-2}{x+3}$ is $\mathbb{R} - \{-3,2\}$, what is the value of k?

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First Monthly Exercises

Choose the correct answer:

1) The value of $(x^2 y^3)^2$ when x = 1, y = 2 is equal to .....

(a) 8 (b) 16 (c) 32 (d) 64

2) If $13^{n-5} = 1$, what is the value of n?

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

3) If the rational function then the domain of the function is:

a) $\mathbb{R} - \{2\}$ (b) $\mathbb{R} - \{3, -3\}$ (c) $\mathbb{R} - \{3, -3, 2\}$ (d) $\mathbb{R}$

Answer the following questions:

1) Write the expression in simplest form $\frac{(m^5)^5}{(-m^2)^6}$.

.....

2) Solve the following equation (for x ∈ R): $3^{x-1} = 27$

.....

3) Find the minimum value of the function $f(x) = x^2 - 3x - 4$

.....

4) Find the set of real zeros for each of the following function: $m(x) = x^2 + 1$

.....

5) Find the set of values of x for which the following rational function is undefined:
$n(x) = \frac{x-3}{x^2-5x+6}$

.....

6) Determine the domain of the rational function $n(x) = \frac{x^2-25}{x-5}$ Then find, if possible, (5) and (−5).

.....

7) Find the value of the expression $\frac{11 \times 6^x \times (11)^{x-3}}{66^x}$ when x = 2

.....

8) Solve the following equation (for x ∈ R): $2^{2x-1} = \frac{1}{32}$

.....

9) If (m, n) is the vertex of the curve for the function f where $f(x) = x^2 - 2x - 2$, what is the value of n?

.....

10) Find the set of real zeros of the following function: $q(x) = -10x - 5$

.....

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11) Write the function in $\mathbf{n(x) = \frac{x^2+2x-15}{x^2-5x+6}}$ its simplest form, and state its domain.

12) Find the common domain of the two functions: $f(x) = \frac{3}{x^2-x-6}$, $g(x) = \frac{x-1}{x^2-4}$

13) If $\mathbf{f_1(x) = \frac{x^2-4}{x^2-2x}}$ and $\mathbf{f_2(x) = \frac{x+2}{x}}$, prove that $\mathbf{f_1 = f_2}$.

14) If $\mathbf{5^y = 4}$, what is the value of $\mathbf{125^y}$?

15) Solve the following equation (for x ∈ R): $\mathbf{\frac{3^x \times 21^x}{7^x} = 243}$

16) If -4 is the x-coordinate of the vertex of the curve for the function f , where $f(x) = ax^2 + 16x + 7$, what is the value of a?

17) Find the set of real zeros of the following function: $f(x) = x^2 - 5x - 24$

18) If the common domain of the two functions $f_1(x) = \frac{3}{x-k}$, $f_2(x) = \frac{x}{x+5}$: is R-{-5,3} , find the value of k ?

19) Find the result of $\mathbf{q^{-6} \times (q^3)^4}$ in simplest form.

20) Solve the following equation (for x ∈ R): $\mathbf{(10)^{2x-1} = \frac{1}{1000}}$

21) Graph the function $f(x) = x^2 - 7x + 12$, and find the maximum or minimum value of the function.

22) If -3 is one of the zeros of the function $f(x) = x^2 + bx - 14$, what is the value of b?

23) Are the two functions $f_1(x) = \frac{x^2}{x^3-x^2}$ and $f_1(x) = \frac{x^2}{x^3-x^2}$ equivalent fractions?

24) If $f_1(x) = \frac{x}{x^2-2x}$, $f_2(x) = \frac{x^2+2x+4}{x^3-8}$ prove that $f_1(x) = f_2(x)$ for every x in their common domain, then determine this domain.

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Unit One | Week ..... | Lesson 5 : Operations on Rational Algebraic Functions | Date: / /

Class performance:

Activity (1): Do You Remember or Have You Forgotten?

Find the result of the following in simplest form (without a calculator in less than a minute):

1) $\frac{1}{4} + \frac{3}{4} =$ .....

2) $\frac{3}{4} - \frac{1}{8} =$ .....

3) $\frac{4}{5} + \frac{1}{8} =$ .....

4) $\frac{4}{5} \times \frac{3}{4} =$ .....

5) $\frac{3}{4} \div \frac{1}{8} =$ .....

Activity (2): Spot the Error and Correct It

Work with your classmate, then answer the following questions:

A student performed the following operations:

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

$$g(x) = \frac{2x}{3} \times \frac{3}{x} = 6x$$

$$h(x) = \frac{x+2}{5} \div \frac{2}{5} = x + 2$$

1) Identify the operation containing an error.

2) Write the reason for the error.

3) Correct the error.

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Home performance (Homework):

Answer the following questions:

1) Find in simplest form, and state its domain:

$$f(x) = \frac{x^2 - 4}{x^2 - x - 6} + \frac{x^2 - 5x + 4}{x^2 - 4x + 3}$$

.....

2) Simplify the following function to its simplest form and state its domain:

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

.....

3) Find the result in simplest form, and state its domain of the function:

$$f(x) = \frac{x^2 + x - 20}{x - 3} \times \frac{2x^2 - 6x}{x^2 + 3x - 10}$$

.....

4) If $f(x) = \frac{x^2+x-2}{x^2-3x-10}$, find $[f(x)]^{-1}$, and state its domain.

.....

5) Find in simplest form and state its domain, where:

$$f(x) = \frac{x^2 + 2x + 1}{1 - x^2} \div \frac{x^2 + 5x + 4}{x^2 + 3x - 4}$$

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Weekly Assessment (Week.....)

Group (A)

First: Choose the correct answer from the given choices:

1) The domain of the multiplicative inverse of the function $f(x) = \frac{x-2}{x+3}$ is:

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

Second: Answer the following questions:

2) Find in simplest form, and state the domain: $f(x) = \frac{1}{x-4} - \frac{8}{x^2-16}$

3) Simplify to simplest form and state the domain:

$$f(x) = \frac{x^2+3x}{x^2-3x-4} \times \frac{x^2-5x+4}{x^2+2x-3}$$

4) Find the result in simplest form, and state the domain:

$$f(x) = \frac{x^2-x-2}{x^2-4x-5} \div \frac{4-x^2}{x^2-3x-10}$$

5) If $f(x) = \frac{x^2-2x}{x^2-4} \div \frac{x^2-x-6}{x^2+5x+6}$, find the simplest form of the function and state its domain, then find $f(3)$ if possible.

Model (B)

First: Choose the correct answer from the given choices:

1) $\frac{2}{x-2} - \frac{x}{x-2} =$ .....

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

Second: Answer the following questions:

2) Find in simplest form, and state the domain: $\mathbf{f(x) = \frac{x^2+6x}{x^2+5x} + \frac{x^2+2x-8}{x^2+3x-10}}$

3) Find in simplest form and state its domain: $\mathbf{f(x) = \frac{x^2-11x+28}{x^2-13x+42} \times \frac{x^2+7x+10}{20-x-x^2}}$

4) Find in simplest form and state its domain: $\mathbf{f(x) = \frac{x^2-2x}{2x^2-x-6} \div \frac{2x^2-3x}{4x^2-9}}$

5) If $\mathbf{g(x) = \frac{x^2-3x-4}{x^2-x-2}}$ represents the area of a rhombus, and its height is $\mathbf{\frac{x-4}{x-2}}$, find its base length in simplest form. (area of rhombus = base length × height)

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Model (C)

First: Choose the correct answer from the given choices:

1) Which of the following does NOT represent the additive inverse of the algebraic fraction $f(x) = \frac{x+3}{x-5}$?

(a) $-\frac{x+3}{x-5}$ (b) $\frac{x+3}{5-x}$ (c) $\frac{x-5}{x+3}$ (d) $\frac{-x-3}{x-5}$

Second: Answer the following questions:

2) Find in simplest form: $f(x) = \frac{3x+15}{x^2+7x+10} - \frac{x+5}{x^2+6x+5}$

3) Find the function $f(x)$ in simplest form and state its domain:

$$f(x) = \frac{x^2+x-20}{x^2+2x-15} \times \frac{x^2+4x-21}{x^2+3x-28}$$

4) Find the quotient function in simplest form and state its domain:

$$f(x) = \frac{6x^2+13x+6}{4x^2-9} \div \frac{6x^2+x-2}{4x^2-1}$$

5) If $f(x) = \frac{x^2-25}{5x-x^2}$, find the domain of $[f(x)]^{-1}$, then write it in simplest form.

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Unit Three | Week ..... | Lesson 1: Similarity of Polygons | Date: / /

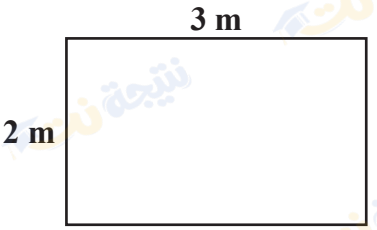
Class performance:

Activity (1): Help the Engineer

An engineer wants to enlarge a window blueprint while preserving its shape so that its length becomes 6 m.

Complete:

Measure	Before Enlargement	After Enlargement
Length	3 m	6 m
Width	2 m	.....
Similarity Ratio	.....	.....



Discuss with your classmate:

» What is the relationship between the lengths of the corresponding sides in the two figures?

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» Based on the ratios of corresponding sides, are the two figures similar? Explain why.

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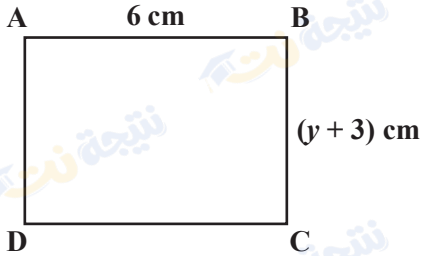
Home performance (Homework):

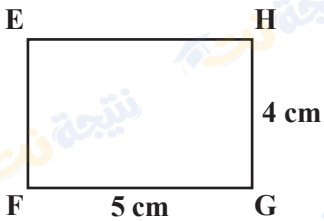
Answer the following questions:

1) Two polygons are similar. The side lengths of one polygon are 3 cm , 5 cm , 6 cm , 8 cm , and 10 cm , and the perimeter of the other polygon is 80 cm. Find the side lengths of the second polygon.

.....

2) In the given figure, if rectangle $ABCD \sim$ rectangle $EFGH$, where $AB = 6$ cm , $BC = (y + 3)$ cm , $EF = 4$ cm and $FG = 5$ cm , find the value of y .





.....

.....

3) Two polygons are similar, and the ratio between two corresponding side lengths is 3 : 2 If the perimeter of the smaller polygon is 34 cm, calculate the perimeter of the larger polygon.

.....

4) If polygon $ABCD \sim$ polygon $EFGH$, $AB = 8$ cm , $6 = BC$ cm and $EF = 12$ cm, find the length of FG.

.....

5) A pentagon has side lengths of 4 cm , 6 cm , 8 cm , 10 cm and 12 cm. Find the side lengths of another similar polygon if the Similarity Ratio of the first polygon relative to the second polygon is 2 .

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Weekly Assessment (Week.....)

Group (A)

First: Choose the correct answer from the given choices:

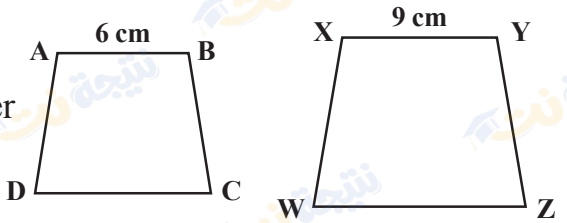
1) The ratio between the perimeters of two similar polygons is 3 : 4. If a side length in the smaller polygon is 9 , then the corresponding side length in the larger polygon equals:

(a) 12 cm (b) 15 cm (c) 16 cm (d) 18 cm

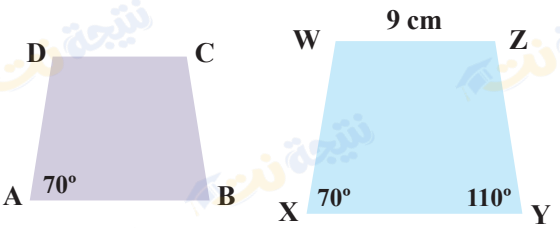
Second: Answer the following questions:

2) Two polygons are similar. The ratio between two corresponding side lengths is **3: 5,** and the sum of their perimeters is 128 . Find the perimeter of each polygon.

3) If **ABCD ~ XYZW**,
AB = 6 cm , XY = 9 cm and the perimeter of polygon ABCD = 24 cm,
find the perimeter of polygon **XYZW**.



4) If **ABCD ~ XYZW** , m (∠A) = 70° ,
m (∠X) = m (∠A), and m (∠Y) = 110°,
find the measure of angle m (∠W).



5) Two rectangles are similar. The dimensions of the first rectangle are 6 cm and 4 cm. If the perimeter of the second rectangle is 50 cm, find its two dimensions, then calculate its area.

Model (B)

First: Choose the correct answer from the given choices:

1) If polygon **EFGH ~** polygon **ABCD**, and the scale factor between them is $\frac{3}{5}$, then the ratio between their perimeters equals:

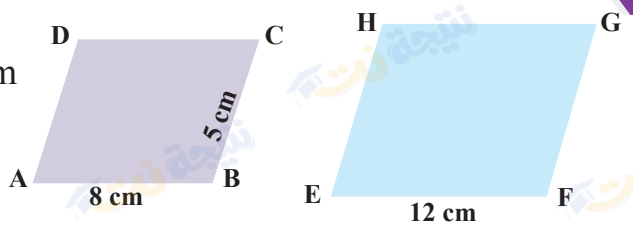
(a) 3 : 5 (b) 5 : 3 (c) 9 : 25 (d) 25 : 9

Second: Answer the following questions:

2) Two polygons are similar. The ratio between their perimeters is 5 : 2. If a side length in the larger polygon is 20 cm, what is the corresponding side length in the smaller polygon?

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3) Parallelograms **ABCD** and **EFGH** are similar. If AB = 8 cm, EF = 12 cm and BC = 5 cm,
find the length of **FG**.



4) If the two polygons in the figure are similar, the scale factor is 2 : 3, and two side lengths in the smaller polygon are x cm and y cm, corresponding to 12 cm and 15 cm in the larger polygon, find the values of x and y.

5) Two polygons are similar. The side lengths of the smaller polygon are 4 cm , 5 cm , 6 cm and 7 cm . If the longest side in the larger polygon is 14 cm, find the perimeter of the larger polygon.

Model (C)

First: Choose the correct answer from the given choices:

1) All regular polygons with the same number of sides are:
(a) Congruent (b) Similar (c) Equivalent (d) Non-similar

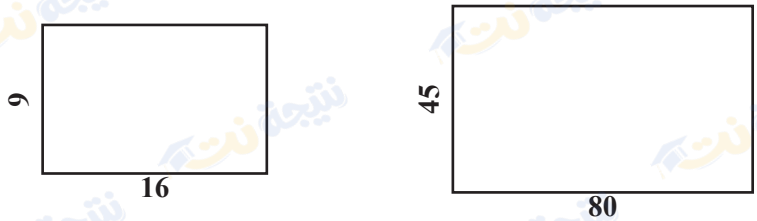
Second: Answer the following questions:

2) A rectangle has dimensions of 8 cm and 6 cm. Find the dimensions of a similar rectangle if its perimeter is 70 cm.

3) If ABCD $\sim$ EFGH and m ($\angle$A) = 65°,
find all angle measures of rhombus EFGH.

4) Two polygons are similar. The ratio between two corresponding side lengths is 5 : 2. If the difference between their perimeters is 36 cm,
find the perimeter of each polygon.

5) Ahmed's computer screen width is 16 inches and its height is 9 inches, while the image projected on the wall has a width of 80 inches and a height of 45 inches. Prove that the two screens are similar, then find the Similarity Ratio from the computer screen to the projected image.



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Unit One | Week ..... | Lesson 2: Similarity of Triangles | Date: / /

Class performance:

Activity: What is your evidence?

Collaborate with members of your group to provide evidence for the validity or invalidity of the following statements:

» If the measure of two angles in one triangle equals the measure of two angles in another triangle, then the two triangles are similar.

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» If the length of two sides in a triangle is proportional to the length of the corresponding two sides in another triangle

.....

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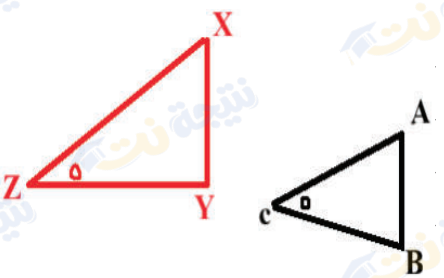
» If the measure of angle C equals the measure of angle Z, $\frac{ZY}{AB} = \frac{ZX}{CA}$ The two triangles are similar.

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» All right triangles are the same

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Discuss the answer with your group members.

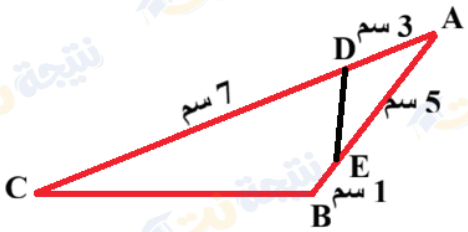
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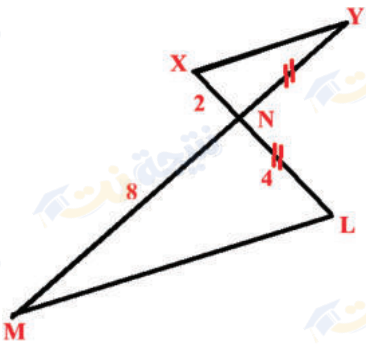
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Home performance (Homework):

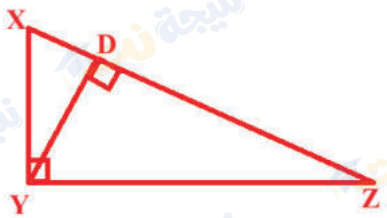
1) From the figure opposite, prove that:
   A) $\Delta AED \sim \Delta ACB$
   b) m $\angle$B = m $\angle$ADE



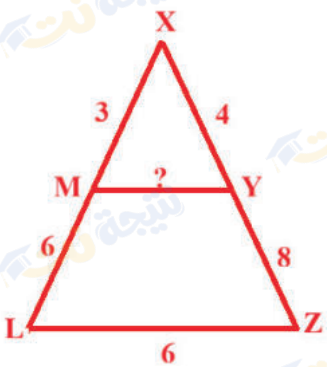
2) In the figure opposite:
   NY = NL = 4 cm, NX = 2 cm, NM = 8 cm
   Prove that:
   A) $\Delta NXY \sim \Delta NLN$
   b) $\overline{XY} // \overline{ML}$



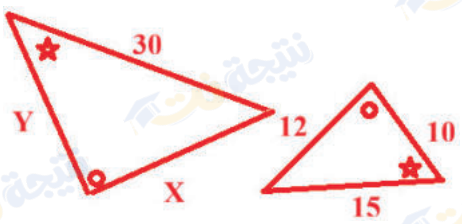
3) In the figure opposite ΔXYZ :
   Right angle at Y, $\overline{YD} \perp \overline{XZ}$
   Prove that: $(YZ)^2 = DZ \times ZX$



4) In the opposite figure:
   XY = 4 cm, XM = 3 cm, LZ =ML = 6 cm, , YZ =8 cm
   a) Prove that triangles XYM and XZL are similar
   b) Calculate the length of MY.



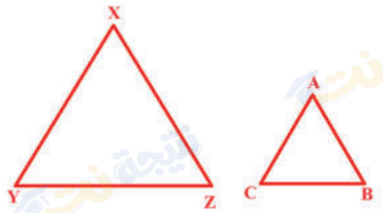
5) From the figure opposite:
   find the value of X + Y



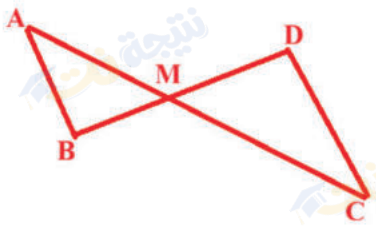
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Weekly Assessment (Week.....)
Group (A)

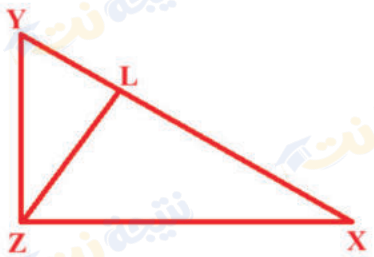
1) In triangle ABC,AB = BC, angle B measures 60°
In triangle XYZ, XY = YZ = XZ = 2AC
Prove that Find the similarity ratio



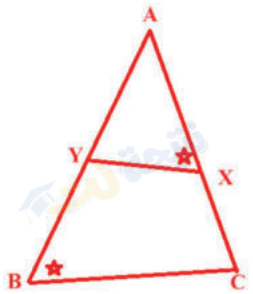
2) In the figure opposite:
AB = 24 cm, AM = 36 cm, BM = 18 cm,
MD = 30 cm, MC = 60 cm
Prove that: Then find DC



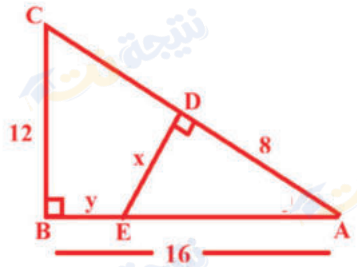
3) In the figure opposite: $\Delta YLZ \sim \Delta YZX$,
XL = 3cm, LY = 1cm
Find the length of $\overline{YZ}$



4) From the figure opposite:
Prove that: $\Delta AXY \sim \Delta ABC$



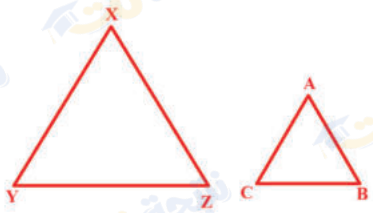
5) From the figure opposite:
Prove that triangles ADE and ABC are similar.
Then find the value of x + y



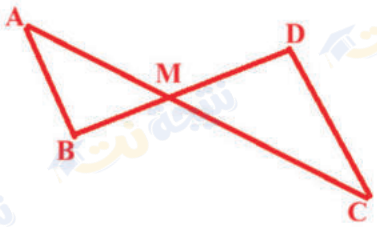
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Group (B)

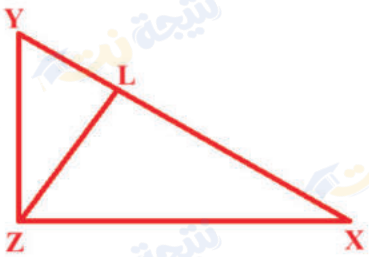
1) In triangle ABC, AB = BC, angle B of measures 60°
In triangle XYZ, XY = YZ = XZ = 3AC
Prove that: $\Delta XYZ \sim \Delta ABC$ Find the similarity ratio



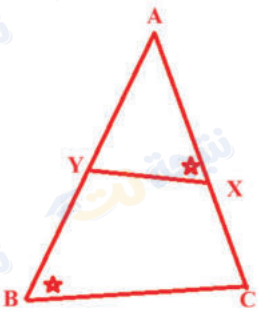
2) In the figure opposite:
AB = 12cm, AM = 18cm, BM = 9cm,
MD = 15cm, MC = 30cm
Prove that:Then find DC



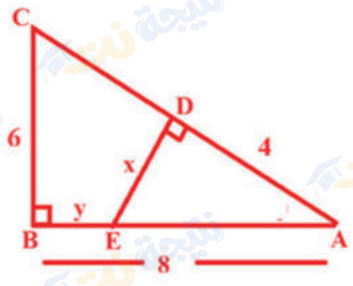
3) In the figure opposite: $\Delta YLZ \sim \Delta YZX$,
XL = 6 cm, LY = 2 cm
Find the length of $\overline{YZ}$



4) From the figure opposite:
Prove that: $\Delta AXY \sim \Delta ABC$



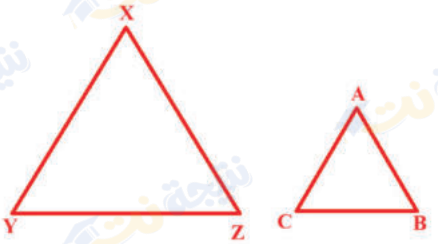
5) From the figure opposite:
Prove that triangles ADE and ABC are similar.
Then find the value of x + y



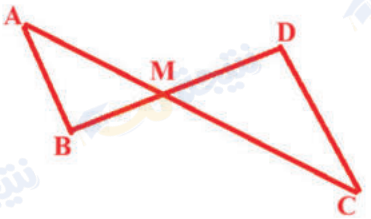
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Group (C

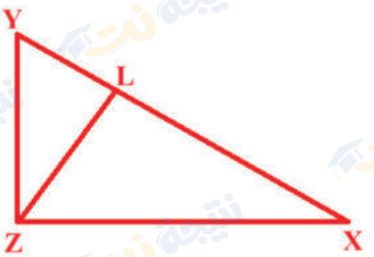
1) In triangle ABC,AB = BC, measure angle B is 60°
In triangle XYZ, XY = YZ = XZ = 4AC
Prove that: $\Delta XYZ \sim \Delta ABC$ Find the similarity ratio



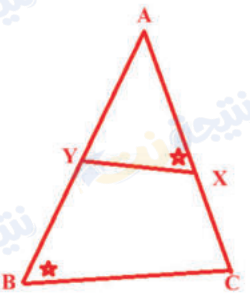
2) In the figure opposite: $\overline{BD} \cap \overline{AC} = \{M\}$
AB = 4cm, AM = 6cm, BM = 3cm,
MD = 5cm, MC = 10cm
Prove that: $\Delta ABM \sim \Delta CDM$ Then find DC



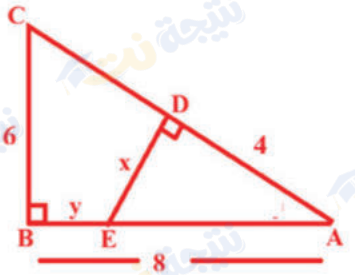
3) In the figure opposite: $\Delta YLZ \sim \Delta YZX$,
XL = 9cm, LY = 3cm
Find the length of $\overline{YZ}$



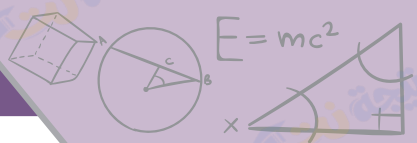
4) From the figure opposite:
Prove that $\Delta AXY \sim \Delta ABC$



5) From the figure opposite:
Prove that triangles ADE and ABC are similar.
Then find the value of x + y



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Unit One | Week ..... | Lesson 3: Dilation | Date: / /

Class performance:

Activity: "Make a Dilation"

Cooperation among members of a group

1) Identify three non-collinear points on the coordinate plane and connect them.

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.....

2) Multiply the coordinates of the points by a number greater than one.

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3) Connect the resulting dots

.....

.....

4) What do you notice?

.....

.....

5) Repeat the activity with a number less than one. What do you notice?

.....

.....

6) Discuss the results with your colleagues

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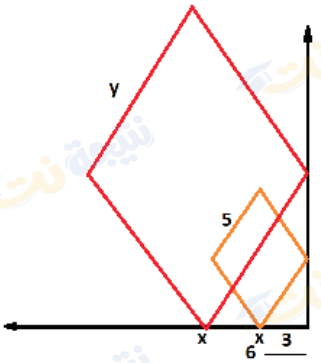
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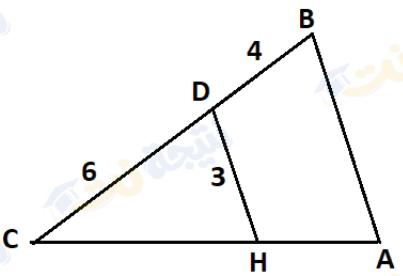
Home performance (Homework):

Answer the following:

1) In the opposite figure:
Determine if the dilation centered at a point s transforms x into x` Enlarge or reduce,
then find the dilation factor and the value of y



2) In the opposite figure:
ΔABC is the Image of ΔHDC Given dilation centered at C, find the dilation factor
and prove that AB // DH
Then find the length



3) Draw the shape ABCD on the coordinate plane with vertices A(3,1), B(5,3), C(3,5), and D(1,3), and draw its image with dilation centered at the origin and its coefficient 3.

4) Draw the shape ABCD on the coordinate plane with vertices A(-4,-4), B(8,4), C(8,12), and D(0,8), and draw its image with dilation centered at the origin and its coefficient is $\frac{1}{4}$

5) What is the image of point P(-2,4) with dilation centered at the origin and its coefficient is 3?

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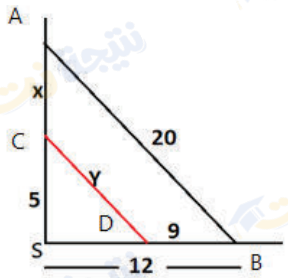
Weekly Assessment (Week.....)

Group (A)

Answer the following:

1) What is the ratio of the dilation centered at the origin and draw point A(-1,3) to point B(-3,9)?

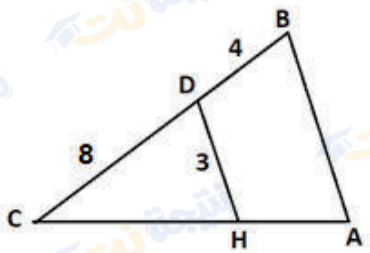
2) In the opposite figure:
$\overline{AB}$ is the image of $\overline{CD}$ with dilation Its centered at s.
Find the dilation factor and the value of x+y



3) Draw the shape ABCD on the coordinate plane with vertices A(1,1), B(5,3), C(2,5), and D(1,3), and draw its image with dilation centered at the origin and its coefficient is 3.

4) Draw the shape ABCD on the coordinate plane with vertices A(-8,-4), B(4,4), C(4,12), and D(0,8), and draw its image with dilation centered at the origin and its coefficient is $\frac{1}{4}$

5) In the opposite figure:
ΔABC Image ΔHDC with dilation centered at C,
find the dilation factor and prove that $\overline{AB} \parallel \overline{DH}$
Then find the length

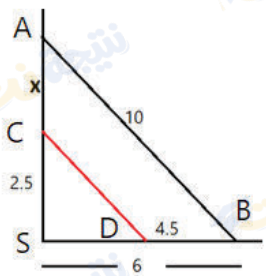


Group (B)

Answer the following:

1) What is the ratio of the extension centered at the origin and plotting point A(-1,3) to point B(-2,6)?

2) In the opposite figure:
$\overline{AB}$ Image $\overline{CD}$ with dilation
Its center is s. Find the dilation factor and the value of x+y

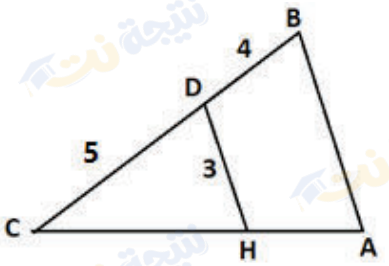


3) Draw the shape ABCD on the coordinate plane with vertices A(3,2), B(5,1), C(3,3), and D(1,3). Draw its image with dilation centered at the origin and a coefficient of 3.

4) Draw the shape ABCD on the coordinate plane with vertices A(-4,-8), B(8,4), C(8,8), and D(0,8), and draw its image with dilation centered at the origin and its coefficient

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5) In the opposite figure:
ΔABC is the image ΔHDC with dilation centered at C,
find the dilation factor and prove that $\overline{AB}$ // $\overline{DH}$
Then find the length

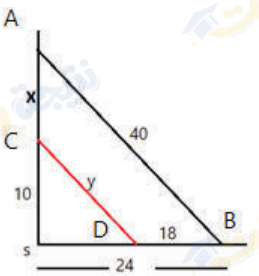


Group (C)

Answer the following:

1) What is the ratio of the dilation centered at the origin and plotting point A(-1,3) to point B(-4,12)?

2) In the opposite figure:
$\overline{AB}$ is the image of $\overline{CD}$ dilation



3) Its center is s. Find the dilation factor and the value of x+y

4) Draw the shape ABCD on the coordinate plane with vertices A(3,1), B(5,3), C(3,5), and D(1,3), and draw its image with an dilation centered at the origin and coefficient of 3.

5) Draw the shape ABCD on the coordinate plane with vertices A(-3,-3), B(6,3), C(6,9), and D(0,6), and draw its image with an dilation centered at the origin and its coefficient

6) In the opposite figure:

7) ΔABC is the image of ΔHDC with dilation centered at C,
find the coefficient of dilation and prove that $\overline{AB}$ // $\overline{DH}$ Then find the length

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Unit One | Week ..... | Lesson 4: Trigonometric Ratios of Acute Angles | Date: / /

Class performance:

Activity: Check it yourself

In collaboration with members of your group

Draw right triangle ABC where m ($\angle$B) = 90° , AB = 6 cm، BC = 8 cm.

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Calculate the length of $\overline{AC}$ (the hypotenuse) using Pythagoras.

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Write the definition of sin A, cos A, tan A, and then find their numerical values.

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Discuss the answer with your group members.

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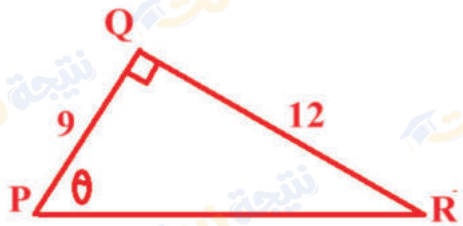
Home performance (Homework):

1) Can sin θ = 1.5 for an acute angle θ? Explain your answer.

2) If tan α = $\frac{5}{12}$, calculate sin α and cos α (draw the triangle to help you answer).

3) A ladder 10 meters long rests against a vertical wall, making an angle θ with the ground such that cos θ = 0.6. What is the height of the top of the ladder above the ground?

4) In triangle PQR which is right at Q,
if PQ = 9 cm, QR = 12 cm,
and the measure of angle P = θ.



a) Calculate the length of the $\overline{PR}$.

b) Find sin θ, cos θ, tan θ, (write the steps).

5) Prove that **tan θ** = $\frac{\sin\theta}{\cos\theta}$ Using the sides of the right triangle, then use this relationship to find **tan θ** If sin θ = $\frac{3}{\sqrt{13}}$, cos θ = $\frac{2}{\sqrt{13}}$

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Second Monthly Exercises

Choose the correct answer:

1) If the domain of the function $f(x) = \frac{-2X}{X-a}$ is $R - \{5\}$ then the value of **a** is:

a) 2 b) −5 C) 5 d) 0

2) If the ratio of the lengths of two corresponding sides of two similar polygons is **3 : 4**, and the perimeter of the smaller polygon is **30 cm**, then the perimeter of the larger polygon is:

a) 40 cm b) 45 cm C) 35 cm d) 50 cm

3) In right triangle XYZ, if sin X = $\frac{4}{5}$, what are the value of cos X ?

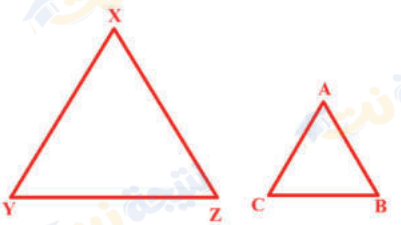
a) $\frac{4}{5}$ b) $\frac{3}{5}$ C) $\frac{3}{4}$ d) $\frac{4}{3}$

Answer the following questions:

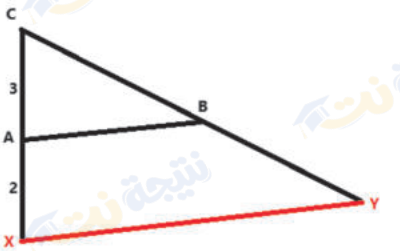
1) Simplify $f(x) = \frac{x^2-4}{x^2-x-6} + \frac{x^2-5x+4}{x^2-4x+3}$ and state its domain.

2) Prove that rectangle **ABCD**, with dimensions **6 cm** and **4 cm**, is similar to rectangle **XYZW**, with dimensions **3 cm** and **2 cm**. Then write the similarity ratio.

3) In triangle ABC, AB = BC, m∠ B = 60°
In triangle XYZ, XY = YZ = XZ = 3AC
Prove thatFind the similarity ratio



4) If $\overline{AB}$ is the image of $\overline{XY}$
with dilation centered at C,
calculate the coefficient of expansion.

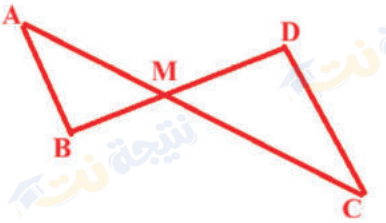


5) If angles θ and β are complementary
(their sum is 90°), and sin θ = $\frac{2}{3}$, what is the value of cos β? And why?

6) Simplify $f(x) = \frac{2x-2}{x^2-3x+2} - \frac{3x+3}{x^2-x-2}$ and state its domain.

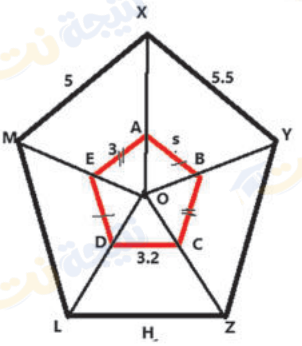
7) Two polygons are similar. The side lengths of one polygon are **3 cm, 5 cm, 6 cm, 8 cm,** and **10 cm**. If the perimeter of the other polygon is **80 cm**, find the lengths of its sides.

8) In the figure opposite: $\overline{BD} \cap \overline{AC} = \{M\}$
AB = 12 cm, AM = 18 cm, BM = 9 cm,
MD = 15 cm, MC = 30 cm
Prove that: $\Delta ABM \sim \Delta CDM$ Then find DC



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9) The opposite figure:
Figure ABCDE is a representation of figure XYZLM with dilation centered at O. Find the values of S and H.



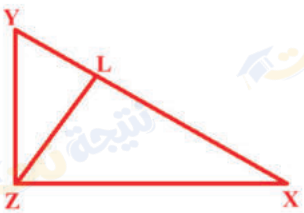
10) In right triangle ABC, if m∠B = 90°, and m∠C = 30°, and the length of AB = 5 cm (the side opposite the angle 30°), so calculate the length of the hypotenuse $\overline{AC}$.

11) Simplify $f(x)$ and state its domain.

$$f(x) = \frac{x^2 + x - 20}{x - 3} \times \frac{2x^2 - 6x}{x^2 + 5x - 10}$$

12) Two rectangles are similar. The dimensions of the first rectangle are **5 cm** and **8 cm**. If the perimeter of the second rectangle is **78 cm**, find the area of the second rectangle.

13) In the figure opposite: $\Delta YLZ \sim \Delta YZX$,
XL = 6 cm, LY = 2 cm Find the length of $\overline{YZ}$



14) Draw the shape ABCD on the coordinate plane with vertices A(3,1), B(5,3), C(3,5), and D(1,3), and plot its image with dilation centered at the origin and a coefficient of 3.

15) In right triangle ABC, if m∠B = 90°, AB = 8 cm , BC = 15 cm Find the value of tan A

16) If $f(x) = \frac{x^2+x-2}{x^2-3x-10}$ find $[f(x)]^{-1}$ in its simplest form, and state its domain.
Then, if $[f(x)]^{-1} = \frac{1}{2}$ find the value of **x**.

17) If $ABCD \sim EFGH$,
where **AB = 32 cm, EF = 3x − 1, BC = 40 cm,**
and **FG = 3x + 1,** find the value of **x**.

18) From the figure opposite: Prove that $\Delta AXY \sim \Delta ABC$



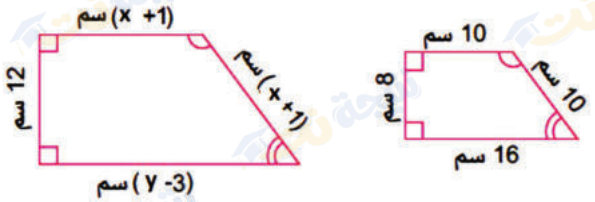
19) Draw the shape ABCD on the coordinate plane with vertices A(-3,-3), B(6,3), C(6,9), and D(0,6), and draw its image with dilation centered at the origin and its coefficient $\frac{1}{3}$

20) In right triangle, if $\sin\theta = \frac{5}{13}$, what are the values of cos θ and tan θ ?

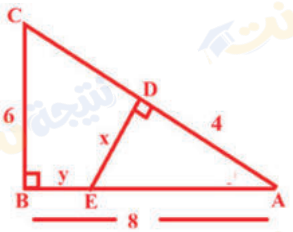
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21) A rhombus has an area of $\frac{x^2-3x-4}{x^2-x-2}$ square units and a height of $\frac{x^2-7x+12}{x^2-2x}$ units. Find the length of its base in terms of x, expressing your answer in its simplest form.

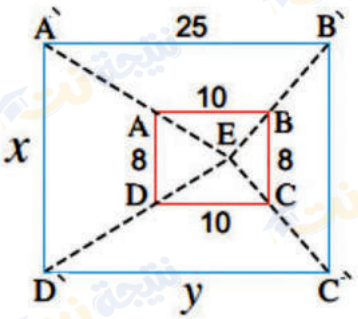
22) If the two polygons are similar, find the value of x and y.



23) From the figure opposite:
Prove that triangles ADE and ABC are similar.
Then find the value of x + y



24) In the opposite figure:
A dilation with center E, making polygon A'B'C'D' the image of polygon ABCD, Find the scale factor of the dilation, state whether it is an enlargement or a reduction, and find the values of x and y



25) In the opposite figure:
If tan θ= $\frac{3}{4}$ find the value of x, y

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Unit One | Week ..... | Lesson 5: Trigonometric Ratios of Special Angles | Date: / /

Class performance:

Activity: Explore trigonometric ratios yourself

Collaborate with your group members on:

Draw a right-angled isosceles triangle with each side of the right angle measuring 1 cm.

» Calculate the length of the hypotenuse using Pythagoras.

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» Deduce the values of sin 45°, cos 45°, tan 45°. What do you notice?

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» Then draw a right-angled triangle with angle measurements of (30°, 60°, 90°), and the length of the side opposite angle 30° is 1 cm.

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» Deduce the values of sin 30°, cos 60°.

.....

» **Discuss your observations with the group members**

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Home performance (Homework):

1) If **sin 25 = cos 2x** where x is an acute angle, find the value of **tan x** to the nearest decimal place.

2) Calculate the value of the expression: $(\sin 45)^2 + (\cos 45)^2$

3) An engineer wants to calculate the height of a building. He looks at it at an angle of 60° with the ground, and the distance between him and the base of the building is 10 meters. What is the height of the building?



4) In the triangle XYZ, which is right at Y, if m∠X = 30° The length of the hypotenuse XZ = 12 cm.

» Calculate the length of YZ (the side opposite the 30° angle).

» Calculate the length of XY using trigonometric ratios and write the solution steps in detail.

5) Without using a calculator, prove that: $\tan 60 = \frac{\sin 60}{\cos 60}$

Find the value θ if it was $2\sin\theta - (\sin\theta)^2 = (\cos\theta)^2$

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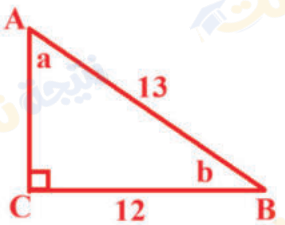
Weekly Assessment (Week.....)

Group (A)

1) Find the value **cos 60° sin 30° - sin 60° tan 60° + (cos 30°)²**
2) Find the value **cos² 30° tan 45° - sin² 60° tan 45°**
3) A man is 1.8 meters tall stood in the sun, and the length of his shadow equal to Meters. What is the angle of elevation of the sun above the Earth's surface?
4) In the triangle ABC, right-angled at B, m∠ C = 35°, the length of the hypotenuse is 10 cm, calculate the length of $\overline{AB}$ to the nearest centimeter, and write down the steps of the solution.
5) Prove that: **sin² 30° = 5 cos² 60°- tan² 45°**

Group (B)

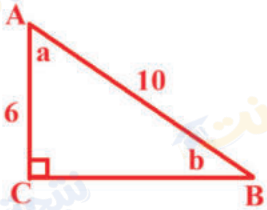
1) Find the value of x: ***X* sin 45° cos 45° tan 45° = cos 60°.**
2) Find the value of: **tan 45° - sin 30° + cos 60°?**
3) A man is 1.6 meters tall stood in the sun, and the length of his shadow equal to $2\sqrt{3}$ Meter. What is the angle of elevation of the sun above the Earth's surface?
4) In right triangle DEF, perpendicular at E, m∠ F = 50°, the length of the hypotenuse $\overline{DF}$ =14 cm. Calculate the length of $\overline{DE}$ to the nearest centimeter, and write down the steps of the solution.



5) In right triangle ABC at C
Prove that: **cos a sin *b* + sin a cos *b* = 1**

Group (C)

1) Find the value of x: ***X* sin 45° cos 30° tan 45° = cos 30°.**
2) Find the value of: **tan 45° - sin 60° + cos 30°**?
3) A man is 1.7 meters tall stood in the sun, and the length of his shadow equal to $\sqrt{3}$ Meter. What is the angle of elevation of the sun above the Earth's surface?
4) In triangle GHI, right at H, m∠ I = 70° The length of the hypotenuse $\overline{GI}$ =8 cm Calculate the length of $\overline{GH}$ to the nearest centimeter, and write down the steps of the solution.



5) In right triangle ABC at C
Prove that **cos a sin *b* + sin a cos *b* = 1**

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Unit One | Week ..... | Lesson 6: The Relationship Between Parallel and Perpendicular Lines | Date: / /

Class performance:

Activity One: The Monorail



A company is constructing a new monorail line connecting two areas. They want to build another monorail line running alongside it without intersecting it, in order to maintain safety.

If the slope of the first monorail line is $\frac{2}{3}$, what is the slope of the second monorail line? Why?

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Activity Two: The World Cup



In preparation for hosting a World Cup match, engineers are marking the football field lines according to international specifications. If the slope of one touchline is $\frac{1}{2}$, what is the slope of the opposite touchline? Why?

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Activity Three: The Octagon



Walkways inside the octagon were designed so that one walkway intersects the main walkway at a right angle, making visitor movement easier, If the slope of the main walkway is $\frac{2}{3}$, what is the slope of the other walkway?

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Home performance (Homework):

1) If the line passing through A(2 , 3) and B(11 , 6) is parallel to the line passing through C(-1,4) and D(k,10), then find k.
2) Find k if the line passing through A(3,k) and B(7,5) is perpendicular to the line passing through C(1,2) and D(5,10).
3) Prove that A(2,1), B(8,4), and C(14,7) are collinear, then find the angle of inclination of the straight line.
4) If the slope of the first line is equal to twice the slope of the second line, and the two lines are perpendicular, and one of the two slopes is positive, find the slope of each line.
5) Find k if the line passing through two points (k,5) and (8,5) which is parallel to the x-axis, then find its angle of inclination.

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Weekly Assessment (Week.....)

Group (A)

First: Choose the correct answer:

1- In square ABCD, if the slope of $\overline{AB} = \sqrt{3}$ then the slope of BC equals

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

Second: Answer the following questions:

2- If the straight line passing through the two points A(2, -3), B(k, 1) and its slope equal $\frac{1}{2}$ then find the value of k?

3- Find the measure of the angle of the straight line whose slope is $m = \sqrt{3}$

4- Prove that the straight line passing through the two points (5, -7) and (1, -6) is perpendicular to the straight line passing through the points (3, 4) and (4, 8)

5- Find the slope of the straight line passing through the two points A(3, 5) and B(7, 9)

Then find the slope of the line parallel to it

Model (B)

First: Choose the correct answer:

1- In square ABCD, if the slope of $\overline{AB} = \sqrt{2}$ then the slope of BC equals

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

Second: Answer the following questions:

2- If the straight line passing through the two points A(4, -3), B(k, 1) and its slope equal $\frac{1}{4}$ then find the value of k?

3- Find the measure of the angle of the straight line whose slope is m = 1

4- Prove that the straight line passing through the two points (-7, 3) and (-6, 1) is perpendicular to the straight line passing through the points (3, 8) and (2, 6)

5- Find the slope of the straight line passing through the two points A(8, 5) and B(5, 9),

Then find the slope of the line parallel to it

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Model (C)

First: Choose the correct answer:

1- In square ABCD, if the slope of $\overline{AB} = \sqrt{5}$ then the slope of BC equals

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

Second: Answer the following questions:

2- If the straight line passing through the two points A(4, -3), B(k, 1) and its slope equal $\frac{1}{3}$ then find the value of k?

3- Find the measure of the angle of the straight line whose slope is $m = \frac{\sqrt{3}}{3}$

4- Prove that the straight line passing through the two points (2, 5) and (3, 7) is perpendicular to the straight line passing through the points (4, 3) and (6, 2)

5- Find the slope of the straight line passing through the two points A(6, 3) and B(1, 8)

Then find the slope of the line parallel to it

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Unit One | Week ..... | Lesson 7: Equation of a Straight Line | Date: / /

Class performance:

Activity 1: High-Speed Electric Train



The Ministry of Transport is extending a high-speed railway between two cities.

The line passes through the monitoring point (2, 3) and has a slope of 2.Write the equation of the railway line, then determine the coordinates of the point on the line when x = 6.

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Activity 2: Internet Package

A family subscribes to an internet package costing 150 pounds per month, plus 10 pounds for each additional gigabyte.Write the equation for the total cost, then calculate the bill for 7 extra gigabytes.



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Activity 3: Decent Life Initiative

As part of the 'Decent Life' initiative to develop Egyptian villages, a straight water pipeline passes through the points (2, 3) and (8, 15). Find the equation of the line representing the pipeline.



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Home performance (Homework):

1) Find value of k such that the straight line passing through the points (1,4) and (k,5) is parallel to $y = 2x - 3$.
2) Find the equation of the line passing through (5,8) with slope equal to the slope of the straight line joining (-1,1) and (3,10).
3) Find K if the point (7, K) lies on $y = -2x + 11$.
4) If the straight line passing through the points (1,3) and (5,11) is parallel to another straight line passing through (4,-2) and cuts the y-axis at b, then find b.
5) If the straight line passing through the points (1,2) and (6,9) cuts the x-axis at (0,a). Find a.

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Weekly Assessment (Week.....)

Group (A)

First: Choose the correct answer :

1) If the two straight lines kx - y - 13 = 0 and (k - 1)x - 2y - 8 = 0 are parallel, then the value of k is:

a) 2 b) 3 c) -1 d) 2

Second: Answer the following questions

2) Find the equation of the line passing through the point (0, -5) and whose slope equals 2.

3) Find the equation of the line passing through the point (1, 4) and perpendicular to the line 2x - y + 3 = 0.

4) Find the equation of the straight line passing through the point (2, 1) and parallel to line 5x - 2y + 8 = 0.

5) Find the equation of the straight line passing through the two points (2, 5) and (3, 7) and which intercepts apart from the y-axis of magnitude 2 units.

Group (B)

First: Choose the correct answer :

1) If the two straight lines kx + y + 12 = 0 and (k - 4)x + 3y - 8 = 0 are parallel, then the value of k is:

a) -2 b) 3 c) -1 d) 2

Second: Answer the following questions

2) Find the equation of the line passing through the point (0, -3) and whose slope equals 3.

3) Find the equation of the line passing through the point (2, 1) and perpendicular to the line 5x - 3y + 2 = 0.

4) Find the equation of the straight line passing through the point (2, 5) and parallel to line 3x + 2y + 1 = 0.

5) Find the equation of the straight line passing through the two points (3, 6) and (1, 2) and which intercepts apart from the y-axis of magnitude 5 units.

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Group (C)

First: Choose the correct answer :

1) If the two straight lines $kx + y + 2 = 0$ and $(k - 8)x + 3y = 5$ are parallel, then the value of k is:

a) 2 b) 3 c) -1 d) -2

Second: Answer the following questions

2) Find the equation of the line passing through the point (0, 4) and whose slope equals 6.

3) Find the equation of the line passing through the point (7, 2) and perpendicular to the line $x - 2y + 3 = 0$.

4) Find the equation of the straight line passing through the point (5, 2) and parallel to line $7x + 3y + 1 = 0$.

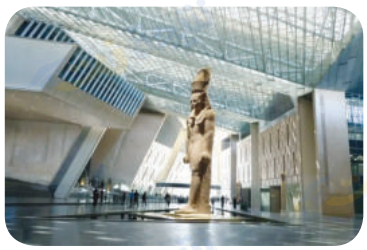
5) Find the equation of the straight line passing through the two points (2, 8) and (3, 5) and which intercepts apart from the y-axis of magnitude -1 unit.

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Unit Four | Week ..... | Lesson 1: Measures of Dispersion | Date: / /

Class performance:

Activity 1: The Grand Egyptian Museum



The number of visitors over six days was:820, 840, 835, 830, 845, 825

» Calculate the range.

» Is the number of visitors approximately constant from one day to another?

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Activity 2: The New Administrative Capital



One of the air quality monitoring stations recorded AQI values over seven days:34, 35, 33, 34, 36, 35, 32• Arrange the data in ascending order.

» Calculate the Interquartile Range (IQR).

» Decide whether the values are clustered or widely spread.

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Activity 3: 100 Million Healthy Lives Initiative



The number of citizens screened over seven days: 210, 218, 215, 220, 214, 219, 216

» Calculate the standard deviation.

» Explain what it indicates about consistency.

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Home performance (Homework):

1) Find the range of the values: 8, 12, 10, 15, 14, 9
2) Find the IQR of the values: 5, 7, 11, 13, 15, 17, 19, 21
3) If Q_1=18 and Q_3 = 31, then find the IQR and determine whether dispersion is high or low.
4) Find the standard deviation of the values: 15, 18, 22, 20, 25
5) Find the arithmetic mean, then the standard deviation of the values: 9, 11, 13, 15, 17

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Weekly Assessment (Week.....)

Group (A)

First: Choose the correct answer:

1) The range of the data 5, 9, 12, 20, 4 is:

a) 16 b) 15 c) 10 d) 20

Second: Answer the following questions:

2) Find the interquartile range for the following data:22, 15, 20, 12, 7, 25, 18, 23

3) Find the value of K that makes the range of the set of values 15, 16, K, 7, 9 equal to: 14

4) Find the standard deviation for the values:12, 15, 18, 20, 25

5) If the interquartile range = 3.5 and the lower quartile = 28, what is the value of the upper quartile?

Group (B)

First: Choose the correct answer :

1) The range of the data 5, 9, 12, 22, 3 is:

a) 12 b) 15 c) 18 d) 20

Second: Answer the following questions:

2) Find the interquartile range for the following data:25, 12, 14, 15, 20, 22, 18, 8

3) Find the value of K that makes the range of the set of values 14, 15, K, 16, 17, ,5 ,6 equal to: 13

4) Find the standard deviation for the values:4, 6, 8, 10, 12

5) If the interquartile range = 4.5 and the lower quartile = 30, what is the value of the upper quartile?

Group (C)

First: Choose the correct:

1) The range of the data 5, 9, 18, 26, 7 is:

a) 13 b) 19 c) 12 d) 5

Second: Answer the following questions:

2) Find the interquartile range for the following data:5, 7, 9, 11, 13, 15, 17 ,19

3) Find the value of K that makes the range of the set of values 13, 14, 16, K, 2, 5 equal to: 15

4) Find the standard deviation for the values:11, 9, 7, 5, 3

5) If the interquartile range = 2.5 and the lower quartile = 23, what is the value of the upper quartile?

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General Exercises

First: Choose the correct:

1) Which of the following is the y-intercept (intersection with the Y-axis) of the curve of the function $f(x) = x^2 - 5x - 6$?

a) (1, 6) b) (-1, -6) c) (1, -6) d) (-1, 6)

2) What is the set of real zeros of the function $f(x) = x^2 - 4$?

a) {-4} b) {±4} c) {-2} d) {±2}

3) The common domain of the two functions $n_1(x) = \frac{3}{x+2}$, $n_2(x) = \frac{5}{x-3}$ is:

a) $R - \{-2\}$ b) $R - \{3\}$ c) $R - \{-2, 3\}$ d)

4) If the dilation factor is less than 1, this means .....

a) Reduction b) Enlargement

c) Congruence d) Not preserving angle measures

5) If the range of the values 8, 8, 8, x equals zero, then x equals:

a) 0 b) 8 c) 16 d) 4

Second: Answer the following questions:

1) A cube-shaped box for storing goods has an edge length of $3xy^2$ meters. Find the volume of the box in simplest form in terms of x and y.

2) A cuboidal fish tank has dimensions in meters $2a^2$, 4ab, and 3b. Find the volume of the tank in simplest form in terms of a and b.

3) A cylinder shaped barrel used for storing juice has a base radius of r meters and a height of $5r^2$ meters. Find the volume of the barrel in terms of π and r in simplest form.

4) A wooden box in the shape of a cube has base edge lengths given as 3x cm and 9x-1 cm. Find the volume of the box in cubic centimeters in simplest form.

5) A cuboidal water tank has dimensions in meters: 2x, 2x+1, and 4x. Find the volume of the tank in cubic meters in simplest form.

6) An oil barrel in the shape of a cylinder, has a base area of 5^2x cm^2 and a height of 5x+1 cm. Find the volume of the barrel in cubic centimeters in simplest form.

7) Graph the following functions, indicating the axis of symmetry, the vertex of the curve, and the maximum or minimum value:

a) $q(x) = -2x - x^2$ b) $g(x) = (x - 1)^2 + 2$

8) If the daily profit of a gift shop follows the function $p(t) = -t^2 + 8t - 12$, where t is the number of hours the shop is open and p(t) represents the total profit, at what hour after opening will the shop's profit equal zero?

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9) The height of an athlete's jump in the air as a function of time is represented by $h(t) = -5t^2 + 10t$, where t is time in seconds and h(t) is height in meters from the ground. After how many seconds does the athlete return to the ground?

10) Find the common domain of the two functions: $n_1(x) = \frac{3}{x+2}$, $n_2(x) = \frac{5}{x-3}$

11) If: $f(x) = \frac{x^2-4}{x-2}$ find the solution set of the equation f(x) = 5 in the set of real numbers.

12) Find the common domain of the functions
$f_1(x) = \frac{x^2-4x+3}{x^2-x-6}$ and $f_2(x) = \frac{x^2-9}{x^2-5x+6}$.

13) If $f_1(x) = \frac{x^2-3x}{x^2-6x+9}$ and $f_2(x) = \frac{4x}{4x-12}$ prove that $f_1(x) = f_2(x)$ for every x in the common domain of the two functions.

14) If the domain of the function $f(x) = \frac{x+6}{x^2-ax+36}$ is $R - \{6\}$, find the value of the constant a.

15) If: $f_1(x) = \frac{x^2-4}{x^2-2x}$ and $f_2(x) = \frac{x+2}{x}$, prove that: $f_1 = f_2$

16) Determine the values of $f(x) = g(x)$ that make if: $f(x) = \frac{x-1}{x^2-1}$, $g(x) = \frac{1}{x+1}$

17) Find the common domain of the following three functions:

$$f_1(x) = \frac{x+2}{3} \quad , \quad f_2(x) = \frac{x}{x^2-1} \quad , \quad f_3(x) = \frac{5}{x+2}$$

18) Prove that $f_1 = f_2$, where: $f_1(x) = \frac{x^2-3x}{x^2-6x+9}$, $f_2(x) = \frac{4x}{4x-12}$

19) If: $f(x) = \frac{x}{x^2-4}$ and $g(x) = \frac{1}{x-2}$, Find the common domain in which the two functions are equal.

20) Find the common domain of the two functions:

$$f(x) = \frac{2x-3}{x^2-16} \quad , \quad g(x) = \frac{x+1}{x^2-5x+4}$$

21) If: $f(x) = \frac{x^2+2x}{x^2+4x+4}$ and $g(x) = \frac{6x}{6x+12}$, is f = g ? Why?

22) Prove that: $f_1(x) = f_2(x)$ for all values of (x) in the common domain, and find this domain

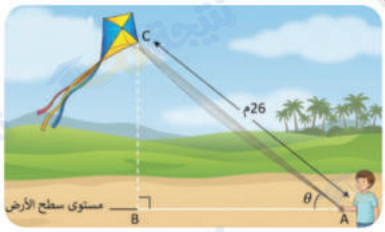
23) Find the set of x values that make $f(x) = g(x)$, if:

$$g(x) = \frac{x+1}{x^2-3x-4} \ , \ f(x) = \frac{x+4}{x^2-16}$$

24) Using the values of special angles, find the value of:
$\sin 30° \times \cos 60° + \tan 45°$

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25) A kite with a string 26 meters long flies above the ground. The string makes an angle θ with the ground surface, such that $\sin\theta = \frac{5}{13}$.
Calculate the vertical height of the kite and write down the steps of the solution.

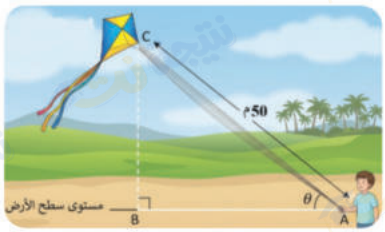


26) In the triangle DEF, which is right at E, if DE = 7 cm and DF =25 cm
Find sin D, then prove that $\sin^2 F + \cos^2 F = 1$

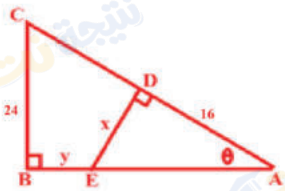
27) In right triangle DEF, m∠E = 90°, DE = 5 cm and EF = 12 cm, find the value of tan D.

28) If $\cos\theta = \frac{12}{13}$, what is the value of tan θ, sin θ?

29) A kite with a string 50 meters long is raised above the ground, and the string makes an angle θ with the ground surface, such that $\sin\theta = \frac{7}{25}$.
Calculate the vertical height of the kite.



30) In the triangle GHI, which is right at H,
if GH = 9 cm and GI = 41 cm,
Find sin G, then prove that $\sin^2 I + \cos^2 I = 1$

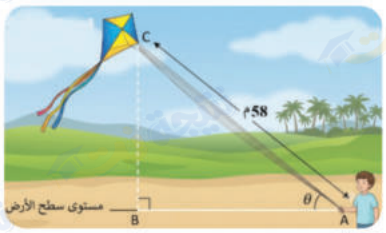


31) If $\tan\theta = \frac{3}{4}$, Find the values of x and y.

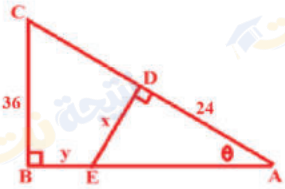
32) In right triangle GHI, m(∠H) = 90°, GH = 7 cm and HI = 24 cm, find the value of tan G.

33) If $\sin\theta = \frac{8}{17}$, what is the value of cos θ, tan θ?

34) A kite with a string 58 meters long is raised above the ground. The string makes an angle θ with the ground surface, such that $\sin\theta = \frac{20}{29}$.
Calculate the vertical height of the kite.

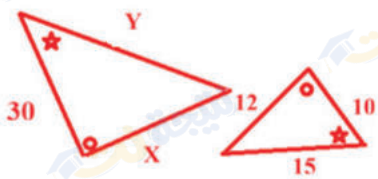


35) In the triangle JKL, which is right at K,
if JK = 11 cm and JL =61 cm
Find sin J, then prove that $\sin^2 L + \cos^2 L = 1$

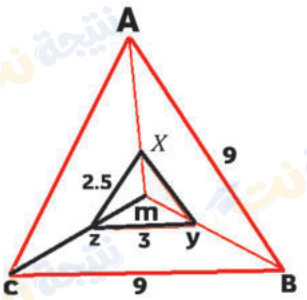


36) If $\tan\theta = \frac{3}{4}$, Find the values of x and y.

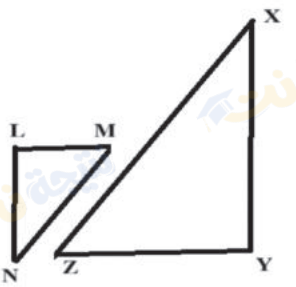
37) From the figure opposite:
Find the value of Y – X



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38) Triangle ABC is the image of triangle XYZ stretched about m. Find the dilation factor and the perimeter of both triangles.



39) In the opposite figure $\Delta NLM \sim \Delta YZX$:
YZ = 6 cm, LM = 2cm , NM = 4cm and XY = 9cm
Find the ratio between the perimeter of ΔNLM and perimeter of ΔXYZ

40) If $\cos\theta = \frac{3}{5}$, what is the value of $\tan\theta$, $\sin\theta$?

41) Find the value $30° \tan 45° - 60° \tan 45°$

42) Prove that: The straight line passing through the two points A(4, 6), B(3, 5) is parallel to the straight line whose angle measures 45°.

43) If the slope of the first line is $\frac{-2}{3}$ and $\frac{K}{4}$ the slope of the second line is , and the two lines are perpendicular, find the value of k.

44) Find the equation of the straight line that passes through the point (2, -3) and is parallel to the line 2x - y + 1 = 0. Then find the equation of the line perpendicular to it.

45) If the straight line passing through the two points (8, 9) and (5, 8) is parallel to the line whose equation is 3x + ky + 12 = 0, find the value of k.

46) Find the equation of the straight line passing through the origin and parallel to the line whose equation is: 3y = 4x – 5 .

47) If the straight line y = kx + 4 passes through the point (2, 10), find the value of k.

48) Find the value of k such that the points A(1, 2), B(3, k), C(5, 6) are collinear.

49) Prove that the points A(1, 2), B(3, 4), C(5, 0), D(1, -2) are the vertices of a parallelogram.

50) Find Q_3 ، Q_1 and the interquartile range for the following data:
20, 18, 15, 12, 10, 8, 7, 5, 2

51) Calculate the range for the following set of data: 30, 21, 21, 15, 10, 7, 7, 3

52) Calculate the mean and standard deviation for the following data:
18, 16, 14, 12, 10

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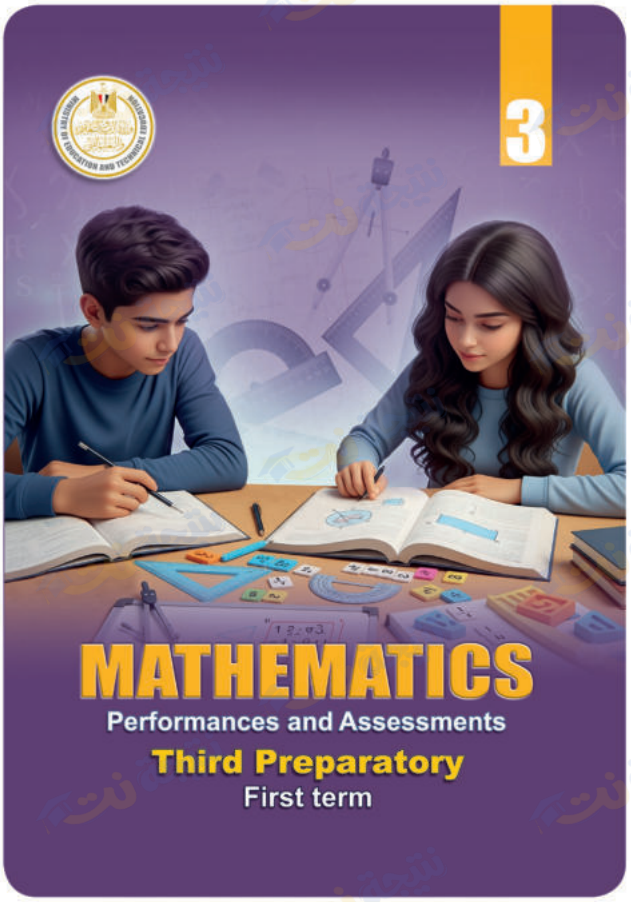
53) Determine the equation of the straight line that passes through the point (2, 3) and intercepts 4 units on the positive part of the x-axis.

54) Find the equation of the straight line that intercepts equal positive segments of length 4 and 3 respectively on the x-axis and y-axis.

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