Grade 9–11 Mathematics

5-Day E-Learning Lesson Plans + Practice Worksheets

Topics: Order of Operations • Algebraic Terms • Linear Equations • Slope • Laws of Exponents

E-Learning Routine

Watch/read the mini-lesson and study worked examples
Independent worksheet practice
Students should show work

Day 1: Order of Operations

Watch Video:

https://youtu.be/tyrz0EJ0InQ

Learning objective	Evaluate numerical expressions accurately by applying parentheses, exponents, multiplication/division, and addition/subtraction in the correct order.
Key vocabulary	Expression, parentheses, exponent, multiplication, division, addition, subtraction, PEMDAS.
Mini-lesson / teacher notes	Use PEMDAS: Parentheses/Grouping → Exponents → Multiplication and Division from left to right → Addition and Subtraction from left to right. Emphasize that multiplication does not always come before division; they have equal priority.
Worked examples	1) $8 + 3\times4 = 8 + 12 = 20$. 2) $(7+5)\times2 = 12\times2 = 24$. 3) $5+2^2\times3 = 5+4\times3 = 17$.
E-learning sequence	1. Do Now: evaluate $6+2\times5$. 2. Watch/read the mini-lesson. 3. Pause after each example and solve before revealing the answer. 4. Complete MCQs 1–15. 5. Complete constructed responses. 6. Submit exit ticket.

Quick formative check	why 8+3×4 is not 44 and why 18÷3×2 is evaluated left to right.
Exit ticket	Evaluate 12 + 4(5 − 2). Show every step.

Worksheet: 15 Multiple-Choice Questions

1. Evaluate: 8 + 3 × 4.

A. 20

B. 44

C. 32

D. 11

2. Evaluate: (18 − 6) ÷ 3.

A. 2

B. 4

C. 6

D. 12

3. Evaluate: $5 + 2^2 \times 3$.

A. 21

B. 36

C. 49

D. 17

4. Evaluate: (7 + 5) × 2.

A. 17

B. 19

C. 24

D. 29

5. Evaluate: 30 ÷ 5 + 4.

A. 2

B. 10

C. 14

D. 34

6. Evaluate: 6 + 18 ÷ 3 × 2.

A. 18

B. 12

C. 10

D. 20

7. Evaluate: 4(3 + 2) − 7.

A. 13

B. 15

C. 20

D. 9

8. Evaluate: $24 - 3^2$.

A. 15

B. 21

C. 9

D. 27

9. Which operation is done first in 7 + 4 × 2?

A. Addition

B. Multiplication

C. Subtraction

D. Division

10. Evaluate: 36 ÷ (3 + 3).

A. 6

B. 9

C. 12

D. 18

11. Evaluate: $2^3 + 5 \times 2$.

A. 16

B. 18

C. 26

D. 12

12. Evaluate: $40 - 12 \div 4$.

A. 7

B. 28

C. 37

D. 43

13. Evaluate: $(10 - 2)^2 \div 4$.

A. 4

B. 8

C. 16

D. 64

14. Evaluate: $3 + 4 \times (6 - 2)$.

A. 14

B. 19

C. 28

D. 22

15. Why are parentheses important in an expression?

A. They change the order of operations

B. They always mean multiply

C. They make every answer negative

D. They are optional and never affect value

Worksheet: 5 Descriptive / Constructed-Response Questions

1. Evaluate $18 - 2(3 + 4)$ and explain each step.

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2. Evaluate $6^2 - 4(5 + 1) \div 3$. Show the order of operations.

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3. A school buys 5 packs of pencils with 12 pencils in each pack and gives away 17 pencils. Write and evaluate an expression.

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4. Create two different numerical expressions that equal 24. Explain how you know.

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5. A student calculates $20 - 8 \div 2 = 6$. Identify the error and give the correct answer with an explanation.

Day 2: Addition and Subtraction of Like and Unlike Terms

Watch Video:

https://youtu.be/2WNtGxBSGvY

Learning objective	Combine like terms correctly and explain why unlike terms cannot be combined by addition or subtraction.
Key vocabulary	Term, coefficient, variable, constant, like terms, unlike terms, simplify.
Mini-lesson / teacher notes	Like terms have the same variable part with the same exponents. Add or subtract coefficients while keeping the variable part unchanged. Unlike terms remain separate.
Worked examples	1) $5x+3x=8x$. 2) $7m+2n+3m=10m+2n$. 3) $4x+2-x+7=3x+9$.
E-learning sequence	1. Do Now: $4x+2x$. 2. Sort sample terms into like/unlike groups. 3. Model combining coefficients. 4. Complete MCQs. 5. Complete responses. 6. Self-check using answer key.
Quick formative check	highlight matching variable parts before combining terms.
Exit ticket	Simplify: $9x + 4y - 3x + 2y$.

Worksheet: 15 Multiple-Choice Questions

1. Simplify: 5x + 3x.

A. 8x

B. 15x

C. $8x^2$

D. 2x

2. Simplify: 9a − 4a.

A. 13a

B. 5a

C. 36a

D. 5

3. Simplify: 7m + 2n + 3m.

A. 10m+2n

B. 12mn

C. 10m+5n

D. 7m+5n

4. Which pair are like terms?

A. 3x and 3y

B. 4a and $4a^2$

C. 6p and −2p

D. 5 and 5x

5. Simplify: 8y − 3y + 2.

A. 5y+2

B. 11y+2

C. 5y

D. 3y+2

6. Simplify: 4x + 2 − x + 7.

A. 3x+9

B. 5x+9

C. 3x−5

D. 4x+9

7. Simplify: $6p - 2q + 3p + q$.

A. $9p-q$

B. $9p+q$

C. $3p-q$

D. $9pq$

8. Simplify: $10 - 4z + 2z$.

A. $10-2z$

B. $6z+10$

C. $10-6z$

D. $2z-10$

9. Why are $3x$ and $3x^2$ unlike terms?

A. Different coefficients

B. Different variables

C. Different exponents

D. They are actually like terms

10. Simplify: $2a + 5b - 7a + b$.

A. $-5a+6b$

B. $9a+6b$

C. $-5a+4b$

D. $5a-6b$

11. Which is a constant term?

A. $7x$

B. $-3y$

C. 12

D. $4z^2$

12. Simplify: 5r + 4 − 2r − 9.

A. 3r−5

B. 7r+13

C. 3r+13

D. −3r−5

13. Simplify: −3x + 8x.

A. −11x

B. 5x

C. 24x

D. 5

14. Simplify: 2c + 3d − c + 5d.

A. c+8d

B. 3c+8d

C. c−2d

D. −c+8d

15. A student combines 4x and 7y to get 11xy. What is the mistake?

A. They added unlike terms

B. They subtracted coefficients

C. They forgot the variable

D. There is no mistake

Worksheet: 5 Descriptive / Constructed-Response Questions

1. Simplify 7x + 4 − 3x + 9 and explain which terms can be combined.

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2. Simplify 5a − 2b + 3a + 6b − 4.

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3. Write an algebraic expression for: 'three more than twice n, plus five n.' Then simplify.

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4. A grocery store sells x apples each day for 4 days and y oranges each day for 3 days. Write and simplify an expression for the total number of pieces of fruit.

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5. Explain the difference between like and unlike terms and give two examples of each.

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Day 3: One-Step and Two-Step Linear Equations

Watch Video:

https://youtu.be/9eRF7pJCOUQ

Learning objective	Solve one-step and two-step linear equations using inverse operations and verify solutions by substitution.
Key vocabulary	Equation, solution, inverse operation, coefficient, isolate, balance.
Mini-lesson / teacher notes	Use inverse operations: addition ↔ subtraction and multiplication ↔ division. For two-step equations, undo addition/subtraction first, then multiplication/division. Keep both sides balanced.
Worked examples	1) $x+7=12 \rightarrow x=5$. 2) $4x-5=19 \rightarrow 4x=24 \rightarrow x=6$. Always substitute the answer back to check.
E-learning sequence	1. Do Now: $x-3=10$. 2. Watch/read worked examples. 3. Solve each example before revealing the next step. 4. Complete MCQs and constructed responses. 5. Check by substitution.
Quick formative check	identify the inverse operation needed at each step before calculating.
Exit ticket	Solve $3x + 4 = 19$ and check your solution.

Worksheet: 15 Multiple-Choice Questions

1. Solve: x + 7 = 12.

A. 5

B. 19

C. −5

D. 84

2. Solve: x − 4 = 9.

A. 5

B. 13

C. −13

D. 36

3. Solve: 3x = 21.

A. 6

B. 7

C. 18

D. 24

4. Solve: x/5 = 6.

A. 1.2

B. 11

C. 30

D. 35

5. Solve: 2x + 3 = 11.

A. 4

B. 5

C. 7

D. 14

6. Solve: 4x − 5 = 19.

A. 4

B. 6

C. 24

D. 14

7. Solve: 3x + 2 = 20.

A. 6

B. 8

C. 18

D. 22

8. Solve: 5x − 7 = 18.

A. 3

B. 5

C. 25

D. 31

9. Solve: 7 + 2x = 17.

A. 3

B. 5

C. 7

D. 12

10. Solve: 6x + 4 = 40.

A. 4

B. 6

C. 7

D. 44

11. Which operation undoes multiplication by 8?

A. Addition of 8

B. Subtraction of 8

C. Division by 8

D. Multiplication by 8

12. What should you do to both sides of x − 9 = 14?

A. Add 9

B. Subtract 9

C. Multiply by 9

D. Divide by 9

13. Solve: 2(x + 3) = 14.

A. 4

B. 5

C. 7

D. 10

14. Solve: 3x − 4 = 2x + 6.

A. 2

B. 6

C. 10

D. −10

15. Why must the same operation be performed on both sides of an equation?

A. To keep the equation balanced

B. To make x positive

C. To avoid fractions

D. Because variables cannot be on one side

Worksheet: 5 Descriptive / Constructed-Response Questions

1. Solve 5x + 7 = 32. Show inverse operations and check your answer.

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2. Solve 4x − 9 = 27. Explain how you isolate x.

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3. A phone plan charges $15 plus $8 per month of data service. The total bill is $55. Write and solve an equation to find the number of months/data units represented by x.

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4. Solve 2(x + 5) = 26 using two different methods.

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5. A student says 3x + 5 = 20 gives x = 25. Explain the error and solve the equation correctly.

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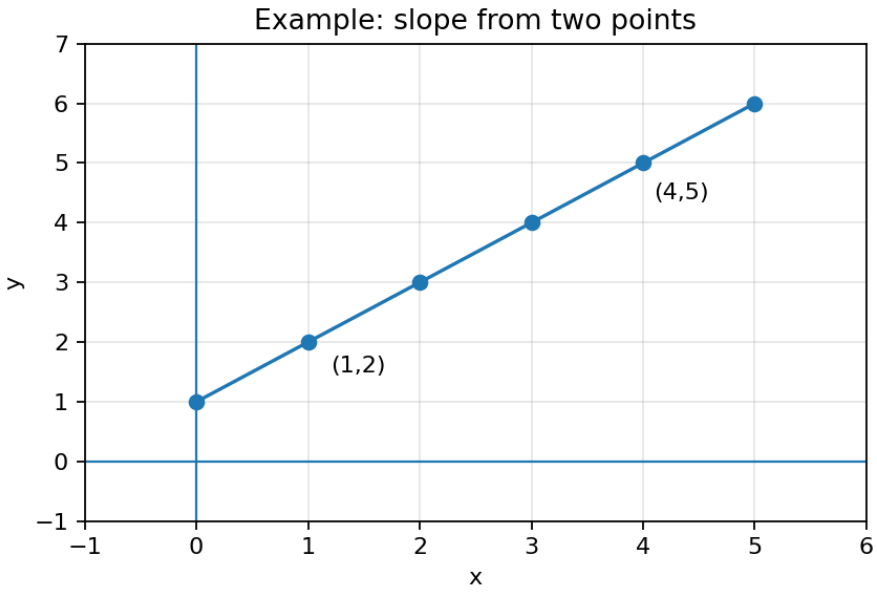
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Day 4: Slope of a Line: Two Points, Equation, and Graph

Watch Video:

https://youtu.be/ed3eEyN4-uc

Learning objective	Calculate slope from two points, identify slope from slope-intercept equations, and determine slope from a graph using rise over run.
Key vocabulary	Slope, rise, run, rate of change, positive slope, negative slope, zero slope, undefined slope, y-intercept.
Mini-lesson / teacher notes	Use $m=(y_2-y_1)/(x_2-x_1)$. In $y=mx+b$, m is the slope. From a graph, count vertical change (rise) and horizontal change (run). Positive slope rises left-to-right; negative slope falls left-to-right.
Worked examples	Example: points (1,2) and (4,5) give $m=(5-2)/(4-1)=3/3=1$. In $y=-2x+5$, the slope is -2.
E-learning sequence	1. Do Now: identify slope in $y=2x+1$. 2. Study the graph and calculate rise/run. 3. Practice with point pairs. 4. Identify slope from equations. 5. Complete worksheet and exit ticket.
Quick formative check	state 'rise over run' before calculating. why vertical lines are undefined.
Exit ticket	Find the slope through (3,4) and (7,10).



Visual example: from (1,2) to (4,5), rise = 3 and run = 3, so slope = 1.

Slope formula:

$$m = (y_2 - y_1) / (x_2 - x_1)$$

Worksheet: 15 Multiple-Choice Questions

1. Find the slope through (1,2) and (4,5).

A. 1

B. 3

C. −1

D. 1/3

2. Find the slope through (2,7) and (5,13).

A. 2

B. 3

C. 6

D. −2

3. What is the slope of y = 4x − 9?

A. −9

B. 4

C. 9

D. −4

4. What is the slope of y = −2x + 5?

A. 5

B. 2

C. −2

D. −5

5. What is the slope of a horizontal line?

A. 0

B. 1

C. Undefined

D. −1

6. What is the slope of a vertical line?

A. 0

B. 1

C. Undefined

D. −1

7. For y = 3x + 2, what does 3 represent?

A. y-intercept

B. x-intercept

C. slope

D. constant only

8. A line rises 8 units and runs 4 units. Its slope is:

A. 2

B. 4

C. 12

D. 1/2

9. A line falls 6 units while running 3 units to the right. Its slope is:

A. 2

B. −2

C. −1/2

D. 1/2

10. Which equation has slope 1/2?

A. $y=2x+1$

B. $y=-2x+1$

C. $y=(1/2)x-4$

D. $y=4x-2$

11. If two points have the same y-value, the slope is:

A. Undefined

B. 0

C. 1

D. −1

12. If two points have the same x-value, the slope is:

A. 0

B. 1

C. Undefined

D. −1

13. Using $m=(y2-y1)/(x2-x1)$, for (−2,3) and (2,11), m is:

A. 1

B. 2

C. 4

D. 8

14. A graph goes down 10 units and right 5 units. What is its slope?

A. 2

B. −2

C. −5

D. 1/2

15. Why can a vertical line not have a numerical slope?

A. Its run is zero, causing division by zero

B. Its rise is zero

C. It is always horizontal

D. It has no y-values

Worksheet: 5 Descriptive / Constructed-Response Questions

1. Find the slope through (−1,4) and (3,12). Show the formula and substitution.

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2. Find the slope of y = −3x + 7 and explain how the equation gives the slope immediately.

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3. Describe how you can find slope from a graph using rise/run.

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4. A line passes through (2,5) and (6,1). Interpret the sign of its slope and calculate it.

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5. Explain the difference between zero slope and undefined slope. Include a simple example equation or description for each.

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Day 5: Laws of Exponents

Watch Video:

https://youtu.be/duLyfKvdCU0

Learning objective	Apply the product, quotient, power-of-a-power, zero-exponent, and negative-exponent laws to simplify expressions.
Key vocabulary	Exponent, base, product of powers, quotient of powers, power of a power, zero exponent, negative exponent.
Mini-lesson / teacher notes	Product: $a^m \cdot a^n = a^{m+n}$. Quotient: $a^m / a^n = a^{m-n}$. Power of a power: $(a^m)^n = a^{mn}$. Zero exponent: $a^0 = 1$ for $a \neq 0$. Negative exponent: $a^{-n} = 1/a^n$.
Worked examples	1) $x^3 \cdot x^4 = x^7$. 2) $a^8 / a^3 = a^5$. 3) $(m^2)^4 = m^8$. 4) $z^{-2} = 1/z^2$.
E-learning sequence	1. Do Now: $x^2 \cdot x^3$. 2. Build an exponent-law reference card. 3. Practice one law at a time. 4. Mix laws in multi-step problems. 5. Complete worksheet and exit ticket.
Quick formative check	identify the law before simplifying. explain why exponents are added, subtracted, or multiplied.
Exit ticket	Simplify: $(x^2)^3 / x^4$.

Worksheet: 15 Multiple-Choice Questions

1. Simplify: $x^3 \cdot x^4$.

A. x^7

B. x^{12}

C. x

D. $2x^7$

2. Simplify: a^8 / a^3.

A. a^{24}

B. a^5

C. a^{11}

D. a^{-5}

3. Simplify: $(m^2)^4$.

A. m^6

B. m^8

C. m^2

D. $4m^2$

4. Simplify: x^0, $x \neq 0$.

A. 0

B. 1

C. x

D. undefined

5. Simplify: $2^3 \cdot 2^2$.

A. 2^5

B. 2^6

C. 4^5

D. 2

6. Simplify: y^7/y^2.

A. y^9

B. y^5

C. y^3

D. y^{14}

7. Simplify: $(3x^2)^2$.

A. $3x^4$

B. $6x^4$

C. $9x^4$

D. $9x^2$

8. Which law is used in $a^5 \cdot a^2 = a^7$?

A. Power of a power

B. Product of powers

C. Quotient of powers

D. Zero exponent

9. Which law is used in $x^9 / x^4 = x^5$?

A. Product

B. Quotient

C. Power of a power

D. Negative exponent

10. Simplify: $(p^3q^2)^2$.

A. p^6q^4

B. p^5q^4

C. p^6q^2

D. p^9q^4

11. Rewrite $1/x^3$ using a negative exponent.

A. x^3

B. x^{-3}

C. $-x^3$

D. $1-x^3$

12. Simplify: z^{-2}.

A. z^2

B. $-z^2$

C. $1/z^2$

D. $1-z^2$

13. Simplify: $(2a^3)(5a^2)$.

A. $10a^5$

B. $7a^5$

C. $10a^6$

D. $10a$

14. Simplify: $b^6 \cdot b^{-2}$.

A. b^8

B. b^4

C. b^{-8}

D. b^3

15. Why does $x^0 = 1$ for $x \neq 0$?

A. It follows from the quotient law: $x^n/x^n=1$

B. Zero means no value

C. All exponents are zero

D. Because x must equal 1

Worksheet: 5 Descriptive / Constructed-Response Questions

1. Simplify $x^4 \cdot x^3$ and name the exponent law used.

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2. Simplify $(a^3)^4 / a^2$. Show each law used.

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3. Rewrite $1/(5x^2)$ using negative exponents, and explain what the negative exponent means.

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4. Simplify $(2m^2n^3)^2$ completely.

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5. A student says $x^5 \cdot x^2 = x^{10}$. Explain the error and give the correct rule and answer.

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5-Day Self-Check

Day	Topic	I can…	Status
1	Order of operations	Evaluate expressions and explain the order used.	☐ Ready ☐ Practice more
2	Like/unlike terms	Combine like terms and keep unlike terms separate.	☐ Ready ☐ Practice more
3	Linear equations	Solve and check one- and two-step equations.	☐ Ready ☐ Practice more
4	Slope	Find slope from	☐ Ready ☐

		points, equations, and graphs.	Practice more
5	Exponents	Apply exponent laws and simplify expressions.	☐ Ready ☐ Practice more