

21. $|7(-3) + 2(4)| = ?$

A. -28

B. -13

C. 13

D. 28

E. 29

22. If $x > |y|$, which of the following is the solution statement for x when $y = -4$?

F. x is any real number.

G. $x > 4$

H. $x < 4$

J. $-4 < x < 4$

K. $x > 4$ or $x < -4$

- 53.** For real numbers a and b , when is the equation $|a + b| = |a - b|$ true?
- A.** Always
 - B.** Only when $a = b$
 - C.** Only when $a = 0$ and $b = 0$
 - D.** Only when $a = 0$ or $b = 0$
 - E.** Never

E. \$6.00

22. The diameter, d centimeters, of the metal poles Goodpole Manufacturing produces must satisfy the inequality $|d - 3| \leq 0.001$. What is the maximum diameter, in centimeters, such a metal pole may have?

F. 1.4995

G. 1.5005

H. 2.999

J. 3.000

K. 3.001

42. What are the real solutions to the equation $|x|^2 + 2|x| - 3 = 0$?

F. ± 1

G. ± 3

H. 1 and 3

J. -1 and -3

K. ± 1 and ± 3

1. $|7 - 3| - |3 - 7| = ?$

A. -8

B. -6

C. -4

D. 0

E. 8

46. If $a < b$, then $|a - b|$ is equivalent to which of the following?

F. $a + b$

G. $-(a + b)$

H. $\sqrt{a - b}$

J. $a - b$

K. $-(a - b)$

26. $-3 \mid -6 + 8 \mid = ?$

F. -42

G. -6

H. -1

J. 6

K. 42

55. If x and y are real numbers such that $x > 1$ and $y < -1$, then which of the following inequalities *must* be true?

A. $\frac{x}{y} > 1$

B. $|x|^2 > |y|$

C. $\frac{x}{3} - 5 > \frac{y}{3} - 5$

D. $x^2 + 1 > y^2 + 1$

E. $x^{-2} > y^{-2}$

60. The solution set of which of the following equations is the set of real numbers that are 5 units from -3 ?

F. $|x + 3| = 5$

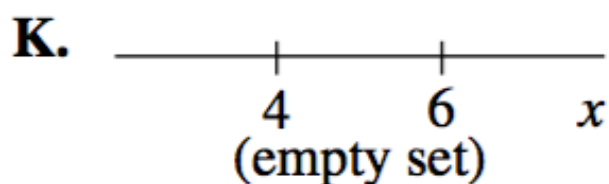
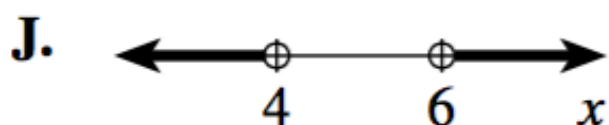
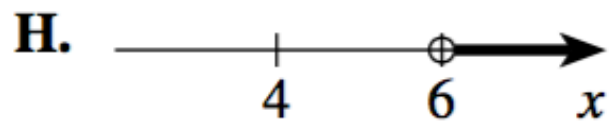
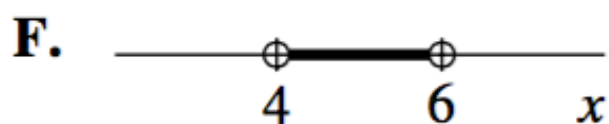
G. $|x - 3| = 5$

H. $|x + 5| = 3$

J. $|x - 5| = 3$

K. $|x + 5| = 3$

58. Which of the following number line graphs shows the solution set to the inequality $|x - 5| < -1$?



12. What is the solution of the following equation? $|x + 7| - 8 = 14$

f. $\{-14, 14\}$

g. $\{-22, 22\}$

h. $\{15\}$

i. $\{-8, 8\}$

j. $\{-29, 15\}$

9. $|3 - 2| - |1 - 4| = ?$

- A. -4
- B. -2
- C. 2
- D. 4
- E. 10

54. If $2 \leq x \leq 5$ and $-4 \leq y \leq -3$, what is the maximum value of $|y - 2x|$?

F. 20

G. 14

H. 13

J. 8

K. 7

14. What is the smallest positive integer x such that $|2 - x| \geq 6$?

F. 3

G. 5

H. 6

J. 7

K. 8

23. Which of the following is an irrational number?

A. $|-1.9|$

B. 0

C. $\frac{1}{7}$

D. 0.3

E. $\sqrt{6}$

9. It costs a dollars for an adult ticket to a reggae concert and s dollars for a student ticket. The difference between the cost of 12 adult tickets and 18 student tickets is \$36. Which of the following equations represents this relationship between a and s ?

A. $\frac{12a}{18s} = 36$

B. $216as = 36$

C. $|12a - 18s| = 36$

D. $|12a + 18s| = 36$

E. $|18a + 12s| = 36$

Solve $|z + 2| \leq -2$

Possible Answers:

$z = -4$

All real numbers

No solutions

$z \leq 0$

$z \leq -4$



Correct answer:

No solutions

Explanation:

Absolute values measure the distance from the origin and is always positive, thus it can never be less than or equal to a negative number (unless a negative number is multiplied outside the absolute value). So the correct answer is no solutions.

$$|7 - 2| - |4 - 8| = ?$$

Possible Answers:

2

0

6

1

9



Correct answer:

1

Explanation:

Absolute value is the key here. Absolute value means the number's distance from zero. So we must account for that. Therefore $|4 - 8| = |-4| = 4$.

What are the values of a and b , if any, where $-a|b + 7| > 0$?

Possible Answers:

$a > 0$ and b not equal to -7

$a > 0$ and b not equal to 7

$a < 0$ and b not equal to -7

$a < 0$ and $b = -7$



Correct answer:

$a < 0$ and b not equal to -7

Explanation:

The absolute value will always yield a positive, as long it is not zero. Therefore, b cannot equal -7 . For the value to be positive, a must be a negative number.

What is the absolute value of $19 - 36(3) + 2(4 - 87)$?

Possible Answers:

-168

-255

255

168

293



Correct answer:

255

Explanation:

$$19 - 36(3) + 2(4 - 87) =$$

$$19 - 108 + 2(-83) =$$

$$19 - 108 - 166 = -255$$

Absolute value is the non-negative value of the expression

Solve for z where $|z + 1| < 3$

Possible Answers:

$$-4 < z < 2$$

$$z < 1 \text{ or } z > 3x$$

$$1 < z$$

$$1 < z < 3$$

$$-4 < z$$



Correct answer:

$$-4 < z < 2$$

Explanation:

Absolute value problems generally have two answers:

$z + 1 < 3$ or $z + 1 > -3$ and subtracting 1 from each side gives $z < 2$ or $z > -4$ which becomes $-4 < z < 2$

Find the absolute value of the following when $x = 2$,

$$\left| \frac{x^3 - 12}{2} \right|$$

Possible Answers:

10

-2

-10

2



Correct answer:

2

Explanation:

$$2^3 = 8$$

$$8 - 12 = -4 \text{ and } \frac{-4}{2} = -2$$

It is important to know that the absolute value of something is always positive so the absolute value of -2 is 2

2 is your answer.

Evaluate for $x = 2$:

$$|2x - 18| + |3x - 7|$$

Possible Answers:

13

23

21

15

27



Correct answer:

15

Explanation:

$$\begin{aligned} &|2x - 18| + |3x - 7| \\ &= |2 \cdot 2 - 18| + |3 \cdot 2 - 7| \\ &= |4 - 18| + |6 - 7| \\ &= |-14| + |-1| \\ &= 14 + 1 = 15 \end{aligned}$$

Evaluate for $x = 0.6$:

$$|4x - 1.4| + |x^2 - 1|$$

Possible Answers:

2.36

0.36

0.64

1.36

1.64



Correct answer:

1.64

Explanation:

Substitute 0.6 for x :

$$|4x - 1.4| + |x^2 - 1|$$

$$= |4 \cdot 0.6 - 1.4| + |0.6^2 - 1|$$

$$= |2.4 - 1.4| + |0.36 - 1|$$

$$= |1| + |-0.64|$$

$$= 1 + 0.64$$

$$= 1.64$$

Evaluate for $x = 0.6$:

$$|0.5x - 0.7| - |0.6x - 0.4|$$

Possible Answers:

0.76

1.04

0.36

0.44

0.96



Correct answer:

0.36

Explanation:

Substitute $x = 0.6$.

$$\begin{aligned} &|0.5x - 0.7| - |0.6x - 0.4| \\ &= |0.5 \cdot 0.6 - 0.7| - |0.6 \cdot 0.6 - 0.4| \\ &= |0.3 - 0.7| - |0.36 - 0.4| \\ &= |-0.4| - |-0.04| \\ &= 0.4 - 0.04 = 0.36 \end{aligned}$$

Which of the following sentences is represented by the equation

$$|x + 7| = x - 3$$

Possible Answers:

The absolute value of the sum of a number and seven is three less than the number.

The sum of three and the absolute value of the sum of a number is three less than the number.

None of the other responses are correct.

The absolute value of the sum of a number and seven is three greater than the number.

The sum of three and the absolute value of the sum of a number is three greater than the number.



Correct answer:

The absolute value of the sum of a number and seven is three less than the number.

Explanation:

$|x + 7|$ is the absolute value of $x + 7$, which in turn is the sum of a number and seven and a number. Therefore, $|x + 7|$ can be written as "the absolute value of the sum of a number and seven". Since it is equal to $x - 3$, it is three less than the number, so the equation that corresponds to the sentence is

"The absolute value of the sum of a number and seven is three less than the number."

Define $f(x) = 13x - |x^2 - 7|$ |

Evaluate $f(2)$.

Possible Answers:

17

9

3

5

None of the other responses is correct.



Correct answer:

3

Explanation:

$$f(x) = 13x - |x^2 - 7| |$$

$$f(2) = 13 \cdot 2 - |2^2 - 7| |$$

$$= 13 \cdot 2 - |4 - 7| |$$

$$= 13 \cdot 2 - |-3| |$$

$$= 13 \cdot 2 - 3 |$$

$$= 16 - 3 |$$

$$= 13 |$$

$$= 3$$

Define an operation \blacktriangledown as follows:

For all real numbers a, b ,

$$a\blacktriangledown b = \frac{a+1}{|a|+|b|}$$

Evaluate: $\frac{4}{5}\blacktriangledown\left(-\frac{4}{5}\right)$.

Possible Answers:

$1\frac{1}{8}$

$\frac{5}{8}$

0

None of the other responses is correct.

The expression is undefined.



Correct answer:

$1\frac{1}{8}$

Explanation:

$$a\blacktriangledown b = \frac{a+1}{|a|+|b|}, \text{ or, equivalently,}$$

$$a\blacktriangledown b = (a+1) \div (|a|+|b|)$$

$$\frac{4}{5}\blacktriangledown\left(-\frac{4}{5}\right) = \left(\frac{4}{5}+1\right) \div \left(\left|\frac{4}{5}\right|+\left|-\frac{4}{5}\right|\right)$$

$$= \frac{9}{5} \div \left(\frac{4}{5}+\frac{4}{5}\right)$$

$$= \frac{9}{5} \div \frac{8}{5}$$

$$= \frac{9}{5} \times \frac{5}{8}$$

$$= \frac{9}{8}$$

Define $p(x) = \frac{|x + 2| - 1}{|x + 1| - 2}$.

Evaluate $p\left(-1\frac{1}{5}\right)$.

Possible Answers:

$$\frac{1}{11}$$

$$1$$

$$\frac{1}{9}$$

$$-\frac{1}{9}$$

$$-\frac{1}{11}$$



Correct answer:

$$\frac{1}{9}$$

Define an operation \triangleright as follows:

For all real numbers a, b ,

$$a \triangleright b = \left| a - \frac{1}{2}b \right| + \left| \frac{1}{2}a + b \right|$$

Evaluate $\frac{1}{3} \triangleright 4$.

Possible Answers:

$$1\frac{1}{2}$$

$$2\frac{1}{2}$$

None of the other responses are correct.

$$6\frac{1}{2}$$

$$5\frac{5}{6}$$



Correct answer:

$$5\frac{5}{6}$$

Define $g(x) = ||1,000 - \sqrt{x}| - x^3|$.

Evaluate $g(16)$.

Possible Answers:

5,100

3,092

5,092

The expression is undefined.

3,100



Correct answer:

3,100

Explanation:

$$g(x) = ||1,000 - \sqrt{x}| - x^3|$$

$$g(16) = ||1,000 - \sqrt{16}| - 16^3|$$

$$= ||1,000 - 4| - 16^3|$$

$$= ||996| - 16^3|$$

$$= |996 - 16^3|$$

$$= |996 - 4,096|$$

$$= |-3,100|$$

Define an operation \blacklozenge as follows:

For all real numbers a, b ,

$$a \blacklozenge b = |2a - 2b + 5|$$

Evaluate $(-4) \blacklozenge (-7)$

Possible Answers:

11

None of the other responses are correct.

17

27



Correct answer:

11

Explanation:

$$a \blacklozenge b = |2a - 2b + 5|$$

$$(-4) \blacklozenge (-7) = |2(-4) - 2(-7) + 5|$$

$$= |-8 - (-14) + 5|$$

$$= |-8 + 14 + 5|$$

$$= |11|$$

$$= 11$$

What is the minimum value for x if $|x + 12| = 14$?

Possible Answers:

-26

2

-14

-2

0



Correct answer:

-26

Explanation:

When solving an absolute value equation, you should remember that you can have either a positive or a negative value in the absolute value. So, for instance:

$|x| = 12$ means that x can be either 12 or -12 .

Thus, for this question, you know that $|x + 12| = 14$ can mean:

$$x + 12 = 14$$

$$x + 12 = -14$$

Then, you just solve each and get:

$$x = 2$$

$$x = -26$$

Thus, -26 is the minimum possible value for x .

Simplify $-15 * |5 - 22|$.

Possible Answers:

-405

255

405

-255

17



Correct answer:

-255

Explanation:

Begin by simplifying the contents of the absolute value:

$$-15 * |5 - 22| = -15 * |-17|$$

Remember that the absolute value of a negative number is a positive value. Thus:

$$-15 * |-17| = -15 * 17 = -255$$

What is the largest possible value for x if $4|3x - 5| = 64$?

Possible Answers:

7

64

3

16

0



Correct answer:

7

Explanation:

When solving an absolute value equation, you should remember that you can have either a positive or a negative value in the absolute value. So, for instance:

$|x| = 12$ means that x can be either 12 or -12 .

Thus, for this question, you know that $4|3x - 5| = 64$. Start by dividing by 4 on both sides. This will give you:

$$|3x - 5| = 16$$

Now, from this, we know:

$$3x - 5 = 16$$

$$3x - 5 = -16$$

Solve each equation for x . The first is:

$$3x = 21$$

$$x = 7$$

Evaluate the following expression:

$$|13 - 24 * 2|$$

Possible Answers:

−4.5

4.5

22

−35

35



Correct answer:

35

Explanation:

First use order of operations (PEMDAS which stands for Parentheses, Exponents, Multiplication, Division, Addition, and Subtraction) to evaluate the inner part of the absolute value:

First multiply

$$24 * 2 = 48.$$

Then subtract that from 13.

$$13 - 24 * 2 = 13 - 48 = -35.$$

Absolute value means the distance away from zero, and distance is always positive.

Thus: 35 is the answer

Evaluate the expression if $x = 5$ and $y = 7$.

$$|4x + 3y| - |4x - 3y|$$

Possible Answers:

82

0

-82

42

40



Correct answer:

40

Explanation:

$$|4x + 3y| - |4x - 3y|$$

To solve, we replace each variable with the given value.

$$|4(5) + 3(7)| - |4(5) - 3(7)|$$

$$|20 + 21| - |20 - 21|$$

Simplify. Remember that terms inside of the absolute value are always positive.

$$|41| - |-1| = 41 - 1 = 40$$