

Unit 1 Algebraic Expressions and Integers Review Guide

1. Underline the hundredths place.

a. 95.022

b. 15,002.811

c. 0.0076

2. Write down the place value of the digit 7 in the following numbers.

a. 127,000.223

b. 33,087.004

c. 1,630.007

3. Write the value of the underlined digit.

a. 3,229

b. 100,122,221

c. 3,009.09

4. Write each number in standard form.

a. Ten and two hundredths

b. Eighty-six one-thousandths

c. Three million, fifteen thousand, two hundred twenty-two.

5. Write the following numbers in standard form.

a. $800,000 + 60,000 + 2,000 + 10 + 0.6 + 0.009$

b. $1,000 + 90 + 3 + 0.6 + 0.09 + 0.002$

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6. Write the following numbers in expanded form.

a. 18,002.0321

b. 3,000.631

7. Find the terms, constant/s and coefficient/s for each expression.

a. $x + 3y + 12 =$

b. $c + 7d + 8 =$

c. $100 + z =$

Terms:
Variables:
Constant:
Coefficients:

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Variable:
Constant:
Coefficient:

8. Write an algebraic expression for each verbal phrase.

a. The sum of n and 20, divided by 9

b. 3 more than 2 times a number

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9. Evaluate each expression using the values given.

a. $x + 5y$ when $x = 7$ and $y = 9$

b. $a - 2b$ when $a = 20$ and $b = 6$

Find the value of each numerical expression. Follow the order of operations when finding each value.

10. $800 - (15 * 2) - (102 - 12) =$

11. $900 \div (90 \div 3 - 10 - 125 \div 25)$

12. $(640 \div 4 - 5) - 361 \div 19 =$

13. $(280 \div 7 + 15) - (216 \div 36 - 6) =$

14. $10^2 - (50 - 7^2) + (343 \div 7) =$

15. $1,000 + (11^2 - 7^2 * 2)^2 =$

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16. Write an algebraic expression for the word expression.

- a. The quotient of x and **30** b. The sum of **45** and the product of **8** and y c. Twice a number increased by **89**.

17. Write the word expression for each algebraic expression.

- a. $x - 13$ b. $z - 9$ c. $y^3 + 8$

Evaluate each expression for the given values of the variable.

18. $\frac{2x + y}{2} + (4x - y) =$
 $x = 20$ $y = 10$

19. $5a + 2b - (a - b)^2 =$
 $a = 11$ $b = 5$

20. Write an integer to represent each situation.

- a. An increase of **78** points. b. A profit of **100** dollars. c. The stock market went down **600** points today.

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21. Graph each integer or set of integers on a number line.

a. $\{-5, 4\}$



b. $\{-4, -2, 5\}$



22. Find the opposite of each integer.

a. Opposite of -111

b. Opposite of -32

c. Opposite of $+98$

23. Graph each integer and its opposite on a number line.

a. -6



b. 2



24. Compare the following integers. Write $<$, $=$ or $>$.

a. 2 ___ -2

b. -55 ___ -62

c. 100 ___ $|-100|$

25. Find the absolute value of the following numbers.

a. $|-17| =$

b. $|-212| =$

c. $|+35| =$

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Find the value of each numerical expression. Follow the order of operations when finding each value.

26. $|-105| - 2 * |-10| + 18 \div 3 =$

27. $80 - |-99| \div 3 - |+14| + 20 \div 2 =$

28. Find the sum of each expression below using the rules for adding integers.

a. $-15 + (-12) =$

b. $17 + (-42) =$

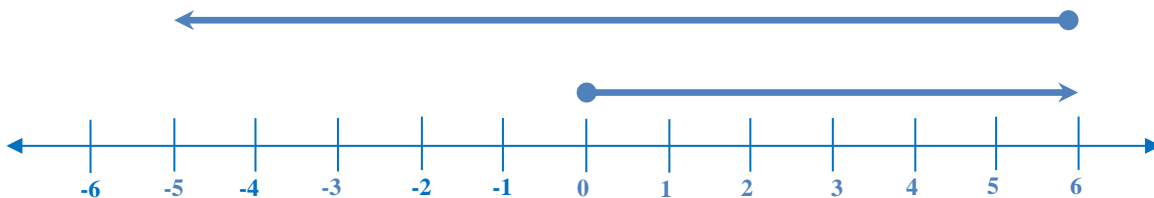
c. $-110 + 20 =$

29. Show the addition on the number line. Then write the sum.

$5 + (-2) =$



30. Write the expression that each number line demonstrates. Then write the sum.



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Solve each expression below.

31. $-200 + 45 + [-133 + 33]^2 =$

32. $10 + (-567) + (-11) + (-11) =$

33. At 6 a.m. the temperature was -6°C . At noon, the temperature rose 11°C . What was the temperature at noon?

34. Find the difference of each expression below.

a. $-5 - (-20) =$

b. $7 - (-14) =$

c. $-21 - 20 =$

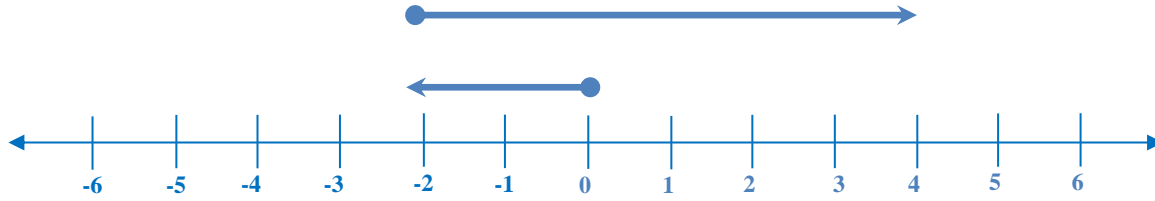
35. Show the subtraction on the number line. Then write the difference.

$4 - (-2) =$



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36. Write the expression that each number line demonstrates. Then write the difference.



Solve each expression below.

37. $-200 + 125 - [60 - 56]^2 =$

38. $100 - (-5) - (-3) + (-8) - 60 =$

39. Round the number to the nearest.....

a. **14,360**
Nearest thousand

b. **2,799**
Nearest hundred

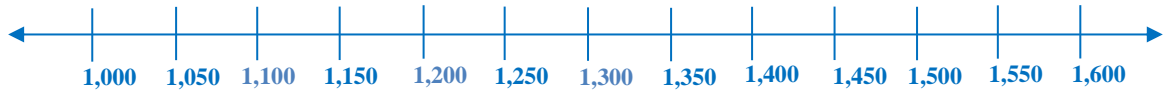
c. **620**
Nearest ten

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40. Round the number to the nearest..... (USE NUMBER LINE)

1,159

Nearest hundred



Estimate the answer using rounding method.

41. $931 + 1,969 =$

42. $16,899 - 5,960 =$

Estimate the answer using front end estimation.

43. $4,699 + 677 =$

44. $999 - 199 =$

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Estimate the answer using cluster estimation.

45. $124 + 117 + 99 + 102 =$

46. $11 * 12 * 13 * 14 =$

Write a rule for each number pattern, and find the next number.

47. 2, 6, 18, 54

Find one counterexample to show that each conjecture is false.

48. The difference $a^2 - b^2$ is equal to $(a - b)^2$

49. All numbers that are divisible by 3 are also divisible by 6.

Fill in the missing numbers.

50. The rule for the pattern shown is +5.
4, _____, 14, 19, 24, _____,

51. The rule for the pattern shown is -10.
90, _____, 70, 60, _____, 40,

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52. Find the quotient of each expression below using the rules for dividing integers.

a. $-625 \div (-5) =$ b. $210 \div (-3) =$ c. $\frac{-600}{10} =$

Solve each expression below.

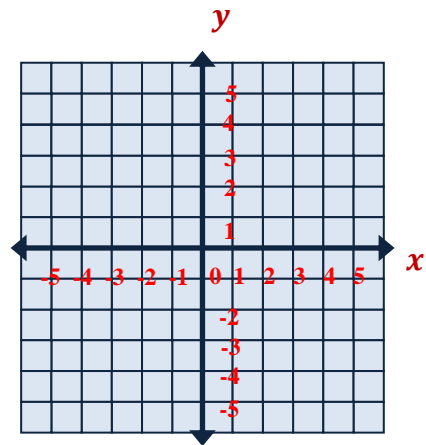
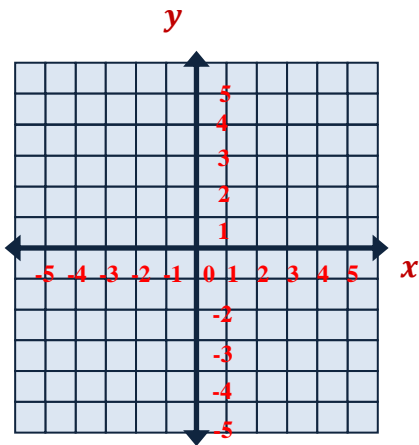
53. $11 * (-10) + [-343 \div 7]^2 =$

54. $[40 \div (-5)]^2 - [5 * (-2)]^2 + 24 =$

Graph each point on a coordinate plane and find the line segment lengths.

55. $A(-3, 4)$ and $N(-3, -2)$

56. $T(-4, 2)$ and $R(3, 2)$



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ANSWERS

1. Underline the hundredths place.

a. 95.022 b. 15,002.811 c. 0.0076

95.022

15,002.811

0.0076

2. Write down the place value of the digit 7 in the following numbers.

a. 127,000.223 b. 33,087.004 c. 1,630.007

One-thousands

Ones

One-thousandths

3. Write the value of the underlined digit.

a. 3,229 b. 100,122,221 c. 3,009.09

Tens
20

Hundred-millions
100,000,000

Hundredths
0.09

4. Write each number in standard form.

a. Ten and two hundredths

10.02

b. Eighty-six one-thousandths

0.086

c. Three million, fifteen thousand, two hundred twenty-two.

3, 015,222

5. Write the following numbers in standard form.

a. 800,000 + 60,000 + 2,000 + 10 + 0.6 + 0.009

862,010.609

b. 1,000 + 90 + 3 + 0.6 + 0.09 + 0.002

1,093.692

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6. Write the following numbers in expanded form.

a. **18,002.0321**

$$\text{Value of 1} = 1 * 10,000 = 10,000$$

$$\text{Value of 8} = 8 * 1,000 = 8,000$$

$$\text{Value of 2} = 2 * 1 = 2$$

$$\text{Value of 3} = 3 * 0.01 = 0.03$$

$$\text{Value of 2} = 2 * 0.001 = 0.002$$

$$\text{Value of 1} = 1 * 0.0001 = 0.0001$$

$$18,002.0321 = 10,000 + 8,000 + 2 + 0.03 + 0.002 + 0.0001$$

b. **3,000.631**

$$\text{Value of 3} = 3 * 1,000 = 3,000$$

$$\text{Value of 6} = 6 * 0.1 = 0.6$$

$$\text{Value of 3} = 3 * 0.01 = 0.03$$

$$\text{Value of 1} = 1 * 0.001 = 0.001$$

$$3,000.631 = 3,000 + 0.6 + 0.03 + 0.001$$

7. Find the terms, constant/s and coefficient/s for each expression.

a. $x + 3y + 12 =$

Terms: $x, 3y, 12$

Variables: x, y

Constant: 12

Coefficients: $1, 3$

b. $c + 7d + 8 =$

Terms: $c, 7d, 8$

Variables: c, d

Constant: 8

Coefficients: $1, 7$

c. $100 + z =$

Terms: $100, z$

Variable: z

Constant: 100

Coefficient: 1

8. Write an algebraic expression for each verbal phrase.

a. The sum of n and 20 , divided by 9

$$(n + 20) \div 9$$

b. 3 more than 2 times a number

$$3 + 2k$$

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9. Evaluate each expression using the values given.

a. $x + 5y$ when $x = 7$ and $y = 9$

$$\begin{aligned} x + 5y &= \\ 7 + 5 * 9 &= \\ = 7 + 45 &= \\ = \mathbf{52} & \end{aligned}$$

b. $a - 2b$ when $a = 20$ and $b = 6$

$$\begin{aligned} a - 2b &= \\ = 20 - 2 * 6 &= \\ = 20 - 12 &= \\ = \mathbf{8} & \end{aligned}$$

Find the value of each numerical expression. Follow the order of operations when finding each value.

10. $800 - (15 * 2) - (102 - 12) =$

$$\begin{aligned} 800 - (15 * 2) - (102 - 12) &= \\ = 800 - 30 - 90 &= \\ = 770 - 90 &= \\ = \mathbf{680} & \end{aligned}$$

11. $900 \div (90 \div 3 - 10 - 125 \div 25) =$

$$\begin{aligned} 900 \div (90 \div 3 - 10 - 125 \div 25) &= \\ = 900 \div (30 - 10 - 5) &= \\ = 900 \div (20 - 5) &= \\ = 900 \div 15 &= \\ = \mathbf{60} & \end{aligned}$$

12. $(640 \div 4 - 5) - 361 \div 19 =$

$$\begin{aligned} (640 \div 4 - 5) - 361 \div 19 &= \\ = (160 - 5) - 361 \div 19 &= \\ = 155 - 361 \div 19 &= \\ = 155 - 19 &= \\ = \mathbf{136} & \end{aligned}$$

13. $(280 \div 7 + 15) - (216 \div 36 - 6) =$

$$\begin{aligned} (280 \div 7 + 15) - (216 \div 36 - 6) &= \\ = (40 + 15) - (6 - 6) &= \\ = 55 - 0 &= \\ = \mathbf{55} & \end{aligned}$$

14. $10^2 - (50 - 7^2) + (343 \div 7) =$

$$\begin{aligned} 10^2 - (50 - 7^2) + (343 \div 7) &= \\ = 100 - (50 - 49) + 49 &= \\ = 100 - 1 + 49 &= \\ = 99 + 49 &= \\ = \mathbf{148} & \end{aligned}$$

15. $1,000 + (11^2 - 7^2 * 2)^2 =$

$$\begin{aligned} 1,000 + (11^2 - 7^2 * 2)^2 &= \\ = 1,000 + (121 - 49 * 2)^2 &= \\ = 1,000 + (121 - 98)^2 &= \\ = 1,000 + (23)^2 &= \\ = 1,000 + 529 &= \\ = \mathbf{1,529} & \end{aligned}$$

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16. Write an algebraic expression for the word expression.

a. The quotient of x and 30

$$\frac{x}{30} \text{ or } x \div 30$$

b. The sum of 45 and the product of 8 and y

$$45 + 8y$$

c. Twice a number increased by 89.

$$2n + 89$$

17. Write the word expression for each algebraic expression.

a. $x - 13$

The **difference** of a number x and 13

b. $z - 9$

A number z **take away** 9

c. $y^3 + 8$

y cubed **increased by** 8

Evaluate each expression for the given values of the variable.

18. $\frac{2x + y}{2} + (4x - y) =$
 $x = 20$ $y = 10$

$$\begin{aligned} \frac{2x + y}{2} + (4x - y) &= \\ &= \frac{2 * 20 + 10}{2} + (4 * 20 - 10) = \\ &= \frac{40 + 10}{2} + (80 - 10) = \\ &= \frac{50}{2} + 70 = \\ &= 25 + 70 = \\ &= 95 \end{aligned}$$

19. $5a + 2b - (a - b)^2 =$

$$a = 11 \quad b = 5$$

$$\begin{aligned} 5a + 2b - (a - b)^2 &= \\ &= 5 * 11 + 2 * 5 - (11 - 5)^2 = \\ &= 55 + 10 - (6)^2 = \\ &= 55 + 10 - 36 = \\ &= 65 - 36 = \\ &= 29 \end{aligned}$$

20. Write an integer to represent each situation.

a. An increase of 78 points.

$$+78$$

b. A profit of 100 dollars.

$$+100$$

c. The stock market went down 600 points today.

$$-600$$

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21. Graph each integer or set of integers on a number line.

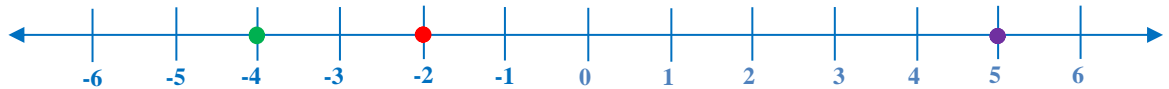
a. $\{-5, 4\}$

$\{-5, 4\}$



b. $\{-4, -2, 5\}$

$\{-4, -2, 5\}$



22. Find the opposite of each integer.

a. Opposite of -111

$+111$

b. Opposite of -32

$+32$

c. Opposite of $+98$

-98

23. Graph each integer and its opposite on a number line.

a. -6

$+6$



b. 2

-2



24. Compare the following integers. Write $<$, $=$ or $>$.

a. 2 ___ -2

$2 > -2$

b. -55 ___ -62

$-55 > -62$

c. 100 ___ $|-100|$

$100 = |-100|$

25. Find the absolute value of the following numbers.

a. $|-17| =$

$|-17| = 17$

b. $|-212| =$

$|-212| = 212$

c. $|+35| =$

$|+35| = 35$

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Find the value of each numerical expression. Follow the order of operations when finding each value.

26. $|-105| - 2 * |-10| + 18 \div 3 =$

$$\begin{aligned} & |-105| - 2 * |-10| + 18 \div 3 = \\ & = 105 - 2 * 10 + 18 \div 3 = \\ & = 105 - 20 + 6 = \\ & = 85 + 6 = \\ & = \mathbf{91} \end{aligned}$$

27. $80 - |-99| \div 3 - |+14| + 20 \div 2 =$

$$\begin{aligned} & 80 - |-99| \div 3 - |+14| + 20 \div 2 = \\ & = 80 - 99 \div 3 - 14 + 20 \div 2 = \\ & = 80 - 33 - 14 + 10 = \\ & = 47 - 14 + 10 = \\ & = 33 + 10 = \\ & = \mathbf{43} \end{aligned}$$

28. Find the sum of each expression below using the rules for adding integers.

a. $-15 + (-12) =$

$$-15 + (-12) = \mathbf{-27}$$

b. $17 + (-42) =$

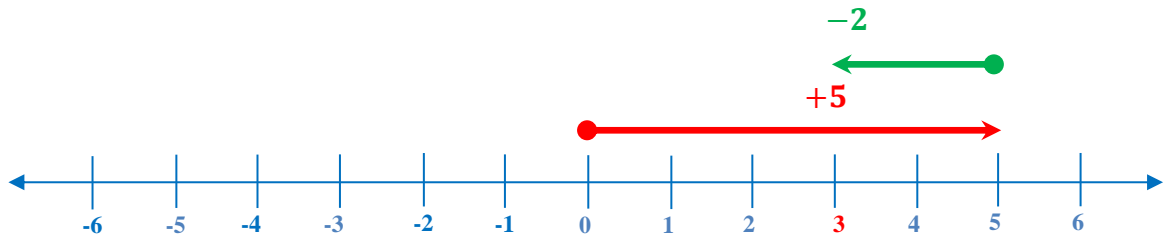
$$17 + (-42) = \mathbf{-25}$$

c. $-110 + 20 =$

$$-110 + 20 = \mathbf{-90}$$

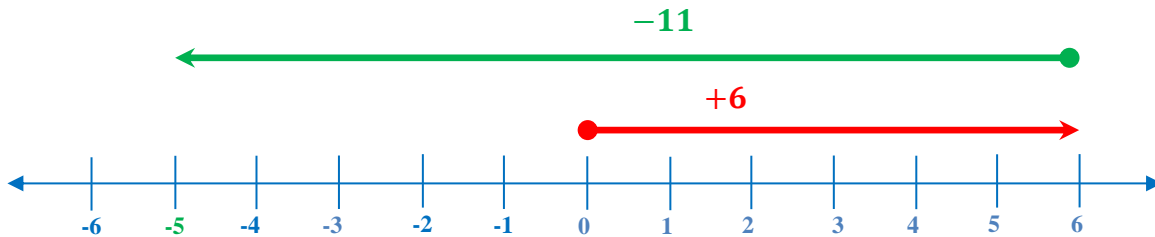
29. Show the addition on the number line. Then write the sum.

$5 + (-2) =$



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

30. Write the expression that each number line demonstrates. Then write the sum.



$$6 + (-11) = -5$$

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Solve each expression below.

31. $-200 + 45 + [-133 + 33]^2 =$

$$\begin{aligned} & -200 + 45 + [-133 + 33]^2 = \\ & = -200 + 45 + [-100]^2 = \\ & = -200 + 45 + 10,000 = \\ & = -155 + 10,000 = \\ & = \mathbf{9,845} \end{aligned}$$

32. $10 + (-567) + (-11) + (-11) =$

$$\begin{aligned} & 10 + (-567) + (-11) + (-11) = \\ & = -557 + (-11) + (-11) = \\ & = -546 + (-11) = \\ & = \mathbf{-557} \end{aligned}$$

33. At 6 a.m. the temperature was -6°C . At noon, the temperature rose 11°C . What was the temperature at noon?

Temperature in 6 a.m. $-6^\circ\text{C} = -6$
 ... rose $11^\circ\text{C} = +11$

$$-6 + 11 = \mathbf{5}$$

The temperature at noon was $\mathbf{5^\circ\text{C}}$.

34. Find the difference of each expression below.

a. $-5 - (-20) =$

$$\begin{aligned} & -5 - (-20) = \\ & = -5 + 20 = \\ & = \mathbf{15} \end{aligned}$$

b. $7 - (-14) =$

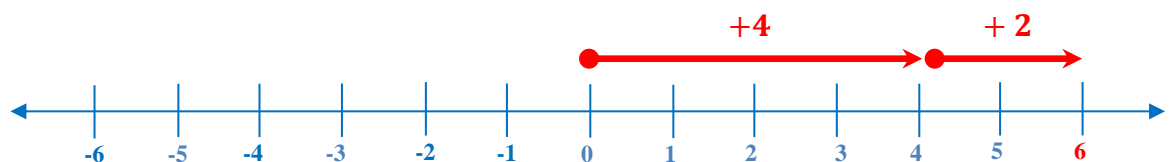
$$\begin{aligned} & 7 - (-14) = \\ & = 7 + 14 = \\ & = \mathbf{21} \end{aligned}$$

c. $-21 - 20 =$

$$\begin{aligned} & -21 - 20 = \\ & = -21 + (-20) = \\ & = \mathbf{-41} \end{aligned}$$

35. Show the subtraction on the number line. Then write the difference.

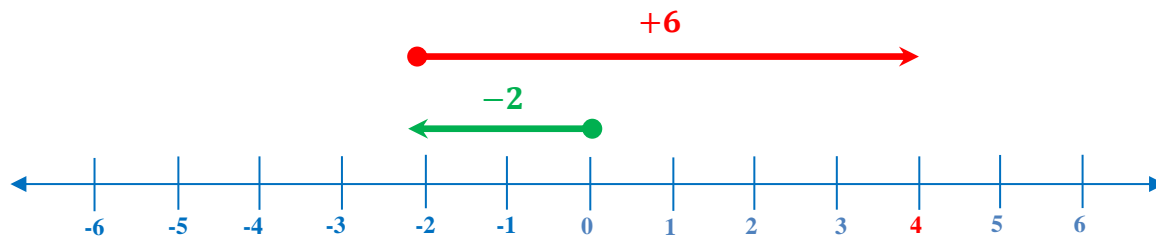
$$4 - (-2) =$$



$$\begin{aligned} & 4 - (-2) = \\ & = 4 + 2 = \\ & = \mathbf{6} \end{aligned}$$

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36. Write the expression that each number line demonstrates. Then write the difference.



$$\begin{aligned} & -2 - (-6) = \\ & = -2 + 6 = \\ & = 4 \end{aligned}$$

Solve each expression below.

37. $-200 + 125 - [60 - 56]^2 =$

$$\begin{aligned} & -200 + 125 - [60 - 56]^2 = \\ & = -200 + 125 - [60 + (-56)]^2 = \\ & = -200 + 125 - [-4]^2 = \\ & = -200 + 125 - 16 = \\ & = -75 - 16 = \\ & = -75 + (-16) = \\ & = -91 \end{aligned}$$

38. $100 - (-5) - (-3) + (-8) - 60 =$

$$\begin{aligned} & 100 - (-5) - (-3) + (-8) - 60 = \\ & = 100 + 5 - (-3) + (-8) - 60 = \\ & = 105 - (-3) + (-8) - 60 = \\ & = 105 + 3 + (-8) - 60 = \\ & = 108 + (-8) - 60 = \\ & = 100 - 60 = \\ & = 100 + (-60) = \\ & = 40 \end{aligned}$$

39. Round the number to the nearest.....

a. 14,360
Nearest thousand

$$14, \boxed{3}60 \rightarrow 14,000$$

b. 2,799
Nearest hundred

$$2,7 \boxed{9}9 \rightarrow 2,800$$

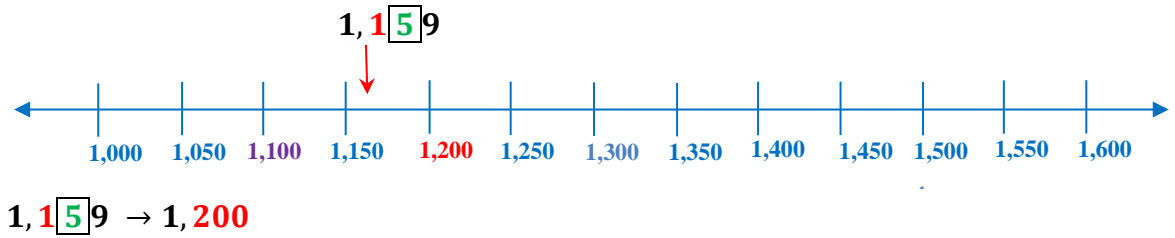
c. 620
Nearest ten

$$62 \boxed{0} \rightarrow 620$$

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40. Round the number to the nearest..... (USE NUMBER LINE)

1, 159
Nearest hundred



Estimate the answer using rounding method.

41. $931 + 1,969 =$

$931 + 1,969 =$
Round to nearest ten

$93\boxed{1} \rightarrow 930$
 $1,96\boxed{9} \rightarrow 1,970$
 $930 + 1,970 = \mathbf{2,900}$

42. $16,899 - 5,960 =$

$16,899 - 5,960 =$
Round to nearest thousand

$16,\boxed{8}99 \rightarrow 17,000$
 $5,\boxed{9}60 \rightarrow 6,000$
 $17,000 - 6,000 = \mathbf{11,000}$

Estimate the answer using front end estimation.

43. $4,699 + 677 =$

$4,699 + 677 =$

$4,\boxed{6}99 \rightarrow 5,000$
 $6\boxed{7}7 \rightarrow 700$
 $5,000 + 700 = \mathbf{5,700}$

44. $999 - 199 =$

$999 - 199 =$

$9\boxed{9}9 \rightarrow 1,000$
 $1\boxed{9}9 \rightarrow 200$
 $1,000 - 200 = \mathbf{800}$

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Estimate the answer using cluster estimation.

45. $124 + 117 + 99 + 102 =$

$124 + 117 + 99 + 102 =$
Notice that they all cluster around **100**.

$100 + 100 + 100 + 100 =$

$4 * 100 = 400$

Real answer:

$124 + 117 + 99 + 102 = 442$

46. $11 * 12 * 13 * 14 =$

$11 * 12 * 13 * 14 =$
Notice that they all cluster around **10**.

$10 * 10 * 10 * 10 = 10,000$

Real answer:

$11 * 12 * 13 * 14 = 24,024$

Write a rule for each number pattern, and find the next number.

47. 2, 6, 18, 54

Start with 3 , each number is 3 times the previous number.

$2 * 3 = 6$

$6 * 3 = 18$

$18 * 3 = 54$

$54 * 3 = 162$

The next number is **162**

Find one counterexample to show that each conjecture is false.

48. The difference $a^2 - b^2$ is equal to $(a - b)^2$

$a^2 - b^2 = (a - b)^2$
 $6^2 - 5^2 = 36 - 25 = 11$
 $(6 - 5)^2 = 1^2 = 1$
 $11 \neq 1$

49. All numbers that are divisible by 3 are also divisible by 6.

9 is divisible by 3 but no divisible by 6.

Fill in the missing numbers.

50. The rule for the pattern shown is +5.
4, _____, 14, 19, 24, _____,

$4 + 5 = 9$

$9 + 5 = 14$

$14 + 5 = 19$

$19 + 5 = 24$

$24 + 5 = 29$

4, **9**, 14, 19, 24, **29**,

51. The rule for the pattern shown is -10.
90, _____, 70, 60, _____, 40,

$90 - 10 = 80$

$80 - 10 = 70$

$70 - 10 = 60$

$60 - 10 = 50$

$50 - 10 = 40$

90, **80**, 70, 60, **50**, 40

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52. Find the quotient of each expression below using the rules for dividing integers.

a. $-625 \div (-5) =$

$-625 \div (-5) = 125$

b. $210 \div (-3) =$

$210 \div (-3) = -70$

c. $\frac{-600}{10} =$

$\frac{-600}{10} = -6$

Solve each expression below.

53. $11 * (-10) + [-343 \div 7]^2 =$

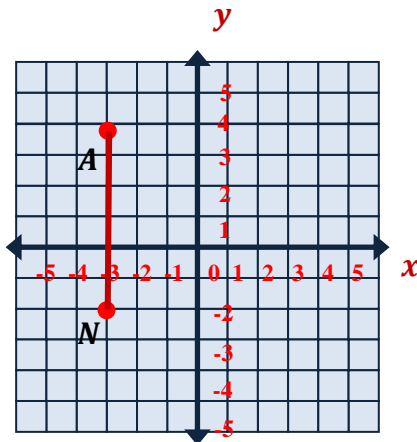
$$\begin{aligned} & 11 * (-10) + [-343 \div 7]^2 = \\ & = 11 * (-10) + [-49]^2 = \\ & = 11 * (-10) + 2,401 = \\ & = -110 + 2,401 = \\ & = 2,291 \end{aligned}$$

54. $[40 \div (-5)]^2 - [5 * (-2)]^2 + 24 =$

$$\begin{aligned} & [40 \div (-5)]^2 - [5 * (-2)]^2 + 24 = \\ & = [-8]^2 - [-10]^2 + 24 = \\ & = 64 - 100 + 24 = \\ & = 64 + (-100) + 24 = \\ & = -136 + 24 = \\ & = -112 \end{aligned}$$

Graph each point on a coordinate plane and find the line segment lengths.

55. $A(-3, 4)$ and $N(-3, -2)$



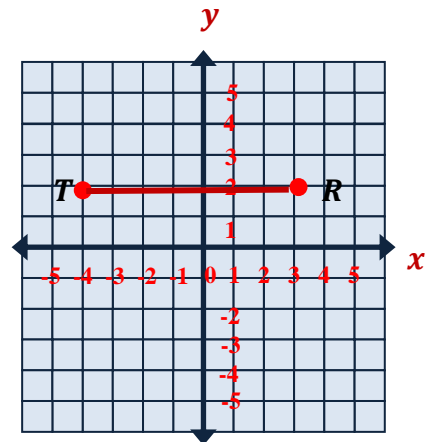
\overline{AN} is vertical

$\overline{AN} = |\text{difference of } y - \text{coordinates}|$

$\overline{AN} = |4 - (-2)| = |4 + 2| = 6$

$\overline{AN} = 6 \text{ units}$

56. $T(-4, 2)$ and $R(3, 2)$



\overline{TR} is horizontal

$\overline{TR} = |\text{difference of } x - \text{coordinates}|$

$\overline{TR} = |3 - (-4)| = |3 + 4| = 7$

$\overline{TR} = 7 \text{ units}$