

كتابة وتفسير المعادلات - الوحدة الثانية



تم تحميل هذا الملف من موقع المناهج الإماراتية

موقع المناهج ⇨ المناهج الإماراتية ⇨ الصف التاسع المتقدم ⇨ رياضيات ⇨ الفصل الأول ⇨ ملفات متنوعة ⇨ الملف

تاريخ إضافة الملف على موقع المناهج: 2026-08-29 19:06:54

ملفات اكتب للمعلم اكتب للطالب | اختبارات الكترونية | اختبارات | حلول | عروض بوربوينت | أوراق عمل
منهج انجليزي | ملخصات وتقارير | مذكرات وبنوك | الامتحان النهائي | للمدرس

المزيد من مادة
رياضيات:

إعداد: Aghead

التواصل الاجتماعي بحسب الصف التاسع المتقدم



صفحة المناهج
الإماراتية على
فيسبوك

الرياضيات

اللغة الانجليزية

اللغة العربية

التربية الاسلامية

المواد على تلغرام

المزيد من الملفات بحسب الصف التاسع المتقدم والمادة رياضيات في الفصل الأول

حل اختبار نهائي وفق الهيكل الوزاري منهج ريفيل

1

حل نموذج تدريبي Exam Mock وفق الهيكل الوزاري الجديد منهج ريفيل

2

حل نموذج اختبار تجريبي Exam Mock وفق الهيكل الوزاري منهج ريفيل

3

نموذج اختبار تجريبي Exam Mock وفق الهيكل الوزاري منهج ريفيل

4

ملخص نهائي وفق الهيكل الوزاري منهج ريفيل

5



وزارة التربية والتعليم
MINISTRY OF EDUCATION

الصف التاسع متقدم ريفيل الوحدة الثانية

Equations in One Variable
لعام 2026 - 2027

إحجز مكانك واستعد للامتحان بثقة كاملة

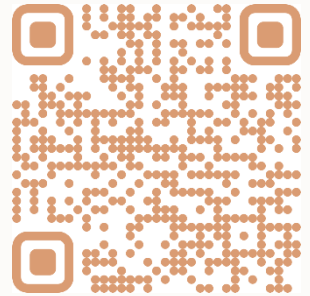
احصل على الشرح الكامل للصف من خلال:

التواصل والحجز عبر الـ Whatsapp
اضغط على الرقم: 0566991363



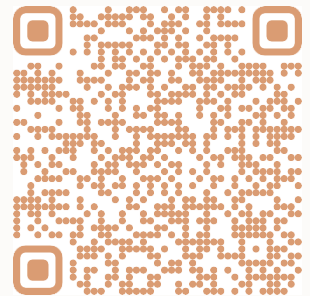
Mr. Aghead

للتواصل والحجز

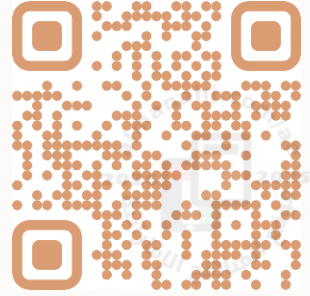


للانتقال إلى المواقع
اضغط هنا

شرح الدروس



انضم للقناة



للتواصل اضغط الرقم:
0566991363

Mr. Ahead

يمكنكم الحصول على

شرح
دروس
الفصل
كامل

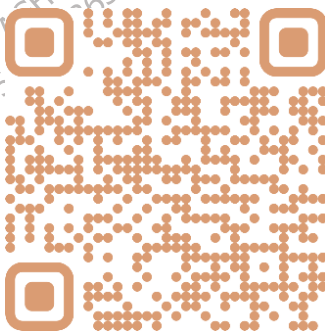
ملازم
محلولة

ب 149
درهم فقط

اختبارات

MR.AGHEAD

0566991363



لا تتردد في التواصل
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اضغط على الرقم: 0566991363

Lesson 1 – Writing and Interpreting Equations

دليل الترجمة والتفسير

مفاتيح الكلمات الدلالية

- () • كلمات مثل "الكمية" تشير للأقواس
- = • "هو نفسه" أو "يساوي" تشير لعلامة (=)

مفهوم القيد (Constraint)

شرط أساسي في المسألة يحد من عدد الحلول الممكنة لتحقيق صحة المعادلة.

تطبيق عملي (محيط المستطيل)



$P = 2(\ell + w)$
التعبير عن الجمل اللفظية بصيغ هندسية.

المعادلة الرياضية

$$4x - 10 = 16$$

أربعة أمثال عدد مطروحاً منه 10 يساوي 16

$$20 - \frac{7}{x} = 2x$$

عشرون ناقص ناتج قسمة 7 على x هو ضعف x

$$3(y + 1) = 12$$

ثلاثة أمثال مجموع y وواحد يساوي 12

الجملة اللفظية

كتابة المعادلات الرياضية: من الكلمات إلى الرموز

المعادلة هي جملة رياضية تحتوي على تعبيرين يفصل بينهما علامة التساوي (=). يركز هذا الدليل على عملية "الترجمة" الرياضية، لتحويل المشكلات اللفظية إلى نماذج حسابية قابلة للحل، مع مراعاة "القيود".

1. تحديد المجاهيل وتسميتها

حدد القيم غير المعروفة في المسألة وخصص لكل منها متغيراً (مثل x أو n).

2. تحليل المعطيات والعلاقات

استخرج الأرقام المعروفة وحدد الروابط الرياضية بينها (مثل الضعف، الفرق، أو ناتج القسمة)

3. كتابة الجملة كمعادلة

صياغة العلاقة النهائية في صورة تعبير رياضي متكامل يحتوي على علامة التساوي.

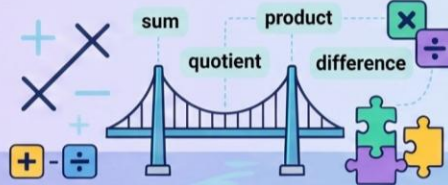
Mastering Mathematical Equations: From Words to Formulas

3 Steps to Writing Equations



1 Identify and Assign Variables

Pinpoint the unknown value and assign a letter (like x or n) to represent it.



2 Map Givens and Relationships

Look for mathematical operations like "sum," "quotient," or "product" connecting the known values.



3 Construct the Equation

Translate the full sentence into a mathematical statement using two expressions and an equal sign.

Interpreting and Refining Formulas



Decoding Grouping Symbols

Use the phrase "the quantity" to identify terms that belong inside parentheses.

$$(3x + 2)$$

The quantity of $2x$ plus 2



Understanding Constraints

A constraint is a specific condition or limit that a solution must satisfy.

$$x > 0$$

Positive values only



"IS" = EQUALS

"Is" Means Equals
In verbal phrases, the words "is" and "equals" can be used interchangeably.

$$\text{Total} = 20$$

The total is 20

Translation Examples

Verbal Phrase:
"The quotient of 7 and x "

$$\frac{7}{x} \div \frac{7}{x}$$

Verbal Phrase:
"Twice the sum of length and width"

$$2(\ell + w)$$

Verbal Phrase:
"Four times a number less 10"

$$4x - 10$$

Choose the correct answer for each question:

❖ Example 1:

1. Write an equation for the sentence:

Four times a number less 10 is equal to 16.

A. $4x - 10 = 16$

B. $4(x - 10) = 16$

C. $10 - 4x = 16$

D. $4x + 10 = 16$

❖ Example 2:

2. Etu has read 12 of the 32 chapters in his assigned book. He plans to finish the book by reading c chapters each for 8 days until the book is due.

Which equation best represents the situation?

A. $12 - 8c = 32$

B. $12 + \frac{c}{8} = 32$

C. $12 + 8c = 32$

D. $12 - \frac{c}{8} = 32$

❖ Example 3:

3. Translate the sentence into a formula. MOTORS: The horsepower of a motor is the product of the motor speed and the torque divided by 5252.

A. $H = \frac{M}{5252T}$

B. $H = \frac{MT}{5252}$

C. $H = \frac{5252}{MT}$

D. $H = \frac{5252M}{T}$

❖ Example 4:

4. Write a sentence for the equation.

$$6z - 15 = 45$$

A. Six times a number z , minus fifteen equals forty-five.

B. Six times the quantity of a number z minus fifteen equals forty-five.

C. Six times the difference of a number z and fifteen equals forty-five.

D. Six plus z minus fifteen equals forty-five.

5. $(y + 3)^2 = 25$

A. y plus 3 squared is 25.

B. y squared plus 3 is 25.

C. The quantity y plus 3 squared is 25.

D. y plus 3 is 25

❖ Example 5:

6. Select the sentence(s) that represent(s) the equation:

$$7(P + 23) = 102$$

A. Seven times the sum of p and twenty-three is the same as one hundred two.

B. Seven times p plus twenty-three equals one hundred two.

C. Seven times the quantity p plus twenty-three equals one hundred two.

D. The quantity seven times p plus twenty-three is the same as one hundred two.

E. Seven times the sum of p and twenty-three is one hundred two.

Practice:

7. The perimeter P of a triangle is equal to the sum of the lengths of sides a, b , and c .

A. $P = a + b + c$

B. $P = a \times b \times c$

C. $P = a + b - c$

D. $P = \frac{a+b+c}{2}$

8. Write a sentence for the equation: $4m = 52$

A. Four plus a number m equals fifty-two.

B. Four times a number m equals fifty-two.

C. A number m divided by four is fifty-two

D. Four minus a number m equals fifty-two.

9. What is the verbal sentence for the equation: $7(p + 23) = 102$

A. Seven times p plus twenty – three equals one hundred two.

B. Seven times the sum of p and twenty – three equals one hundred two.

C. The sum of seven and p multiplied by twenty-three is one hundred two.

D. Seven divided by the sum of p and twenty-three equals one hundred two.

10. Write a sentence for the equation: $r^2 - 15 = t + 19$

A. A number r squared minus fifteen equals a number t plus nineteen.

B. Two times r minus fifteen equals t plus nineteen.

C. The square root of r minus fifteen equals t plus nineteen.

D. r minus fifteen squared equals t plus nineteen.

Lesson 2 – Solving One-Step Equations

Master the Balance: Solving One-Step Equations

A visual guide to isolating variables by applying Properties of Equality to maintain balance.

1. Identify the Inverse Operation
Determine the operation performed on the variable and select its opposite to undo it.

2. Apply Property of Equality
Perform the exact same operation on both sides of the equation to keep it equivalent.

3. Simplify and Check
Calculate the final value and substitute it back into the original equation to verify accuracy.

The Four Properties of Equality

Addition & Subtraction Properties



Adding or subtracting the same number from each side results in an equivalent equation.

Multiplication & Division Properties



Multiply or divide (by a non-zero number) both sides to isolate the variable.

Equivalent Equations

Different-looking equations that share the exact same solution set.

Method Examples

Horizontal Method

$$g - 25 = 113$$

$$+ 25 \quad + 25$$

$$g = 138$$

Vertical Method

$$27 + k = 30$$

$$\text{Subtract } 27 \quad - 27$$

$$k = 3$$



دليل حل المعادلات ذات الخطوة الواحدة

خطوات حل المعادلة

3

التحقق من صحة الحل

$$x + 5 = 10$$

$$5 + 5 = 10$$

عوض القيمة الناتجة في المعادلة الأصلية للتأكد من أن الطرفين متساويان.

2

التبسيط لإيجاد الحل

$$10 - 5 = 5$$

$$x = 5$$

قم بإجراء العمليات الحسابية في كلا الطرفين للحصول على قيمة المتغير النهائية.

1

استخدام العملية العكسية لعزل المتغير

$$x + 5 = 10$$

$$x = 10 - 5$$

تخلص من العدد المرتبط بالمتغير بإجراء عكس عملياته (مثلاً: الجمع عكسه الطرح).

خصائص المساواة الأساسية

خصائص الجمع والطرح

إذا أضفت أو طرحت نفس العدد من طرفي المعادلة، تظل المعادلة صحيحة ومتكافئة.

التعبير الرمزي (إذا كان $a = b$)	الخاصة
$a + c = b + c$	الجمع
$a - c = b - c$	الطرح



خصائص الضرب والقسمة

عند ضرب أو قسمة طرفي المعادلة على نفس العدد (غير الصفر)، نحصل على معادلة متكافئة.

التعبير الرمزي (إذا كان $a = b$)	الخاصة
$ac = bc$	الضرب



Choose the correct answer for each question:

❖ Example 1:

1. Solve $\frac{2}{3} + w = 1\frac{1}{2}$. State which property of equality you used.

A. $\frac{5}{6}$; Subtraction Property of Equality

B. $\frac{5}{6}$; Addition Property of Equality

C. $\frac{13}{6}$; Addition Property of Equality

D. $\frac{13}{6}$; Subtraction Property of Equality

❖ Example 2:

2. Solve the equation:

$$a + 26 = 35$$

A. $a = 61$

B. $a = 9$

C. $a = 11$

D. $a = 59$

❖ Example 3:

3. On average, a male bulldog weighs 15 pounds less than a male golden retriever. If the average male bulldog weighs 50 pounds, write and solve an equation to find the average weight (w) of a male golden retriever.

A. $50 = w - 15$; 65 pounds

B. $50 = w + 15$; 35 pounds

C. $50 = w - 15$; 35 pounds

D. $50 = 15 - w$; 65 pounds

❖ Example 4:

4. Solve the equation $6y = 54$. $Y=?$

A. $y = 6$

B. $y = 9$

C. $y = 12$

D. $y = 48$

❖ Practice:

5. Solve the equation: $v - 9 = 14$

A. $v = 5$

B. $v = 23$

C. $v = -5$

D. $v = 126$

6. Solve the equation:

$44 = t - 72$

A. $t = -28$

B. $t = 28$

C. $t = 116$

D. $t = -116$

7. Solve the equation:

$-61 = d + (-18)$

A. $d = -79$

B. $d = 43$

C. $d = -43$

D. $d = 79$

8. Solve the equation $18 + z = 40$:

A. $z = 58$

B. $z = -22$

C. $z = 22$

D. $z = 720$

9. Solve the equation $-4a = 48$:

A. $a = 12$

B. $a = 52$

C. $a = -12$

D. $a = -192$

10. Write an equation for the sentence, then solve it:

"Six times a number is 132." (Let n be the number).

A. Equation: $6 + n = 132$; $n = 126$

B. Equation: $6n = 132$; $n = 22$

C. Equation: $\frac{n}{6} = 132$; $n = 792$

D. Equation: $6n = 132$; $n = 792$

11. Write an equation for the sentence, then solve it:

"Two thirds equals negative eight times a number." (Let n be the number).

A. Equation: $\frac{2}{3} = -8n$; $n = -\frac{1}{12}$

B. Equation: $\frac{2}{3} = -8n$; $n = -\frac{3}{16}$

C. Equation: $\frac{2}{3}n = -8$; $n = -12$

D. Equation: $\frac{2}{3} = -8n$; $n = \frac{1}{12}$

Lesson 3 – Solving Multi-Step Equations

المعادلة متعددة الخطوات هي التي تتطلب استخدام أكثر من خاصية من خصائص المساواة لحلها. يعتمد الحل بشكل أساسي على "العمل العكسي" لترتيب العمليات الحسابية المعتاد لعزل المتغير والوصول للنتيجة النهائية.

دليل حل المعادلات متعددة الخطوات

القسم الثاني: خطوات الحل المتسلسلة

القسم الأول: القواعد الأساسية والعمليات العكسية

المعادلة متعددة الخطوات

مبدأ العمل العكسي

لحل هذه المعادلات، تقوم بفك العمليات الحسابية بالترتيب العكسي لترتيب العمليات المعتاد (Order of Operations).

توضيح العمليات الحسابية وما يقابلها من عمليات عكسية

العملية الحسابية	العملية العكسية (المقابلة)
الجمع (+)	الطرح (-)
الطرح (-)	الجمع (+)
الضرب (×)	القسمة (÷)
القسمة (÷)	الضرب (×)

1. إلغاء العمليات (Undo)

استخدم خصائص المساواة لإلغاء العمليات الحسابية المرتبطة بالمتغير (ابدأ بالجمع أو الطرح أولاً في القالب).

$$x - + -4 = 2$$

3. التحقق من صحة الحل

قم بتبديل المتغير في المعادلة الأصلية بالقيمة التي حصلت عليها للتأكد من توازن الطرفين.

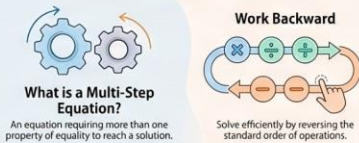
2. عزل المتغير وتبسيط المعادلة

استمر في تطبيق العمليات العكسية على طرفي المعادلة حتى يتبقى المتغير وحيداً في طرف واحد.

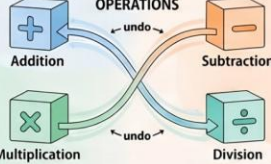
Mastering Multi-Step Equations

A Step-by-Step Guide to Isolating Variables & Solving Algebraic Equations Involving Multiple Operations.

THE STRATEGY OF INVERSE OPERATIONS



INVERSE OPERATIONS



THE STEP-BY-STEP PROCESS

- 1 Undo Addition or Subtraction**
Use properties of equality to move constants away from the variable term.
 $2x + 5 = 15$
 $2x = 10$
- 2 Undo Multiplication or Division**
Isolate the variable by applying the inverse of its coefficient.
 $2x = 10$
 $x = 5$
Substitute your result back into the original equation to verify the statement.
 $2(5) + 5 = 15$
 $10 + 5 = 15$
 $15 = 15$ ✓ Statement Verified!
- 3 Check Your Solution**

Mastering Multi-Step Equations

A Step-by-Step Guide to Isolating Variables & Solving Algebraic Equations Involving Multiple Operations.

THE STEP-BY-STEP PROCESS

- 1 Undo Addition or Subtraction**
Use properties of equality to move constants away from the variable term.
 $2x + 5 = 15$
 $2x = 10$
- 2 Undo Multiplication or Division**
Isolate the variable by applying the inverse of its coefficient.
 $2x = 10$
 $x = 5$
- 3 Check Your Solution**
Substitute your result back into the original equation to verify the statement.
 $2x + 5 = 15$
 $2(5) + 5 = 15$
 $10 + 5 = 15$
 $15 = 15$ ✓ Statement Verified!

Choose the correct answer for each question:

❖ Example 1:

1. Solve the equation:

$$3m + 4 = -11$$

A. $m = -5$

B. $m = 5$

C. $m = -\frac{7}{3}$

D. $m = -21$

2. Solve the equation:

$$8 = \frac{x - 5}{7}$$

A. $x = 51$

B. $x = 61$

C. $x = 21$

D. $x = 9$

❖ Example 2:

3. A sporting goods store sold $\frac{2}{3}$ of its basketballs, but 8 were returned. Now the store has 38 basketballs. How many were there originally? Write an equation for the problem. Then solve the equation. (Let b be the original number of basketballs).

A. $\frac{2}{3}b + 8 = 38$; 45

B. $\frac{2}{3}b - 8 = 38$; 69

C. $\frac{2}{3}b + 8 = 38$; 90

D. $\frac{2}{3}b + 8 = 38$; 138

❖ Example 3:

4. Solve $2 - ax = -8$ for x . Assume $a \neq 0$.

- | |
|------------------------|
| A. $x = -\frac{10}{a}$ |
| B. $x = -\frac{6}{a}$ |
| C. $x = \frac{6}{a}$ |
| D. $x = \frac{10}{a}$ |

❖ Practice:

5. Use properties of equality to solve each equation. Check your solution.

$$3t + 7 = -8$$

- | |
|-----------------------|
| A. $t = 5$ |
| B. $t = -5$ |
| C. $t = -\frac{1}{3}$ |
| D. $t = -3$ |

6. Use properties of equality to solve each equation. Check your solution.

$$8 = 16 + 8n$$

- | |
|-------------|
| A. $n = 3$ |
| B. $n = -3$ |
| C. $n = 1$ |
| D. $n = -1$ |

7. Use properties of equality to solve each equation. Check your solution.

$$-34 = 6m - 4$$

- | |
|------------------------|
| A. $m = -5$ |
| B. $m = 5$ |
| C. $m = -\frac{19}{3}$ |
| D. $m = -6$ |

8. Use properties of equality to solve each equation. Check your solution.

$$9x + 27 = -72$$

A. $x = -11$

B. $x = 11$

C. $x = -5$

D. $x = -9$

9. Use properties of equality to solve each equation. Check your solution.

$$\frac{f}{-7} - 8 = 2$$

A. $f = -70$

B. $f = 70$

C. $f = -14$

D. $f = 14$

10. Use properties of equality to solve each equation. Check your solution.

$$1 + \frac{r}{9} = 4$$

A. $r = 45$

B. $r = 27$

C. $r = -27$

D. $r = 3$

11. Use properties of equality to solve each equation. Check your solution.

$$\frac{k}{3} + 4 = -16$$

A. $k = -36$

B. $k = 60$

C. $k = -60$

D. $k = -12$

12. Use properties of equality to solve each equation. Check your solution.

$$\frac{n - 2}{7} = 2$$

A. $n = 12$

B. $n = 18$

C. $n = 14$

D. $n = 16$

13. Use properties of equality to solve each equation. Check your solution.

$$14 = \frac{6 + z}{-2}$$

A. $z = -34$

B. $z = -22$

C. $z = 34$

D. $z = -40$

14. Use properties of equality to solve each equation. Check your solution.

$$-11 = \frac{a - 5}{6}$$

A. $a = -61$

B. $a = -71$

C. $a = 51$

D. $a = -51$

15. Use properties of equality to solve each equation. Check your solution.

$$\frac{22 - w}{3} = -7$$

A. $w = 43$

B. $w = -43$

C. $w = 1$

D. $w = 5$

Lesson 4 – Solving Equations with the Variable on Each Side

دليل حل المعادلات بمتغيرات في كلا الطرفين

خطوات الحل المتسلسلة



٣. عزل المتغير وإيجاد القيمة

استخدم الضرب أو القسمة للتخلص من المعامل العددي للحصول على قيمة المتغير النهائية.



٢. تجميع الحدود المتشابهة

انقل المتغيرات لجهة والثوابت للجهة الأخرى باستخدام خصائص الجمع والطرح للمساواة.



١. تبسيط التعبيرات وفك الأقواس

استخدم خاصية التوزيع للتخلص من الأقواس وتبسيط الحدود في كل طرف على حدة.

أنواع نتائج المعادلات



المتطابقة (Identity)

مثل $-3 = -3$

عندما يكون الطرفان متطابقين تماماً، مما يعني وجود عدد لا نهائي من الحلول.



لا يوجد حل (No Solution)

مثل $20 = -10$

عندما تنتهي المعادلة بعبارة رياضية خاطئة تماماً.



حل وحيد (One Solution)

مثل $x = 5$

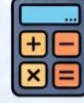
عندما تؤدي الخطوات إلى قيمة محددة ووحيدة للمتغير.

المقارنة



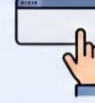
إذا تساوى الطرفان (مثلاً $-37 = -37$)، فإن الحل صحيح.

التبسيط



قم بإجراء العمليات الحسابية في كلا الطرفين.

التعويض



استبدل المتغير في المعادلة الأصلية بالقيمة المستخرجة.

للتحقق من صحة الحل الجبري:

Mastering Equations: Variables on Both Sides

Solving equations with variables on each side requires rewriting the equation into an equivalent form where variable terms are on one side — and constants are on the other. This is achieved through a systematic application of the Properties of Equality and the Distributive Property.

The 3-Step Solving Process

1. Simplify and Distribute



Use the **Distributive Property** to remove grouping symbols like parentheses or brackets from both sides.

Fraction Bars:
Multiply each side by the denominator to clear the fraction.

Nested Grouping:
Work from the innermost symbol (parentheses) outward to the brackets.

Negative Signs:
Ensure negative coefficients are distributed to every form inside the parentheses.

2. Consolidate Terms



Use **Addition** or **Subtraction Properties** to move all variable terms to one side and constants to the other.

3. Isolate and Solve



Use **Multiplication** or **Division Properties** to isolate the variable and find the final numerical solution.

Understanding Possible Outcomes



One Solution

The variable is equal to exactly one specific value that makes the equation true.



No Solution

The solving process results in a false statement (e.g., $-30 = 20$), meaning no value works.



Identity (Infinite Solutions)

Both sides are identical (e.g., $0 = 0$), meaning the equation is true for any value.

Choose the correct answer for each question:

❖ Example 1:

1. Solve the equation:

$$5 + 7a = 4a - 13$$

A. $a = -6$

B. $a = 6$

C. $a = -2$

D. $a = -\frac{8}{3}$

❖ Example 2:

2. BASKETBALL: Nolan and Victor were two of the top scoring freshman players in a college basketball conference last season. The table shows how many points Nolan and Victor scored and how many games they played last season. Nolan played 30 games and scored 750 points. Victor played 34 games and scored 782 points.

Assume that Nolan and Victor play every game and score at the same constant rate as last season. After how many games this season (p) will Nolan and Victor have scored the same number of career points?

A. Equation: $25p + 750 = 23p + 782$; Answer: 16 games

B. Equation: $30p + 750 = 34p + 782$; Answer: 8 games

C. Equation: $25p + 782 = 23p + 750$; Answer: 10 games

D. Equation: $750p + 30 = 782p + 34$; Answer: 12 games

Player	Games Played	Points
Nolan	30	750
Victor	34	782

❖ Example 3:

3. Solve the equation:

$$7(n - 2) + 8 = 3(n - 4) - 2$$

A. $n = 4$

B. $n = 2$

C. $n = -\frac{3}{2}$

D. $n = -2$

❖ Example 4:

4. Solve the equation:

$$5y = \frac{12y + 16}{4}$$

A. $y = 4$

B. $y = 2$

C. $y = -2$

D. $y = 8$

❖ Example 5:

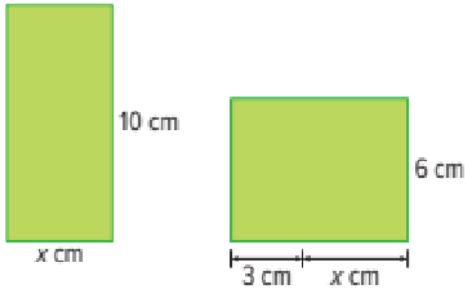
5. GEOMETRY: Find the value of x so that the figures have the same area. (The first rectangle has a width of x cm and a height of 10 cm. The second rectangle has a total length of $(3 + x)$ cm and a height of 6 cm.

A. $x = \frac{9}{2}$ (or 4.5)

B. $x = 3$

C. $x = \frac{9}{4}$ (or 2.25)

D. $x = 6$



❖ Example 6:

6. Solve the equation:

$$6(y - 5) = 2(10 + 3y)$$

- | |
|---|
| A. $y = 5$ |
| B. $y = -5$ |
| C. Infinitely many solutions (Identity) |
| D. No solution |

❖ Example 7:

7. Solve the equation and state whether it has one solution, no solution, or is an identity:

$$3(2b - 1) - 7 = 6b - 10$$

- | |
|---|
| A. One solution: $b = 0$ |
| B. No solution |
| C. Identity (Infinitely many solutions) |
| D. One solution: $b = 1$ |

❖ Practice:

8. Solve the equation:

$$7c + 12 = -4c + 78$$

A. $c = 6$

B. $c = -6$

C. $c = 8$

D. $c = -8$

9. Solve the equation:

$$2m - 13 = -8m + 27$$

A. $m = -4$

B. $m = 2$

C. $m = -2$

D. $m = 4$

10. Solve the equation:

$$9x - 4 = 2x + 3$$

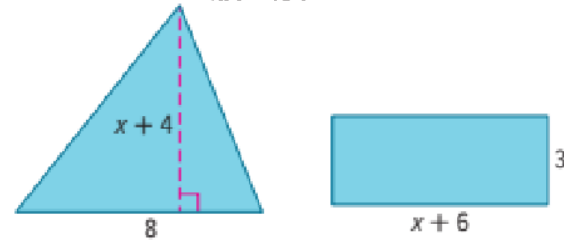
A. $x = 1$

B. $x = -1$

C. $x = \frac{7}{11}$

D. $x = -\frac{7}{11}$

11. Write and solve an equation to find the value of x so that the figures have the same area. (The first figure is a triangle with a base of 8 and a height of $x + 4$. The second figure is a rectangle with a length of $x + 6$ and a width of 3).



- | |
|------------|
| A. $x = 1$ |
| B. $x = 2$ |
| C. $x = 3$ |
| D. $x = 4$ |

12. Solve the equation and state whether it has one solution, no solution, or is an identity:

$$-6y - 3 = 3 - 6y$$

- | |
|---|
| A. One solution: $y = 0$ |
| B. Identity (Infinitely many solutions) |
| C. No solution |
| D. One solution: $y = -1$ |

13. Solve the equation and state whether it has one solution, no solution, or is an identity:

$$\frac{1}{2}(x + 6) = \frac{1}{2}x - 9$$

- | |
|----------------------------|
| A. One solution: $x = 0$ |
| B. Identity |
| C. No solution |
| D. One solution: $x = -12$ |

14. Solve the equation:

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

A. One solution: $x = 3$

B. Identity (Infinitely many solutions)

C. No solution

D. One solution: $x = 0$

Lesson 5 – Solving Equations Involving Absolute Value

دليل حل معادلات القيمة المطلقة

المفاهيم الأساسية والقاعدة العامة

تنبيه: الحل يكون "المجموعة الخالية" إذا كانت النتيجة سالبة



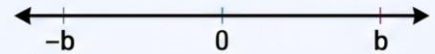
إذا كانت المعادلة على صورة $|x| = n$ وكان n عدداً سالباً، فلا يوجد حل ($\emptyset$).

القاعدة: إذا كان $|a| = b$ ، فإن $a = b$ أو $a = -b$

يجب دائماً دراسة حالتين: الحالة الموجبة (أو الصفر) والحالة السالبة لما بداخل الرمز.

القيمة المطلقة هي المسافة من الصفر

$|a|$



تمثل القيمة المطلقة المسافة، ولأن المسافة لا يمكن أن تكون سالبة، فالنتيجة دائماً موجبة.

خطوات الحل المنهجية



3 التحقق والتمثيل البياني

عوّض بالقيم الناتجة في المعادلة الأصلية للتأكد، ثم مثل الحل بنقاط على خط الأعداد.

2 افصل المعادلة إلى حالتين وحلها

$$|x - 2| = 2$$

$$\begin{aligned} x - 2 &= 2 & x - 2 &= -2 \\ x &= 4 & x &= 0 \end{aligned}$$

قم بإنشاء معادلتين (واحدة تساوي القيمة الموجبة والأخرى تساوي السالبة) ثم حل كل منهما.

1 اعزل رمز القيمة المطلقة

$$3|x - 2| + 5 = 11$$

$$x - 2 = i$$

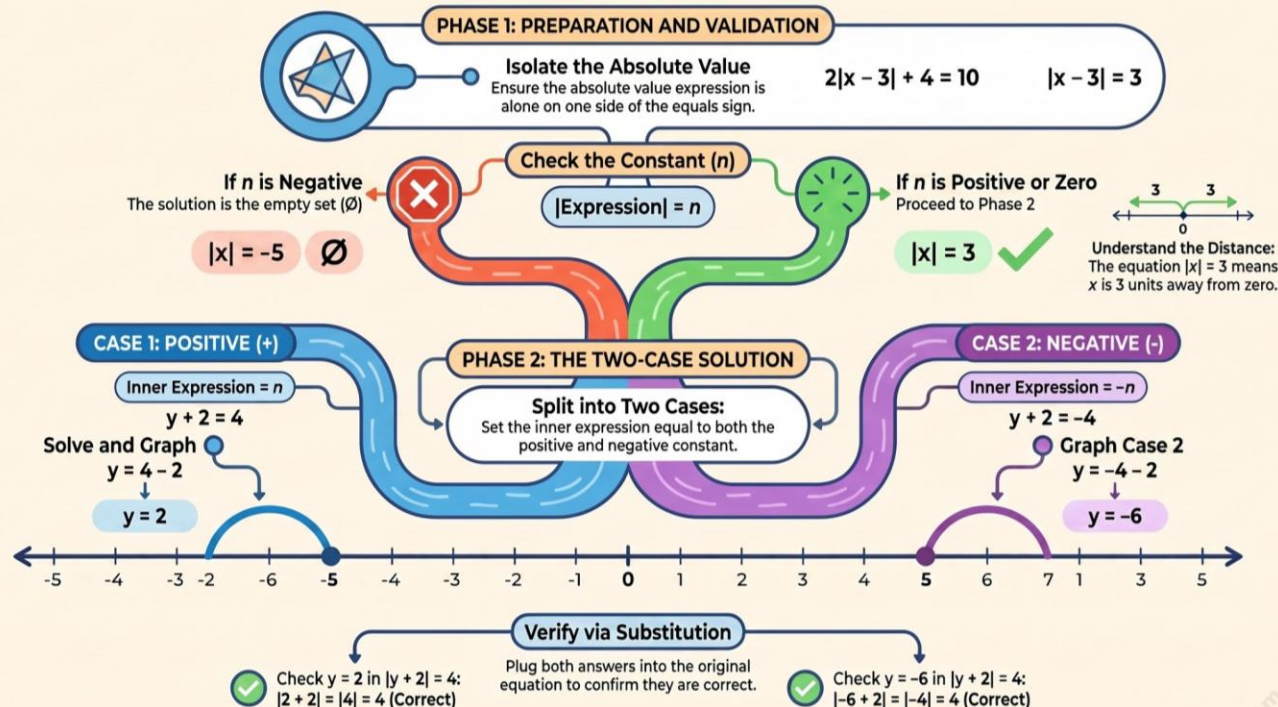
$$|x - 2| = 2$$

تأكد من وجود القيمة المطلقة بمفردها في أحد طرفي المعادلة قبل البدء بالحل.

التمثيل البياني	نوع الحل	الحالة
	حلان مختلفان	😊 إذا كان الناتج (n) موجباً
	حل واحد فقط	😐 إذا كان الناتج (n) يساوي صفراً
	لا يوجد حل ($\emptyset$)	😞 إذا كان الناتج (n) سالباً

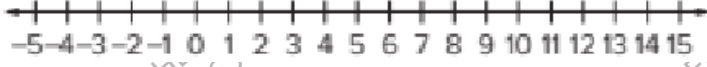
Mastering Absolute Value Equations: A Step-by-Step Guide

Absolute value represents the distance of a value from zero on a number line. Because distance is always non-negative, solving equations like $|x| = n$ requires splitting the problem into two distinct cases—positive and negative—to identify all possible solutions.



Choose the correct answer for each question:

❖ Example 1:

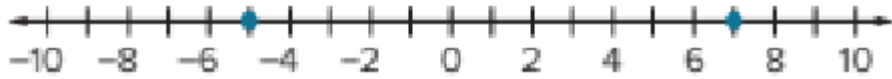
1. Graph the solution set of $|2t - 4| = 8$.

- | |
|--|
| A. The solutions are $t = -2$ and $t = 6$ (Points plotted at -2 and 6 on the number line). |
| B. The solutions are $t = 2$ and $t = -6$ (Points plotted at 2 and -6 on the number line). |
| C. The solutions are $t = -1$ and $t = 5$ (Points plotted at -1 and 5 on the number line). |
| D. The solutions are $t = 6$ and $t = 12$ (Points plotted at 6 and 12 on the number line). |

❖ Example 2:

2. Which statement must be true for the solution of $|ax + b| = c$ to be $\emptyset$ empty set (empty set / no solution)?

- | |
|--|
| A. If a is negative, the solution will be $\emptyset$ empty set. |
| B. If b is negative, the solution will be $\emptyset$ empty set. |
| C. If c is negative, the solution will be $\emptyset$ empty set. |
| D. If c is positive, the solution will be $\emptyset$ empty set. |



❖ Example 3:

3. SKYDIVING: It takes approximately 6 minutes for a skydiver to land after she jumps out of a plane, give or take 30 seconds. What is the range of time, in seconds, it could take the skydiver to land?

A. [330, 390]

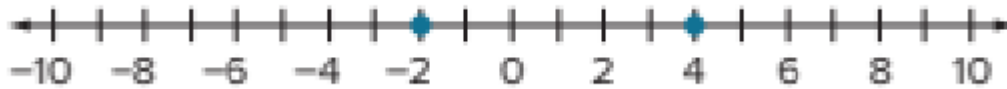
B. [6, 30]

C. [300, 360]

D. [330, 360]

❖ Example 4:

4. Label each graph with the correct equation from the given choices:



A. $|x - 1| = 3$

B. $|x - 3| = 5$

C. $|x - 1| = 6$

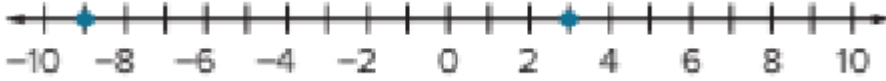
D. $|x + 3| = 6$

A. $|x - 1| = 3$

B. $|x - 3| = 5$

C. $|x - 1| = 6$

D. $|x + 3| = 6$



❖ Practice:

5. Solve the equation and choose the correct solution set for $|n - 3| = 5$:

A. $n = -2$ and $n = 8$

B. $n = 2$ and $n = -8$

C. $n = -3$ and $n = 5$

D. $n = 3$ and $n = -5$

6. Solve the equation and choose the correct solution set for $|f + 10| = 1$:

A. $f = 9$ and $f = 11$

B. $f = -9$ and $f = -11$

C. $f = 1$ and $f = -1$

D. $f = 10$ and $f = -10$

7. Solve the equation $|7 - 2q| = 3$:

A. $q = 2$ and $q = 5$

B. $q = -2$ and $q = -5$

C. $q = 1$ and $q = 3$

D. No solution

8. Solve the equation $|4x - 2| = 26$:

- | |
|--------------------------|
| A. $x = 7$ and $x = -6$ |
| B. $x = 6$ and $x = -7$ |
| C. $x = 7$ and $x = 8$ |
| D. $x = -6$ and $x = -8$ |

9. Solve the equation $|w + 1| = 5$:

- | |
|--------------------------|
| A. $w = 4$ and $w = 6$ |
| B. $w = -4$ and $w = 6$ |
| C. $w = 4$ and $w = -6$ |
| D. $w = -4$ and $w = -6$ |

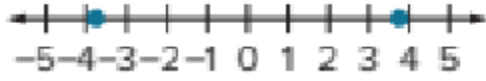
10. Solve the equation $|n + 2| = -1$:

- | |
|---|
| A. $n = 1$ and $n = -3$ |
| B. $n = -1$ and $n = 3$ |
| C. Identity (Infinitely many solutions) |
| D. No solution ($\emptyset$) |

11. Solve the equation $|m - 2| = 2$:

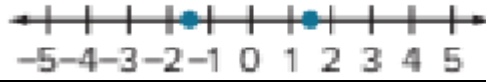
- | |
|-------------------------|
| A. $m = 0$ and $m = 4$ |
| B. $m = 2$ and $m = -2$ |
| C. $m = 1$ and $m = 3$ |
| D. $m = 0$ and $m = -4$ |

12. Solve the equation $\left| -\frac{1}{2}b - 2 \right| = 10$:



- | |
|---------------------------|
| A. $b = -16$ and $b = 24$ |
| B. $b = 16$ and $b = -24$ |
| C. $b = -8$ and $b = 12$ |
| D. $b = 8$ and $b = -12$ |

12. Solve the equation $|-4d + 6| = 12$:



- | |
|---|
| A. $d = -\frac{3}{2}$ and $d = \frac{9}{2}$ |
| B. $d = \frac{3}{2}$ and $d = -\frac{9}{2}$ |
| C. $d = -3$ and $d = 6$ |
| D. $d = 3$ and $d = -6$ |

13. Write an equation involving absolute value for the graph:

- | |
|------------------|
| A. $ x = 4$ |
| B. $ x - 4 = 4$ |
| C. $ x + 4 = 4$ |
| D. $ x = -4$ |

14. Write an equation involving absolute value for the graph:

- | |
|----------------------|
| A. $ x = 1.5$ |
| B. $ x - 1.5 = 1.5$ |
| C. $ x = 3$ |
| D. $ x - 3 = 1.5$ |

Lesson 6 – Solving Proportions

حل التناسب: دليل تعليمي مبسط

الخطوة 3: التحقق
من صحة الحل

$$\frac{27}{45} = \frac{15}{25}$$
$$\frac{3}{5} = \frac{3}{5}$$



الخطوة 3: التحقق من صحة

عوض بالقيمة الناتجة في
التناسب الأصلي للتأكد من
تساوي الطرفين.

الخطوة 2: الضرب
والتبسيط

$$\frac{15}{45} \times x$$
$$x = \frac{15 \times 45}{25}$$
$$x = 27$$

الخطوة 2: الضرب والتبسيط

اضرب طرفي المعادلة في المقام
أو استخدم الضرب التبادلي
للتخلص من الكسور.

خطوات حل
حل التناسب

كتابة التناسب الأصلي

$$\frac{x}{45} = \frac{15}{25}$$

كتابة التناسب الأصلي

رتب النسبتين في شكل كسرين
متساويين لضمان
دقة الحساب.



ما هو التناسب؟

هو معادلة رياضية تنص على أن هناك
نسبتين متكافئتين (متساويتين).



الهدف من الحل

إيجاد قيمة المتغير المجهول
الذي يجعل النسبتين
متعادلتين تماماً.

MASTERING PROPORTIONS: A STEP-BY-STEP GUIDE

A visual walkthrough for setting up and solving equivalent ratios.

PREPARATION & SETUP



What is a Proportion?

An equation stating that two ratios are equivalent.



Study Tip: Start with Words

Write the ratio in words first to ensure numbers are placed correctly.

$$\frac{\text{Apples}}{\text{Oranges}} = \frac{5}{7}$$

THE SOLUTION SEQUENCE

ISOLATE THE VARIABLE

Multiply each side of the equation by the denominator to isolate the unknown.

Original Proportion:

$$\frac{x}{45} = \frac{15}{25}$$

DISTRIBUTE & SIMPLIFY

If the proportion contains expressions like $(x + 7)$, apply the **Distributive Property**.

Multiply each side by 45:

$$x = \frac{45 \cdot 15}{25}$$



VERIFY YOUR SOLUTION

Substitute your answer back into the original proportion to ensure both sides are equal.

Final Solution:
 $x = 27$

Check: $\frac{27}{45} = \frac{15}{25}$
 $\frac{3}{5} = \frac{3}{5}$ ✓

❖ Example 1:

1. Solve $\frac{n-4}{8} = \frac{3}{2}$. If necessary, round to the nearest hundredth.

- | |
|---------|
| A. 16 |
| B. 9.33 |
| C. 8 |
| D. 4.75 |

❖ Example 2:

2. Solve $\frac{x}{12} = \frac{2x-5}{18}$. If necessary, round to the nearest hundredth.

- | |
|----------|
| A. -10 |
| B. -3.75 |
| C. 0.83 |
| D. 10 |

❖ Example 3:

3. MIXTURE: Oscar makes fruit punch to sell from his food truck by mixing 8 parts cranberry juice to 3 parts pineapple juice. How many cups of pineapple juice would Oscar need to mix with 48 cups of cranberry juice to make his punch?

- | |
|-------------|
| A. 11 cups |
| B. 18 cups |
| C. 24 cups |
| D. 128 cups |

❖ Example 4:

4. MIXTURE: Ayita is making a plant food mixture to use in her garden. The mixture is to be 20% plant food and 80% water. She needs to make 12 gallons of the mixture to cover her entire garden. Which proportions can be used to find the amount of plant food \$p\$ she will need? Select all that apply.

- | | |
|----|------------------------------------|
| A. | $\frac{20}{80} = \frac{p}{12}$ |
| B. | $\frac{20}{100} = \frac{p}{12}$ |
| C. | $\frac{80}{100} = \frac{p}{12}$ |
| D. | $\frac{20}{p} = \frac{80}{12}$ |
| E. | $\frac{12-p}{12} = \frac{80}{100}$ |

❖ Practice:

5. Solve the proportion $\frac{3}{8} = \frac{15}{a}$. If necessary, round to the nearest hundredth.

- | | |
|----|-----------|
| A. | $a = 40$ |
| B. | $a = 2.8$ |
| C. | $a = 48$ |
| D. | $a = 3.6$ |

6. Solve the proportion $\frac{t}{2} = \frac{6}{12}$. If necessary, round to the nearest hundredth.

- | | |
|----|-----------|
| A. | $t = 36$ |
| B. | $t = 1$ |
| C. | $t = 4$ |
| D. | $t = 2.5$ |

7. Solve the proportion $\frac{4}{9} = \frac{13}{q}$. If necessary, round to the nearest hundredth.

A. $q = 29.25$

B. $q = 5.78$

C. $q = 2.77$

D. $q = 36$

8. Solve the proportion $\frac{(4v+7)}{15} = \frac{6v+2}{10}$. If necessary, round to the nearest hundredth.

A. $v = 0.8$

B. $v = 2.5$

C. $v = -1.2$

D. $v = 3.6$

9. Solve the proportion $\frac{9b-3}{9} = \frac{5b+5}{3}$. If necessary, round to the nearest hundredth.

A. $b = -3$

B. $b = 4$

C. $b = -2$

D. $b = 1.5$

10. Solve the proportion $\frac{2n-4}{5} = \frac{3n+3}{10}$. If necessary, round to the nearest hundredth.

A. $n = 5$

B. $n = 11$

C. $n = -3$

D. $n = 8.5$

11. Solve the proportion $\frac{2}{g+6} = \frac{4}{5g+10}$. If necessary, round to the nearest hundredth.

A. $g = 0.67$

B. $g = 7$

C. $g = -4$

D. $g = 3.5$

12. Solve the proportion $\frac{9}{g} = \frac{15}{10}$. If necessary, round to the nearest hundredth.

A. $g = 6$

B. $g = 13.5$

C. $g = 5.67$

D. $g = 15$

13. Solve the proportion $\frac{3}{a} = \frac{1}{6}$. If necessary, round to the nearest hundredth.

A. $a = 2$

B. $a = 9$

C. $a = 18$

D. $a = 0.5$

14. Solve the proportion $\frac{6}{z} = \frac{3}{5}$. If necessary, round to the nearest hundredth.

A. $z = 3.6$

B. $z = 10$

C. $z = 15$

D. $z = 2.5$

Lesson 7 – Using Formulas

Mastering Literal Equations & Unit Conversions

Understanding Literal Equations

$$A = \frac{(b_1 + b_2) \times h}{2}$$

A literal equation or formula expresses a relationship between several variables.

1 Isolate the Variable Term

$$P = 2l + 2w$$

$$P - 2w = 2l$$

Use addition or subtraction to move all terms not containing your target variable.

2 Group and Factor

$$(xy) + xz = w \rightarrow x(y + z) = w$$

If the variable appears multiple times, group terms and use the Distributive Property.

3 Final Isolation

$$x(y + z) = w \left\{ \frac{\div}{y + z} \right\} x = \frac{w}{y + z}$$

Divide both sides by the remaining coefficient or quantity to solve for the variable.

Dimensional Analysis (Unit Conversion)

The Power of Conversion Factors

Conversion Factors

1 Gallon
3.785 Liters1 Mile
1609.344 Meters

Use ratios where the numerator and denominator represent the same quantity in different units.

Align and Cancel Units

Given Value
(e.g.,
5 Gallons)3.785 Liters
1 Gallon

=

Liters

Arrange ratios so the "given" units are in the denominator to allow for cancellation.

Precision and Estimation

Always check if the problem requires a precise calculation or a rounded estimate.

Value

Precise Calculation

Rounded Estimate

Result

دليل حل المعادلات الحرفية والتحليل البعدي

التحليل البعدي وتحويل الوحدات

التحليل البعدي (Dimensional Analysis)

هي عملية إجراء العمليات الحسابية باستخدام الوحدات لضمان التحويل الصحيح بين القياسات.



قاعدة شطب الوحدات

$$\text{الوحدة المطلوبة} = \frac{(\text{الوحدة المطلوبة})}{(\text{الوحدة المعطاة})} \times \text{الوحدة المعطاة}$$

رتب معامل التحويل بحيث تُلغى الوحدة المعطاة عند تقسيمها على نفسها، لتبقى الوحدة المطلوبة فقط.

التخطيط للتحويل الناجح



حدد الوحدات المعطاة، والوحدات المطلوبة، ثم اختر معاملات التحويل التي تربط بينهما بدقة.

حل المعادلات الحرفية (عزل المتغير)

ما هي المعادلة الحرفية؟

هي صيغة أو معادلة تتضمن عدة متغيرات تعبر عن علاقة بين كميات مختلفة.

$$V = lwh$$

استخدم العمليات العكسية (الجمع/الطرح ثم الضرب/القسمة) للنقل كافة القيم بعيداً عن المتغير المستهدف.

خطوات عزل المتغير المطلوب

$$\pm \div$$

$$\times \div$$

مثال: حل المعادلة $5a - 2b = 15$ للمتغير a

$$5a - 2b = 15$$

$$+ 2b$$

$$1 \quad 5a = 15 + 2b$$

$$/5$$

$$2 \quad a = \frac{15 + 2b}{5}$$



❖ Example 1:

1. Solve the equation $5a - 2b = 15$ for a .

- | |
|----------------------------|
| A. $a = 3 + \frac{2b}{5}$ |
| B. $a = 15 + \frac{2b}{5}$ |
| C. $a = 3 - \frac{2b}{5}$ |
| D. $a = \frac{15-2b}{5}$ |

❖ Example 2:

2. Solve $2v = \frac{w+v}{t}$ for v .

- | |
|-------------------------|
| A. $v = \frac{w}{2t-1}$ |
| B. $v = \frac{w}{2t}$ |
| C. $v = 2tw - 1$ |
| D. $v = \frac{2t}{w}$ |

❖ Example 3:

3. Part A:

What formula should be used to find the height h ?

- | |
|---------------------------------|
| A. $h = \pi r^2$ |
| B. $h = \sqrt{\frac{V}{\pi r}}$ |
| C. $h = \frac{V}{\pi r^2}$ |
| D. $h = \frac{V}{r^2}$ |



4. Part B:

If the radius of the jar is 1.5 inches and the original volume is 30 cubic inches, then what height should the company make the height of its new jar to increase the volume by 6 cubic inches?

A. $h = 4.25 \text{ inches}$

B. $h = 5.09 \text{ inches}$

C. $h = 6.15 \text{ inches}$

D. $h = 7.5 \text{ inches}$

❖ Example 4:

5. VIDEO GAMES: Ella makes a video game that becomes very popular. She creates a formula, $P = 40c - 300$, to model her profit P given the number of copies sold c , taking into account the \$300 fee that she has paid a retailer to sell her game. Which equation would model how many copies c must be sold to yield a specific amount of profit?

A. $c = \frac{P+40}{300}$

B. $c = \frac{P}{40} + 300$

C. $c = \frac{P}{40} - 300$

D. $c = \frac{P+300}{40}$

❖ Example 5:

6. COOKING: For the chefs to prepare the dishes for the next hour, Adelina needs to provide them with 96 cloves of garlic. However, she can only purchase bags of whole heads of garlic. If each bag of garlic contains 3 heads and each head has about 8 cloves, then how many bags of garlic should she purchase?

Part A:

What assumption must Adelina make when calculating how many bags of garlic to buy?

- | |
|---|
| A. <i>Each head of garlic has exactly 8 cloves.</i> |
| B. <i>The chefs need 96 heads of garlic.</i> |
| C. <i>The chefs need 96 cloves of garlic.</i> |
| D. <i>Each bag has 3 heads of garlic.</i> |

7. How many bags of garlic should Adelina purchase?

- | |
|-------|
| A. 4 |
| B. 12 |
| C. 32 |
| D. 96 |

❖ Example 6:

8. AGRICULTURE: On average, a dairy cow produces 832 ounces of milk a day. About how many gallons of milk does a dairy cow produce each year? (Hint: 1 cup = 8 ounces, 1 quart = 4 cups, and 1 gallon = 4 quarts)

- | |
|------------------------------------|
| A. <i>6.5 gallons per year</i> |
| B. <i>2372.5 gallons per year</i> |
| C. <i>4357.2 gallons per year</i> |
| D. <i>303,680 gallons per year</i> |

❖ Practice:

9. Solve the equation $x - 2y = 1$ for y .

- | |
|------------------------|
| A. $y = \frac{x-1}{2}$ |
| B. $y = \frac{x+1}{2}$ |
| C. $y = 2x - 1$ |
| D. $y = \frac{1-x}{2}$ |

10. Solve the equation $d + 3n = 1$ for n .

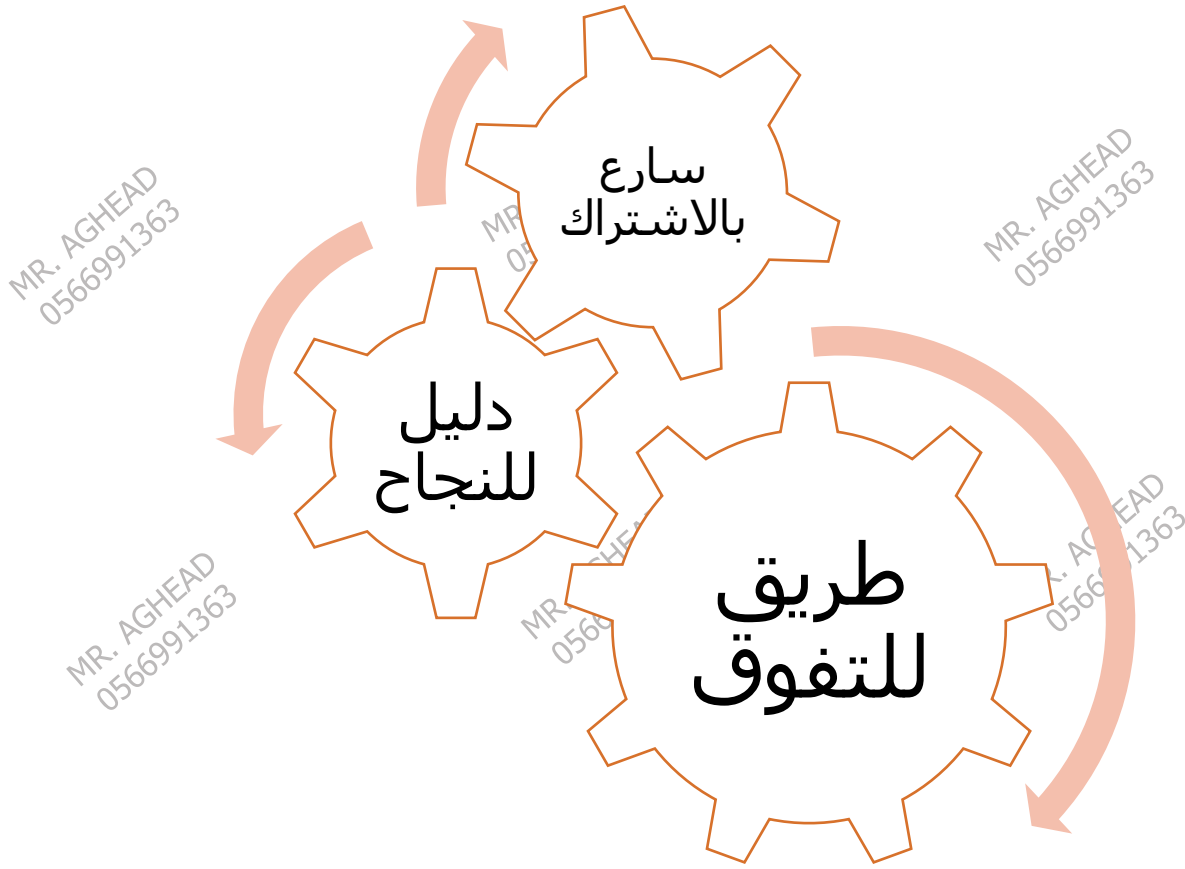
- | |
|------------------------|
| A. $n = \frac{1-d}{3}$ |
| B. $n = \frac{d-1}{3}$ |
| C. $n = 3 - d$ |
| D. $n = \frac{1+d}{3}$ |

11. Solve the equation $u = vw + z$ for v .

- | |
|------------------------|
| A. $u = \frac{u-z}{w}$ |
| B. $u = \frac{u+z}{w}$ |
| C. $u = \frac{w}{u-z}$ |
| D. $u = u - z - w$ |

12. Solve the equation $x = b - cd$ for c .

- | |
|------------------------|
| A. $c = \frac{x-b}{d}$ |
| B. $c = \frac{b-x}{d}$ |
| C. $c = \frac{x+b}{d}$ |
| D. $c = b - x - d$ |



للحجز التواصل عبر الـ Whatsapp من خلال الضغط على الرقم:

0566991363

مع أطيب التمنيات بالنجاح والتوفيق ...
النهاية ...