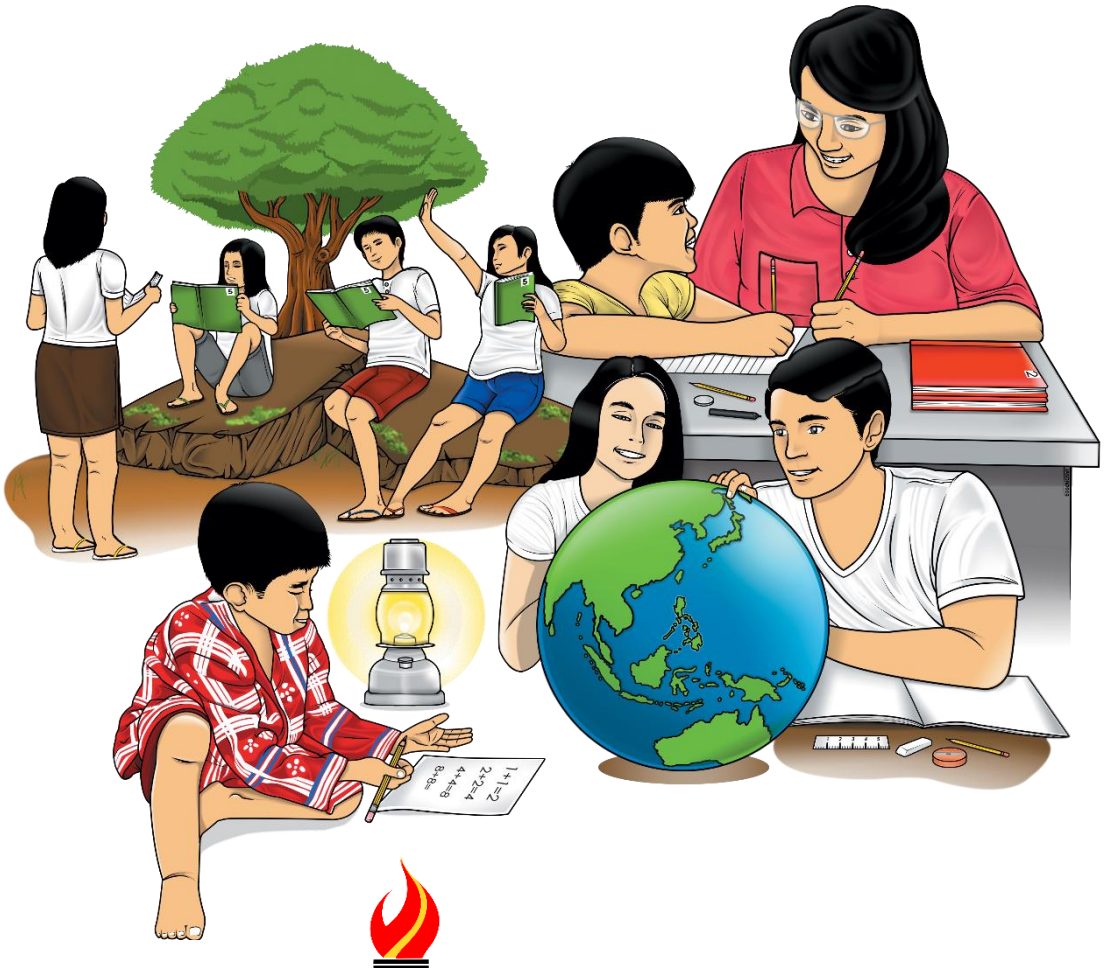
9

DepED
DEPARTMENT OF EDUCATION

Mathematics

Quarter 2 – Module 10
Solving Problems Involving Radicals



ALTERNATIVE DELIVERY MODE
ADM

Mathematics – Grade 9
Alternative Delivery Mode
Quarter 2 – Module 10 :Solving Problems Involving Radicals
First Edition, 2020

Published by the Department of Education
Secretary: Leonor Magtolis Briones
Undersecretary: Diosdado M. San Antonio

Development Team of the Module

Writer: ARjohn A. Atienza, Cecile D. Respall, Lhea Pendon, Myla V. Generalo

Editors: Juvy G. Delos Santos, Maita G. Camilon, Sally C. Caleja

Reviewer: Remylinda T. Soriano, George B. Borromeo, Angelita Z. Modesto

Illustrator:

Layout Artist: Reymark L. Miraples, Jhunness Bhaby A. Villalobos, Rosel P. Patangan

Management Team:

Malcolm S. Garma, Genia V. Santos
Dennis M. Mendoza, Maria Magdalena M. Lim
Aida H. Rondilla, Lucky S. Carpio

Printed in the Philippines by _____

Department of Education - National Capital Region
Office Address: Misamis St., Brgy. Bago Bantay, Quezon City
Telefax: (632) 8926-2213 /8929-4330 /8920-1490 and 8929-4348
E-mail Address: ncr@deped.gov.ph

9

Mathematics

Quarter 2 – Module 10: Solving Problems Involving Radicals

DepED
DEPARTMENT OF EDUCATION

Introductory Message

This Self-Learning Module (SLM) is prepared so that you, our dear learners, can continue your studies and learn while at home. Activities, questions, directions, exercises, and discussions are carefully stated for you to understand each lesson.

Each SLM is composed of different parts. Each part shall guide you step-by-step as you discover and understand the lesson prepared for you.

Pre-tests are provided to measure your prior knowledge on lessons in each SLM. This will tell you if you need to proceed on completing this module or if you need to ask your facilitator or your teacher's assistance for better understanding of the lesson. At the end of each module, you need to answer the post-test to self-check your learning. Answer keys are provided for each activity and test. We trust that you will be honest in using these.

In addition to the material in the main text, Notes to the Teacher are also provided to our facilitators and parents for strategies and reminders on how they can best help you on your home-based learning.

Please use this module with care. Do not put unnecessary marks on any part of this SLM. Use a separate sheet of paper in answering the exercises and tests. And read the instructions carefully before performing each task.

If you have any questions in using this SLM or any difficulty in answering the tasks in this module, do not hesitate to consult your teacher or facilitator.

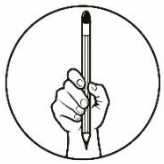
Thank you.

What I Need to Know

LEARNING COMPETENCY

In this module, you will be able to:

- solve problems involving radicals. (**M9AL-IIj-1**)



What I Know

Find out how much you already know about this lesson.
Choose the letter of the correct answer. Please answer all items. Take note of the items that you were not able to answer correctly and find out the right answer as you go through this module.

1. Luis walks 5 km due east and 8 km due north. How far is he from the starting point?
   a. $\sqrt{89}$km b. $\sqrt{64}$ km c. $\sqrt{39}$ km d. $\sqrt{25}$ km

2. Find the length of an edge of a cube given its surface area of 72 m^2.
   a. $6\sqrt{3}$ m b. $6\sqrt{12}$ m c. $2\sqrt{3}$ m d. $\sqrt{2}$ m

3. A taut rope starting from the top of a flagpole and tied to the ground is 15 m long. If the pole is 7 m high, how far is the rope from the base of the flagpole?
   a. $4\sqrt{11}$ m b. $16\sqrt{11}$ m c. $11\sqrt{4}$ m d.$16\sqrt{4}$ m

4. The volume of a cylinder is represented by $V = \pi r^2 h$, where r is the radius of the base and h is the height of the cylinder. If the volume of a cylinder is 120 cubic meters and the height is 5 meters, what is the radius of the base? (Use $\pi = 3.14$)
   a. 2.76 m b. 3.76 m c.4.82 m d. 7.64 m

5. Five times the square root of 1 less than a number is equal to 3 more than the same number. Find the numbers.
   a. 15 and 4 b.-15 and -4 c. 17 and 2 d.-17 and -2

6. The square root of the sum of two consecutive odd integers is equal to 6. Find the larger integer.
   a. 16 b. 18 c. 17 d. 19

7. For an airplane flying above the earth, the approximate distance d (in miles) to the horizon is given by the equation $d = \sqrt{8000a}$, where a is the altitude of the plane in miles. Determine the altitude of the plane if its distance to the horizon is 150 miles.
   a. $1\frac{13}{16}$ mi b. $2\frac{13}{16}$ mi c. $3\frac{13}{16}$ mi d. $4\frac{13}{16}$mi.

8. The formula $t = 1.11\sqrt{L}$, gives the time t (in seconds) required for a pendulum of length L feet to swing through one back- and- forth- cycle. A grandfather's pendulum completes one cycle in 1.28 seconds. To the nearest hundredths in feet, how long is the pendulum?
   a. 1.63 ft b. 1.23 ft c. 1.22 ft d. 1.33 ft

9. Find the length of the side of a square if its diagonal is $\sqrt{2}$ cm.
   a. 10 cm b. 2 cm c. 1 cm d. 0.1 cm

10. The radius of a cone with volume V and height h is $\mathbf{r} = \sqrt{\frac{3V}{\pi h}}$. Suppose a cone has a radius of 10 cm and a height of 25 cm. Find its volume. (Use $\pi = 3.14$)
   a. 260 cm^3 b. 2616.67 cm^3 c. 8263.03 cm^3 d.2616 cm^3

Impressive! You were able to finish answering the pre-test. You may ask your facilitator/guardian to check your work. Congratulations and keep on learning!

Lesson 1	SOLVING PROBLEMS INVOLVING RADICALS

In the previous module, you learned about radical equations and how to find its solution. In this module, you will learn how to solve word problems involving radicals.

What's In

The radical sign is used to denote the positive or the principal root of a number. The word "radical" comes from the Latin word "radix", meaning "root" was used in the 13th century or so, and was abbreviated as "R" or R with a slash through the right leg of the R, like the Rx symbol at pharmacies.

The symbol that looks like a check (radical sign without the "roof") originated in Germany, in the 1500's. It started out looking quite like a musical note. If you had a long expression under the radical sign, the expression was put in parentheses, and later, placed with a line over it. This is where the current symbol came from. Descartes in his _La Geometrie_ (1637) seems to be the first to place the line on top for grouping.

The other use of "radical" means "by the roots" or "from the roots", such as a "radical" change in a person means changing your inner self to have a dramatic change in appearance, opinion, values, goal or personality, like changing your total outlook in life. Most often, it is a result of an experience that is tragic or a success.

Now, why is a square root called a root in the first place?
Answer: a root is the source of something; if you square a number, the number it came from is the root, as if the square grew from it.

Nivera, G.C. &Lapinid, M. C.(2013)

Previously, you learned that a radical equation is an equation in which a variable is radicand or inside a radical symbol. You also learned how to solve radical equations by performing operations on radicals, applying the laws of radicals and simplifying them.

Now, try to answer the given questions by applying the concepts you have learned in the previous lessons on radicals.

What's New

1. What is the square root of:

_____a. $\sqrt{64}$

_____b. $\sqrt{\frac{9}{25}}$

_____c. $\sqrt{0.36}$

2. Simplify:

_____*a.* $\sqrt{(-4x^2y)^2}$

_____*b.* $\sqrt{(x^2+3)^2}$

_____*c.* $-\sqrt{121x^2}$

3. Simplify:

_____a. $\sqrt{400}$

_____b. $\sqrt{32}$

_____c. $-5\sqrt{18}$

4. Simplify**:**

_____a. $\sqrt{x^8}$

_____b. $\sqrt{4x^2y^4z^6}$

_____c. $\sqrt[3]{27x^9y^3z^{12}}$

5. Simplify:

_____a. $\sqrt{b^5}$

_____b. $\sqrt{16x^3y^5}$

_____c. $\sqrt[3]{-54x^4y^8}$

6. Simplify:

_____a. $\sqrt{\frac{75}{36}}$

_____b. $\sqrt{\frac{18x^3}{49xy^2}}$

_____c. $\sqrt{\frac{x^5y^2}{125xy}}$

7. Rationalize the denominator:

_____a. $\frac{4}{\sqrt{x}}$

_____b. $\frac{2}{\sqrt[3]{2}}$

_____c. $\sqrt[6]{\frac{64}{y}}$

8. Simplify:

_____a. $\sqrt{8}+\sqrt{18}-\sqrt{32}$

_____b. $\sqrt{8x^3}+\sqrt{2x^5}-3\sqrt{50x}$

9. Simplify:

_____a. $\sqrt{5x}\sqrt{15}$

_____b. $(2\sqrt{12a})(3\sqrt{2a})$

10. Solve for x.

_____*a.* $2\sqrt{x-3}=12$

_____*b.* $\sqrt{3x-2}=\sqrt{x+4}$

Another way of solving word problems is using the Problem-Solving-Maps. In the following examples, the MBM (Math-Breaker-Map) and the MRM (Multi-Rule-Map) are used. Study each one of them.

Example1 **:** MATH-BREAKER MAP (MBM)

The length of the legs of a right triangle are 3 cm and $3\sqrt{3}$ cm. Find the length of the hypotenuse.

REPRESENTATION OF THE PROBLEM

Let x = the length of the hypotenuse

FORM AN EQUATION

Using Pythagorean Theorem because the given is a right triangle

$c^2 = a^2 + b^2$

SOLVE FOR THE UNKNOWN

$x^2 = 9 + 27$

$x^2 = 36$

$\sqrt{x^2} = \sqrt{36}$

$x = 6$

WRITE THE FINAL ANSWER

The length of the hypotenuse is 6 units.

Example 2: MULTI –RULE MAP (MRM)

The square root of the sum of two consecutive integers is 7. Find the two integers.

Let x = be the 1st integer

x +1 = the second integer

$\sqrt{x + x + 1} = 7$

$\sqrt{2x + 1} = 7$

$\sqrt{2x + 1}^2 = 7^2$

2x+1 = 49

2x = 48

x = 24

The 2 consecutive integers are 24 and 25

Representation of the Problem

Form an Equation

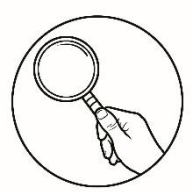
Combine similar terms

Square both sides of an equation

Apply laws of radicals

Addition Property of Equality

Multiplication Property of Equality



What is It

This time, you will apply what you have learned from the previous topics on how to solve problems involving radicals. Let us study the following examples.

***Example 1*:** The square root of the sum of two consecutive odd integers is equal to 8. Find the larger integer.

Solution:
a. Understand the problem:
Let x = be the smaller odd integer
x+2 = be the larger odd integer
We will equate the square root of the sum of these integers to 8.

b. Write the equation: $\sqrt{x + (x + 2)} = 8$

c. Solve:

$\sqrt{x + (x + 2)} = 8$	*Equation from the given data*
$\sqrt{2x + 2} = 8$	*Combine similar terms*
$\sqrt{2x + 2}^2 = 8^2$	*Square both sides of the equation*
$2x + 2 = 64$	
$2x = 62$	*Addition Property of Equality*
$x = 31$	*Multiplication Property of Equality*
$x = 31$	*The smaller odd integer*
$x+2 = 31+2 = 33$	*The larger odd integer*
Since the question is, "find the larger integer", thus the answer is 33.	

Example 2: *The side of a square measures*$(\sqrt{5} + 3)$ *units, solve for its area.*

Solution:

$A = s^2$	*Formula for the area of a square*
$A = [(\sqrt{5} + 3)units]^2$	*Substitute the given in the formula*
$A = [(\sqrt{5} + 3)units]\,[(\sqrt{5} + 3)units]$	*Expand*
$A = [\sqrt{25} + (3\sqrt{5}) + (3\sqrt{5}) + 9]$ *sq. units*	*Multiplication of radicals(foil method)*
$A = (5 + 6\sqrt{5} + 9)$ *sq. units*	*Simplify*
$A = (14 + 6\sqrt{5})$*sq. units*	*Combine similar terms*
Therefore, the Area of the square is $(14 + 6\sqrt{5})$*sq. units*	

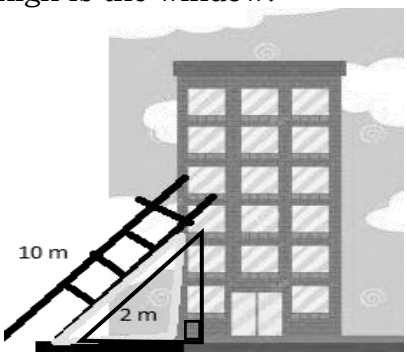
Example 3: In an electrical circuit, the amount of current measured in amperes (I), the amount of power in watts(W), and the resistance (R) in ohms are related by the formula; $I = \sqrt{\frac{W}{R}}$. Find the wattage in a system with 20 amperes and 12 ohms.

Solution:
a. Understand the problem.
b. Identify the given: I = 20 ampere, R= 12 ohms, W =?

c. Solve:

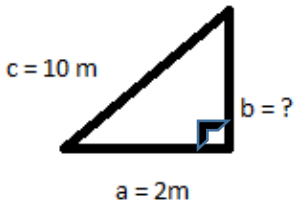
$I = \sqrt{\frac{W}{R}}$	Given Formula
$20\ amp = \sqrt{\frac{W}{12\ ohm}}$	Substitute the given values of I and R
$20\ amp = \left(\frac{\sqrt{w}}{\sqrt{12\ ohm}}\right)\left(\frac{\sqrt{12\ ohm}}{\sqrt{12\ ohm}}\right)$	Rationalize the denominator
$20\ amp = \frac{\sqrt{(W)12\ ohm}}{\sqrt{144\ ohm^2}}$	Multiplication of Radicals
$20\ amp = \frac{\sqrt{(W)(12\ ohm)}}{12\ ohm}$	Get the square root of the denominator
(20 amp)(12 ohm) = $\sqrt{(W)(\ 12\ ohm)}$	*Multiplication Property of Equality*
$(240\ amp.\ ohm)^2 = \sqrt{(W)(12\ ohm)}^2$ $57600\ (amp)^2\ (ohm)^2 = (W)\ (12\ ohm)$	Square both sides of the equation
$\frac{57600\ (amp)^2(ohm)^2}{12\ ohm} = \frac{(W)\ (12\ ohm)}{12\ ohm}$	Divide both sides by 12 ohm or MPE
$4800\ (amp)^2\ (ohm) = W$	Simplify the equations
$W = 4800\ (amp)^2(ohm) \Longrightarrow$ W = 4800 watts (Note that I*I*R = Power (watts)	

Example 4: To save a woman from a burning building, the firemen placed a 10-meter ladder against the window. The foot of the ladder was 2 meters from the wall. Approximately, how high is the window?



Solution:

a. Draw a diagram that represents the problem.



b. Determine the theory involved in the figure.

The figure formed is a right triangle; we will use the Pythagorean Theorem in solving the problem.

$c^2=a^2+b^2$, in the figure one of the legs or sides is denoted by b, which is the height of the window.

We will derive the formula as: $b = \sqrt{c^2 - a^2}$ when b is unknown.

When a is unknown: $a = \sqrt{c^2 - b^2}$.

When c is unknown: $c= \sqrt{a^2 + b^2}$

c. Solve: *a= 2m; c = 10m; b = ?*

$b = \sqrt{c^2 - a^2}$	*Use the derived formula for b*
$b = \sqrt{(10m)^2 - (2m)^2}$	*Substitute the given values to the formula*
$b = \sqrt{100m^2 - 4m^2}$	*Square the numbers*
$b = \pm\sqrt{96m^2}$	*Perform the operation*
$b = \pm(\sqrt{16})(\sqrt{6})(\sqrt{m^2})$	*Factor the radicand to simplify a perfect square factor*
$b = \pm 4(\sqrt{6})\ m$	*Simplify by getting the square root*
$b = 4\sqrt{6}$ *meters*	Get the principal root for the f*inal answer*
The height of the window is $4\sqrt{6}$ meters.	

What's More

Solve the following problems.

1. Lori recently purchased a square painting with an area of 2700 cm^2**.** How much wood does Lori need to make the frame?

2. The maximum number of volts (E), that can be placed across the resistor is given by E =$\sqrt{PR}$, where P is the power in watts and R is the resistance in ohms. If a 2-watt resistor can have at most 40 volts of electricity across it. Find the number of ohms of resistance of this resistor.

3. The time (t) in seconds, it takes a free-falling object to fall (h) in feet is given by the formula t =$\sqrt{\frac{h}{16}}$. If a ball is dropped from a height of 100 m, how long would it take the ball to hit the ground in seconds?

What I Have Learned

In solving problems involving radicals, we must know how to:

Simplify Radicals	-Take the square root of all perfect squares - Leave the other factors under the radical sign
Rationalize the Denominator	-Multiply both numerator and denominator by an appropriate expression such that the product will be a perfect nth root. -For binomial denominators, multiply by their conjugates
Add and Subtract Radicals	-Simplify all radicals -Add or subtract similar radicals. (Similar radicals have the same radicands and indices.
Multiply Radicals	-Apply the property $\sqrt[n]{a}\sqrt[n]{b} = \sqrt[n]{ab}$, then simplify - In multiplying two radical expressions, apply the FOIL method.
Divide Radicals	-Simplify the radical expressions or rationalize the denominator -Apply the property $\frac{\sqrt[n]{a}}{\sqrt[n]{b}} = \sqrt[n]{\frac{a}{b}}$, then simplify
Use Pythagorean Theorem	-The square of the length of the hypotenuse (c)is equal to the sum of the squares of the length of the legs (a and b) of any right triangle. That is, $c^2 = a^2 + b^2$
Solve Radical Equation	-Isolate the term with radicals on one side of the equation then, square both sides of the equation. -Solve the resulting equation. -Check for extraneous solution.

What I Can Do

Try to solve these problems to check your readiness in answering your post-test.

1.

Find the length of the hypotenuse of a right triangle whose legs are 6 cm and 12 cm.

Representation of the Problem

Form an Equation

Solve for the Unknown

Write the Final Answer

2. A kite is secured to a rope that is tied to a ground. A breeze blows the kite so that the rope is taut while the kite is directly above the flagpole that is 30 ft from where the rope is staked down. Find the altitude of the kite if the rope is 110 ft. long.

Let x be the altitude of the kite.

From Pythagorean Theorem:

$c^2 = a^2 + b^2$

$110^2 = 30^2 + x^2$

Square the numbers

Addition Property of Equality

Take the square roots of both sides

Assessment

Read the questions carefully. Write the letter of the correct answer in your answer sheet.

1. A man walks 4 meters to the east going to school and then walks 10 meters northward going to the church. How far is he from the starting point?
   a. $5\sqrt{29}$ m b. $4\sqrt{29}$ m c. $3\sqrt{29}$ m d. $2\sqrt{29}$ m

2. If each side of a square garden is increased by 4 m, its area becomes 144 m^2. What is the length of the side of the original square garden?
   a. 6 m b. 8 m c. 16 m d. 19 m

3. A 26-foot ladder rests against a building and reaches a windowsill 24 feet above the ground. How far from the wall is the base of the ladder?
   a. 10 ft b. 11 ft c. 12 ft. d. 13 ft

4. The volume of a spherical balloon is 113.04 cm^3. Find the radius of the balloon. ($\pi = 3.14$ and volume of a sphere $=\frac{4}{3}\pi r^3$).
   a. 2 cm b. 3 cm c. 4 cm d. 5 cm

5. Find the number such that twice its square root is 14.
   a. 7 b. 8 c. 49 d. 144

6. The square root of the sum of two consecutive odd integers is $6\sqrt{2}$. Find the larger integer.
   a. 34 b. 35 c. 36 d. 37

7. The distance (d) in miles that a person can see to the horizon is represented by the equation $d = \sqrt{\frac{3h}{2}}$, where h is the height where the person is. (1 mile = 1609.3 m). How far can you see to the horizon through an airplane window at a height of 8000 meters? (Note: Convert first the given height of 8000 meters to miles.)
   a. 2.73 miles b. 2.74 miles c. 7.46 miles d. 7.64 miles

8. The time (t) in seconds it takes a free-falling object to fall is given by the formula, $t = \sqrt{\frac{h}{16}}$.How high in feet, will an airplane can reach in 15seconds?
   a. 36 ft b. 60 ft c. 3600 ft d. 6000 ft

9. The side of a square is $8\sqrt{7}$ cm. Find its diagonal.
   a. $8\sqrt{14}$ cm b. $4\sqrt{81}$ cm c. $4\sqrt{18}$ cm d. $8\sqrt{41}$ cm

10. The volume of a can is 602.88 cm^3. The height of the can is three times the radius of the base. Find the radius of the base of the cylinder given its formula as $V = \pi r^2 h$. (Use $\pi = 3.14$)

    a. 4 cm b. 4.5 cm c. 5 cm d. 5.5 cm

Additional Activities

- List down three experiences that you had brought out profound changes in you.
- Do some self-check and think if those changes made a positive or a negative impact in your life. Write the things that you have learned from that experienced.
- Write a thought process wherein you consider getting a rewind of an event in your life and what should you change in that particular event.

E-Search

To further explore the concept learned today and if it's possible to connect the internet, you may visit the following links:

https://www.youtube.com/watch?v=2vG5KdnIZ7I&t=8s

https://www.youtube.com/watch?v=kHIj49h1_qQ

https://www.youtube.com/watch?v=tkaPcuKXu9E

https://www.youtube.com/watch?v=2vG5KdnIZ7I&t=14s

https://www.youtube.com/watch?v=tNjhHLBp4uY

PISA BASED WORKSHEET

Juan is going to Nene's house to do a school project. Instead of walking two perpendicular streets to his classmates' house, Juan will take a short-cut diagonal path through the city plaza. Juan is 15 meters away from Nene's street. The distance from the intersection of the two streets to Nene's house is 8 meters.

Let's Analyze

1. How will you illustrate the problem?

2. How far will Juan travel along the shortcut? Show your solution.

3. How many meters will he save by taking the short cut rather than walking along the sidewalks.

4. If one of the distances increases or decreases, what might happen to the distance of the short cut? Justify your answer.

5. What Mathematical concepts did you use?

Answer Key

WHAT I KNOW

1. A
2. C
3. A
4. A
5. C
6. D
7. B
8. D
9. C
10. B

1a. 8

1b. $\frac{3}{5}$

1c. 0.6

2a. $-4x^2y$

2b. $x^2 + 3$

2c. -11x

3a. 20

3b. $4\sqrt{2}$

3c. $-15\sqrt{2}$

WHAT'S IN

4a. x^4

4b. $2xy^2z^3$

4c. $3x^3\,y\,z^4$

5a. $b^2\sqrt{b}$

5b. $4xy^2\sqrt{xy}$

5c. $-3xy^2\,\sqrt[5]{2xy^2}$

6a. $\frac{5\sqrt{3}}{6}$

6b. $\frac{3x\sqrt{2}}{7y}$

6c. $\frac{x^4\sqrt{5y}}{25}$

7a. $\frac{4\sqrt{x}}{x}$

7b. $\sqrt[8]{4}$

7c. $\frac{2\sqrt[6]{y^5}}{y}$

8a. $\sqrt{2}$

8b. $\sqrt{2x}\,(x^2 + 2x - 15)$

9a. $5\sqrt{3x}$

9b. $12a\sqrt{6}$

10a. x = 39

10b. x = 3

WHAT'S MORE

1.

A = 2700 cm²	Given value
s^2 = 2700	Substitution
s = $30\sqrt{3}$ cm	Take the square roots of both sides
P = 4($30\sqrt{3}$ cm)	Substitution to the formula of Perimeter
P = $120\sqrt{3}$ cm	Multiply

Lori needs $120\sqrt{3}$ cm of wood to make a frame.

2.

$E = \sqrt{PR}$	Given formula
$40 = \sqrt{2R}$	Substitution
1600 = 2R	Square both sides of the equation
800 = R	Multiplication Property of Equality

The resistor needs 800 ohms for the resistance.

3.

$t = \sqrt{\frac{h}{16}}$	Given Formula
$t = \sqrt{\frac{100}{16}}$	Substitution
$t = \frac{5}{2}$	Take the square roots of the fraction

It will take 2.5 seconds for the ball to hit the ground.

WHAT I CAN DO

1\.

Find the length of the hypotenuse of a right triangle whose legs are 6 cm and 12 cm.

Representation of the Problem

Let x = the length of the hypotenuse.

Form an Equation

Using the Pythagorean Theorem

$c^2 = a^2 + b^2$

$x^2 = (6\ cm)^2 + (12\ cm)^2$

Solve for the Unknown

$x^2 = 36\ cm^2 + 144\ cm^2$

$x^2 = 180\ cm^2$

$\sqrt{x^2} = \sqrt{180\ cm^2}$

$x = 6\sqrt{5}\ cm$

Write the Final Answer

The length of the hypotenuse is $6\sqrt{5}$ cm.

2\. A kite is secured to a rope that is tied to a ground. A breeze blows the kite so that the rope is taut while the kite is directly above the flagpole that is 30 ft from where the rope is staked down. Find the altitude of the kite if the rope is 110 ft. long.

Let x be the altitude of the kite. — **Representation of the unknown**

From Pythagorean Theorem: — **Formulating an equation**

$c^2 = a^2 + b^2$

$110^2 = 30^2 + x^2$

$12100 = 90 + x^2$ — Square the numbers

$11200 = x^2$ — Addition Property of Equality

$40\sqrt{7} = x$ — Take the square roots of both sides

ASSESSMENT

1. D	2. B	3. A	4. B	5. C
6. D	7. A	8. C	9. A	10. A

ADDITIONAL ACTIVITIES

Answers may vary.

PISA Based Worksheet

1. The problem can be illustrated using a right triangle.
2. Juan will travel 17 meters.
3. Juan will save 6 meters by taking the short cut.
4. If the distance of the shortcut increases or decreases, the length of the sides also increases or decreases like in direct variation.
5. Pythagorean Theorem (Solving Problems involving Radicals)

References

Nivera, G.C. &Lapinid, M. C.(2013). Grade 9 Mathematics Patterns and Practicalities. Salesiana Books by Don Bosco Press

Bryant, M.L. (2014) Mathematics Learner's Material 9. Department of Education

https://www.expii.com/t/radical-equations-word-problem-4583

http://www.pballew.net/etyindex.html

http://jeff560.tripod.com/mathword.html

https://www.dreamstime.com/mansum008_info

https://www.yourquote.in/tina-jeiva-olorunfemi-jun/quotes/radical-life-change-sometimes-what-need-touch-what-dream-kq91d

For inquiries or feedback, please write or call:

Department of Education - Bureau of Learning Resources (DepEd-BLR)

Ground Floor, Bonifacio Bldg., DepEd Complex
Meralco Avenue, Pasig City, Philippines 1600

Telefax: (632) 8634-1072; 8634-1054; 8631-4985

Email Address: blr.lrqad@deped.gov.ph * blr.lrpd@deped.gov.ph