

Section 2-1: Order of Operations

Computations with More than One Operation

1. 060314a, P.I. 7.N.11

If the expression $3 - 4^2 + \frac{6}{2}$ is evaluated,
what would be done *last*?

- [A] squaring [B] adding
[C] subtracting [D] dividing

Expressions with Grouping Symbols

2. 080612a, P.I. 7.N.11

What is the first step in simplifying the
expression $(2 - 3 \times 4 + 5)^2$?

- [A] add 4 and 5 [B] multiply 3 by 4
[C] square 5 [D] subtract 3 from 2

3. 060217a, P.I. 7.N.11

The expression $15 - 3[2 + 6(-3)]$ simplifies to

- [A] -33 [B] 192 [C] -45 [D] 63

Section 2-2: Properties of Operations

The Property of Closure

4. 010217a, P.I. A.N.1

Which set is closed under division?

- [A] integers [B] whole numbers
[C] counting numbers [D] $\{1\}$

5. 080129a, P.I. A.N.1

Ramón said that the set of integers is *not* closed for one of the basic operations (addition, subtraction, multiplication, or division). You want to show Ramón that his statement is correct. For the operation for which the set of integers is *not* closed, write an example using:

- o a positive even integer and a zero
o a positive and a negative even integer
o two negative even integers

Be sure to explain why *each* of your examples illustrates that the set of integers is *not* closed for that operation.

Commutative Property of Addition

6. 010720a, P.I. A.N.1

If M and A represent integers,
 $M + A = A + M$ is an example of which property?

- [A] distributive [B] associative
[C] commutative [D] closure

7. 010107a, P.I. A.N.1

If a and b are integers, which equation is always true?

- [A] $a - b = b - a$ [B] $\frac{a}{b} = \frac{b}{a}$
[C] $a + b = b + a$ [D] $a + 2b = b + 2a$

Associative Property of Addition

8. 010428a, P.I. A.N.1

Which equation illustrates the associative property of addition?

- [A] $3(x + 2) = 3x + 6$ [B] $3 + x = 0$
[C] $(3 + x) + y = 3 + (x + y)$
[D] $x + y = y + x$

9. 060424a, P.I. A.N.1
Which expression is an example of the associative property?
[A] $x \cdot 1 = x$ [B] $x + y + z = z + y + x$
[C] $x(y + z) = xy + xz$
[D] $(x + y) + z = x + (y + z)$
10. 080725a, P.I. A.N.1
Which equation illustrates the associative property?
[A] $a + b = b + a$
[B] $a(b + c) = (ab) + (ac)$ [C] $a(1) = a$
[D] $(a + b) + c = a + (b + c)$
- The Distributive Property
11. 060108a, P.I. A.N.1
Which equation illustrates the distributive property for real numbers?
[A] $\frac{1}{3} + \frac{1}{2} = \frac{1}{2} + \frac{1}{3}$ [B] $\sqrt{3} + 0 = \sqrt{3}$
[C] $(1.3 \times 0.07) \times 0.63 = 1.3 \times (0.07 \times 0.63)$
[D] $-3(5 + 7) = (-3)(5) + (-3)(7)$
12. 060503a, P.I. A.N.1
Which equation illustrates the distributive property?
[A] $a + (b + c) = (a + b) + c$
[B] $a + 0 = a$
[C] $a + b = b + a$ [D] $5(a + b) = 5a + 5b$
13. 080413a, P.I. A.N.1
Which equation illustrates the distributive property of multiplication over addition?
[A] $6(3a + 4b) = 6(4b + 3a)$
[B] $6(3a + 4b) = (3a + 4b)6$
[C] $6(3a + 4b) = 18a + 4b$
[D] $6(3a + 4b) = 18a + 24b$
14. fall0705ia, P.I. A.N.1
Which property is illustrated by the equation $ax + ay = a(x + y)$?
[A] associative [B] identity
[C] distributive [D] commutative
15. 010812a, P.I. A.N.1
Which property is represented by the statement $\frac{1}{2}(6a + 4b) = 3a + 2b$?
[A] commutative [B] distributive
[C] associative [D] identity
16. 080504a, P.I. A.N.1
The equation $*(\Delta + \Diamond) = *\Delta + *\Diamond$ is an example of the
[A] distributive law [B] transitive law
[C] commutative law [D] associative law
17. 060306a, P.I. A.N.1
Tori computes the value of 8×95 in her head by thinking $8(100 - 5) = 8 \times 100 - 8 \times 5$. Which number property is she using?
[A] distributive [B] commutative
[C] associative [D] closure

18. 080601a, P.I. A.N.1

While solving the equation $4(x + 2) = 28$,
Becca wrote $4x + 8 = 28$. Which property did
she use?

- [A] distributive [B] associative
[C] commutative [D] identity

Addition Property of Zero and the Additive Identity
Element

19. 089907a, P.I. A.N.1

Which equation is an illustration of the
additive identity property?

- [A] $x + 0 = x$ [B] $x \cdot \frac{1}{x} = 1$
[C] $x - x = 0$ [D] $x \cdot 1 = x$

20. 060624a, P.I. A.N.1

Which statement best illustrates the additive
identity property?

- [A] $6(2) = 2(6)$ [B] $6 + (-6) = 0$
[C] $6 + 0 = 6$ [D] $6 + 2 = 2 + 6$

21. 060714a, P.I. A.N.1

Which property is illustrated by the equation
 $\frac{3}{2}x + 0 = \frac{3}{2}x$?

- [A] distributive property
[B] commutative property of addition
[C] additive identity property
[D] additive inverse property

Additive Inverses (Opposites)

22. 060315a, P.I. A.N.1

What is the additive inverse of $\frac{2}{3}$?

- [A] $-\frac{3}{2}$ [B] $\frac{1}{3}$ [C] $\frac{3}{2}$ [D] $-\frac{2}{3}$

23. 010821a, P.I. A.N.1

The additive inverse of $\frac{1}{a}$ is

- [A] $-\frac{1}{a}$ [B] 0 [C] $-a$ [D] a

24. 010207a, P.I. A.N.1

Which expression must be added to $3x - 7$ to
equal 0?

- [A] $3x + 7$ [B] $-3x + 7$
[C] $-3x - 7$ [D] 0

25. 060413a, P.I. A.N.1

Which property of real numbers is illustrated
by the equation $-\sqrt{3} + \sqrt{3} = 0$?

- [A] additive inverse [B] additive identity
[C] commutative property of addition
[D] associative property of addition

26. 060011a, P.I. A.N.1

If $a \neq 0$ and the sum of x and $\frac{1}{a}$ is 0, then

- [A] $x = -a$ [B] $x = -\frac{1}{a}$
[C] $x = a$ [D] $x = 1 - a$

Multiplication Property of One and the
Multiplicative Identity Element

27. 010314a, P.I. A.N.1

Which equation illustrates the multiplicative
identity element?

- [A] $x - x = 0$ [B] $x \cdot \frac{1}{x} = 1$
[C] $x \cdot 1 = x$ [D] $x + 0 = x$

28. 080112a, P.I. A.N.1

The operation element @ is determined by the following table:

@	a	b	c
a	a	b	c
b	b	c	a
c	c	a	b

What is the identity element of this operation?

- [A] b, only [B] a, only
[C] c [D] a and b

29. 080514a, P.I. A.N.1

What is the identity element for ♣ in the accompanying table?

♣	r	s	t	u
r	t	r	u	s
s	r	s	t	u
t	u	t	s	r
u	s	u	r	t

- [A] u [B] r [C] t [D] s

30. 060224a, P.I. A.N.1

An addition table for a subset of real numbers is shown below. Which number is the identity element? Explain your answer.

+	0	1	2	3
0	0	1	2	3
1	1	2	3	4
2	2	3	4	0
3	3	4	0	1

Multiplicative Inverses (Reciprocals)

31. 010516a, P.I. A.N.1

What is the multiplicative inverse of $\frac{3}{4}$?

- [A] $-\frac{3}{4}$ [B] $\frac{4}{3}$ [C] -1 [D] $-\frac{4}{3}$

32. 010730a, P.I. A.N.1

The multiplicative inverse of $-\frac{1}{3}$ is

- [A] 3 [B] -3 [C] $\frac{1}{3}$ [D] $-\frac{1}{3}$

33. 010630a, P.I. A.N.1

Which equation illustrates the multiplicative inverse property?

- [A] $1 \cdot 0 = 0$ [B] $-1 \cdot x = -x$
[C] $x \cdot \frac{1}{x} = 1$ [D] $1 \cdot x = x$

34. 080010a, P.I. A.N.1

The operation * for the set {p, r, s, v} is defined in the accompanying table. What is the inverse element of r under the operation *?

*	p	r	s	v
p	s	v	p	r
r	v	p	r	s
s	p	r	s	v
v	r	s	v	p

- [A] r [B] v [C] p [D] s

35. 080222a, P.I. A.N.1

In the addition table for a subset of real numbers shown below, which number is the inverse of 3? Explain your answer.

\oplus	1	2	3	4
1	2	3	4	1
2	3	4	1	2
3	4	1	2	3
4	1	2	3	4

Section 2-4: Subtraction of Signed Numbers

36. 010403a, P.I. 7.N.13

On February 18, from 9 a.m. until 2 p.m., the temperature rose from -14°F to 36°F .
What was the total increase in temperature during this time period?

[A] 32° [B] 22° [C] 50° [D] 36°

Section 2-7: Operations with Sets

Intersection of Sets

37. fall0710ia, P.I. A.A.31

Given:

Set $A = \{(-2,-1), (-1,0), (1,8)\}$

Set $B = \{(-3,-4), (-2,-1), (-1,2), (1,8)\}$.

What is the intersection of sets A and B ?

[A] $\{(-2,-1), (1,8)\}$

[B] $\{(-3,-4), (-2,-1), (-1,2), (-1,0), (1,8)\}$

[C] $\{(-2,-1)\}$ [D] $\{(1,8)\}$

[1] B _____

[2] B _____

[3] D _____

[4] D _____

[3] All three examples are illustrated under division correctly, such as $2 \div 0$, $-2 \div 4$, $-2 \div -4$, and correct explanations are given.

[2] Only two of the three examples are illustrated and explained correctly.

or [2] All three examples are illustrated correctly, but only one explanation is given or is correct.

or [2] The division examples and explanations are correct, but at most two incorrect examples are also shown, such as examples for addition, subtraction, or multiplication.

[1] The division examples and explanations are correct, but more than two incorrect examples are shown, such as examples for addition, subtraction, or multiplication.

or [1] All three examples are illustrated correctly, but no correct explanation is given.

or [1] Only one correct example with a correct explanation is given.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously

[5] incorrect procedure. _____

[6] C _____

[7] C _____

[8] C _____

[9] D _____

[10] D _____

[11] D _____

[12] D _____

[13] D _____

[14] C _____

[15] B _____

[16] A _____

[17] A _____

[18] A _____

[19] A _____

[20] C _____

[21] C _____

[22] D _____

[23] A _____

[24] B _____

[25] A _____

[26] B _____

[27] C _____

[28] B _____

[29] D _____

[2] 0, and an appropriate explanation is given, such as 0 is the number that when added to any number results in that number or does not change it, or $1 + 0 = 1$, $2 + 0 = 2$, and $3 + 0 = 3$.

[1] 0, but no explanation or an incorrect explanation is given.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously

[30] incorrect procedure. _____

[31] B _____

[32] B _____

[33] C _____

[34] B _____

[2] 1, and an appropriate explanation is given, such as when 1 is added to 3, the result is the identity element, 4; therefore 1 is the inverse of 3.

[1] $1 + 3 = 4$, but the identity element is not identified.

or [1] 4 is identified as the inverse because the identity element and inverse element are confused.

or [1] 1, but no explanation or an incorrect explanation is given.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously

[35] incorrect procedure.

[36] C

[37] A
