

Section 1-1: The Integers

The Set of Integers

1. 010824a, P.I. A.A.1
The larger of two consecutive integers is represented by $x + 4$. Which expression represents the *smaller* integer?

[A] $x + 5$ [B] $x + 2$
[C] $x + 6$ [D] $x + 3$

Subsets of the Integers

2. 010006a, P.I. A.A.1
If the number represented by $n - 3$ is an odd integer, which expression represents the next greater odd integer?

[A] $n - 2$ [B] $n + 1$ [C] $n - 5$ [D] $n - 1$

3. 010506a, P.I. A.A.1
If $n + 4$ represents an odd integer, the next larger odd integer is represented by

[A] $n + 3$ [B] $n + 5$
[C] $n + 6$ [D] $n + 2$

4. 080716a, P.I. A.A.1
In the Ambrose family, the ages of the three children are three consecutive even integers. If the age of the youngest child is represented by $x + 3$, which expression represents the age of the oldest child?

[A] $x + 6$ [B] $x + 7$
[C] $x + 5$ [D] $x + 8$

5. 010712a, P.I. A.A.1
Which expression represents the product of two consecutive odd integers, where n is an odd integer?

[A] $n(n + 2)$ [B] $n(n + 3)$
[C] $2n + 1$ [D] $n(n + 1)$

6. 080113a, P.I. 7.N.11
If n represents an odd number, which computation results in an answer that is an even number?

[A] $2 \times n + 1$ [B] $2 \times n - 1$
[C] $3 \times n + 1$ [D] $3 \times n - 2$

7. 060113a, P.I. 7.N.11
If a is an odd number, b an even number, and c an odd number, which expression will always be equivalent to an odd number?

[A] $ac(b)^1$ [B] $ac(b)^0$
[C] $ac(b)^2$ [D] $a(bc)$

8. 060525a, P.I. 7.N.11
If a and b are both odd integers, which expression must always equal an odd integer?

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

9. 080326b
Tom scored 23 points in a basketball game. He attempted 15 field goals and 6 free throws. If each successful field goal is 2 points and each successful free throw is 1 point, is it possible he successfully made all 6 of his free throws? Justify your answer.

Absolute Value

10. 010518a, P.I. A.N.6

The expression $-|-7|$ is equivalent to

[A] -7 [B] 7 [C] 1 [D] 0

15. 010219a, P.I. 7.N.2

Which is an irrational number?

[A] $\sqrt{3}$ [B] 3.14 [C] $\sqrt{9}$ [D] $\frac{3}{4}$

16. 060211a, P.I. 7.N.2

Which is an irrational number?

[A] 0 [B] π [C] $\sqrt{9}$ [D] $-\frac{1}{3}$

Section 1-3: The Irrational Numbers

The Set of Irrational Numbers

11. 080208a, P.I. 7.N.17

The number 0.14114111411114... is

[A] integral [B] rational
[C] whole [D] irrational

17. 080523a, P.I. 7.N.2

Which is an irrational number?

[A] $\sqrt{49}$ [B] π [C] $\frac{3}{8}$ [D] $0.\bar{3}$

More Irrational Numbers

12. 010632a, P.I. 7.N.2

Write an irrational number and explain why it is irrational.

18. 080718a, P.I. 7.N.2

Which number is irrational?

[A] π [B] $\sqrt{121}$ [C] $\frac{5}{4}$ [D] $0.\bar{3}$

13. 010416a, P.I. 7.N.2

Which number is irrational?

[A] $\sqrt{8}$ [B] 0.3333 [C] $\sqrt{9}$ [D] $\frac{2}{3}$

19. 080432a, P.I. 7.N.2

Given: $\frac{\sqrt{99}}{11}$, $\sqrt{164}$, $\sqrt{196}$

Identify the expression that is a rational number and explain why it is rational.

14. 060303a, P.I. 7.N.2

Which expression represents an irrational number?

[A] $\frac{1}{2}$ [B] $\sqrt{2}$ [C] 0.17 [D] 0

20. 060120a, P.I. 7.N.2

Which is a rational number?

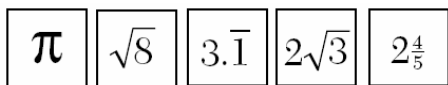
[A] $5\sqrt{9}$ [B] $6\sqrt{2}$ [C] $\sqrt{8}$ [D] π

Section 1-4: The Real Numbers

Ordering Real Numbers

21. 060433a, P.I. 7.N.3

Kyoko's mathematics teacher gave her the accompanying cards and asked her to arrange the cards in order from least to greatest. In what order should Kyoko arrange the cards?



22. 010304a, P.I. 7.N.3

In which list are the numbers in order from least to greatest?

- [A] $\sqrt{3}$, π , 3.2 , $3\frac{1}{3}$ [B] $\sqrt{3}$, 3.2 , π , $3\frac{1}{3}$
[C] 3.2 , π , $3\frac{1}{3}$, $\sqrt{3}$ [D] 3.2 , $3\frac{1}{3}$, $\sqrt{3}$, π

23. 080516a, P.I. 7.N.3

Which numbers are arranged from smallest to largest?

- [A] $\sqrt{9.1}$, 3.14 , π , $\frac{22}{7}$
[B] $\sqrt{9.1}$, π , 3.14 , $\frac{22}{7}$
[C] $\sqrt{9.1}$, 3.14 , $\frac{22}{7}$, π
[D] 3.14 , $\frac{22}{7}$, π , $\sqrt{9.1}$

24. 060609a, P.I. 7.N.3

Which list is in order from smallest value to largest value?

- [A] 3.1 , π , $\frac{22}{7}$, $\sqrt{10}$ [B] 3.1 , $\frac{22}{7}$, π , $\sqrt{10}$
[C] π , $\frac{22}{7}$, 3.1 , $\sqrt{10}$ [D] $\sqrt{10}$, $\frac{22}{7}$, π , 3.1

25. 010816a, P.I. 7.N.3

In which group are the numbers arranged in order from smallest value to largest value?

- [A] 3.14 , $\sqrt{9.86}$, π , $\frac{22}{7}$
[B] $\sqrt{9.86}$, $\frac{22}{7}$, 3.14 , π
[C] π , 3.14 , $\sqrt{9.86}$, $\frac{22}{7}$
[D] $\frac{22}{7}$, 3.14 , π , $\sqrt{9.86}$

26. 080621a, P.I. 7.N.3

Which list shows the numbers

$|-0.12|$, $\sqrt{\frac{1}{82}}$, $\frac{1}{8}$, $\frac{1}{9}$ in order from smallest to largest?

- [A] $\sqrt{\frac{1}{82}}$, $\frac{1}{9}$, $|-0.12|$, $\frac{1}{8}$
[B] $\sqrt{\frac{1}{82}}$, $|-0.12|$, $\frac{1}{9}$, $\frac{1}{8}$
[C] $\frac{1}{8}$, $\frac{1}{9}$, $\sqrt{\frac{1}{82}}$, $|-0.12|$
[D] $|-0.12|$, $\frac{1}{8}$, $\frac{1}{9}$, $\sqrt{\frac{1}{82}}$

27. 010526a, P.I. 7.N.3

Which expression has the *smallest* value?

- [A] $-\pi$ [B] -3.02
[C] $-\sqrt{10}$ [D] $-\frac{16}{5}$

28. 010002a, P.I. 7.N.3

Which number has the greatest value?

- [A] $\frac{\pi}{2}$ [B] $1\frac{2}{3}$ [C] 1.5 [D] $\sqrt{2}$

29. 010213a, P.I. 7.N.3

Which inequality is true if $x = \frac{3.04}{1.48}$,
 $y = 1.99 + 0.33$, and $z = (1.3)^3$?

- [A] $y < x < z$ [B] $x < z < y$
[C] $y < z < x$ [D] $x < y < z$

30. 080717a, P.I. 7.N.3

If $t < \sqrt{t}$, t could be

- [A] $\frac{1}{2}$ [B] 0 [C] 4 [D] 2

31. 069917a, P.I. 7.N.3

If $t^2 < t < \sqrt{t}$, then t could be

- [A] 4 [B] $-\frac{1}{4}$ [C] 0 [D] $\frac{1}{4}$

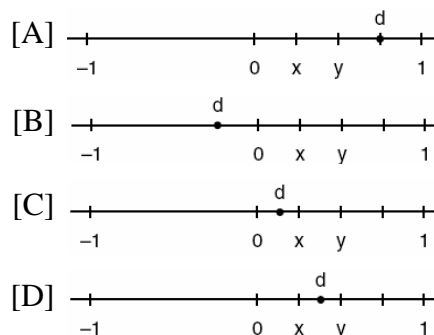
32. 010512a, P.I. 7.N.3

If $x^3 < x < \frac{1}{x}$, then x could be equal to

- [A] $\frac{6}{5}$ [B] 1 [C] $\frac{1}{5}$ [D] 5

33. 010120a, P.I. 7.N.3

Let x and y be numbers such that $0 < x < y < 1$, and let $d = x - y$. Which graph could represent the location of d on the number line?



34. 080006a, P.I. 7.N.3

If $a < b$, $c < d$, and a , b , c , and d are all greater than 0, which expression is always true?

- [A] $\frac{a}{d} > \frac{b}{c}$ [B] $ac < bd$
[C] $a + c > b + d$ [D] $a - c + b - d = 0$

[1] D

[2] D

[3] C

[4] B

[5] A

[6] C

[7] B

[8] A

[2] No, and a correct justification is given.

[1] No, but an incomplete or partially incorrect explanation is given.

[0] No, but no explanation is given.

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

[9] obviously incorrect procedure.

[10] A

[11] D

[2] An irrational number is written, and an appropriate explanation is written, such as an irrational number cannot be written as a fraction or as a repeating or terminating decimal.

[1] An irrational number is written, such as π or the square root of a nonperfect square, but no explanation or an inappropriate explanation is written.

or [1] A correct definition of an irrational number is written, but the example is missing or is inappropriate.

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

[12] incorrect procedure.

[13] A

[14] B

[15] A

[16] B

[17] B

[18] A

[2] $\sqrt{196}$, and an appropriate explanation is given.

[1] An incorrect answer is chosen, but an appropriate explanation is given.

or [1] $\sqrt{196}$, 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

[19] incorrect procedure.

[20] A

[2] $2\frac{4}{5}$, $\sqrt{8}$, $3.\bar{1}$, π , $2\sqrt{3}$ and appropriate

work is shown, such as converting each value to a decimal equivalent.

[1] All values are correctly converted to decimal equivalents, but the order is not indicated or is indicated incorrectly.

or [1] One or two computational errors are made in finding decimal equivalents, but the appropriate order is indicated.

or [1] Appropriate work is shown, but one conceptual error is made, such as indicating the order from greatest to least.

or [1] $2\frac{4}{5}$, $\sqrt{8}$, $3.\bar{1}$, π , $2\sqrt{3}$, but no work is shown.

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

[21] incorrect procedure.

[22] A

[23] A

[24] A

[25] A

[26] A

[27] D

[28] B

[29] B

[30] A

[31] D

[32] C

[33] B

[34] B