Exercise Set I.

(I.1) If we solve the inequality $\left|\frac{2-x}{3}\right| \leq 2$, the solution is an interval of the form $[-a, b]$.
The values of a and b are: **(a)** $a =$ **(b)** $b =$ Solution

(I.2) If we solve the inequality $\left|\frac{3-x}{2}\right| \geq 2$, the solution is an interval of the form $(-\infty, a] \cup [b, \infty)$.
The values of a and b are: **(a)** $a =$ **(b)** $b =$ Solution

(I.3) If we solve the inequality $\left|\frac{2-x}{3}\right| \geq 1$, the solution is the union of intervals of the form $(-\infty, -a] \cup [b, \infty)$. The values of a and b are: **(a)** $a =$ **(b)** $b =$ Solution

(I.4) If we solve the inequality $\left|\frac{1-x}{17}\right| < 1$, the solution is an interval of the form $(-(10+a), 10+b)$. The values of a and b are: **(a)** $a =$ **(b)** $b =$ Solution

(I.5) If we solve the inequalities $-2 \leq \frac{3-x}{2} \leq 2$, the solution is an interval $[-a, b]$, where a and b are positive digits. The values of a and b are: **(a)** $a =$ **(b)** $b =$ Solution

(I.6) If we solve the inequality $\left|\frac{3-x}{2}\right| \geq 1$, the solution is the union of intervals of the form $(-\infty, a] \cup [b, \infty)$. The values of a and b are: **(a)** $a =$ **(b)** $b =$ Solution

(I.7) If we solve the inequality $\left|\frac{5-x}{4}\right| \geq 1$, the solution is the union of intervals of the form $(-\infty, a] \cup [b, \infty)$. The values of a and b are: **(a)** $a =$ **(b)** $b =$ Solution

(I.8) If we solve the inequalities $-2 \leq \frac{x-5}{2} \leq 2$, the solution is an interval $[a, b]$, where a and b are positive digits. The values of a and b are: **(a)** $a =$ **(b)** $b =$ Solution

(I.9) If we solve the inequality $|2x - 11| < 5$, the solution is an interval of the form (a, b). The values of a and b are:

(a) $a =$ **(b)** $b =$ Solution

Solution Set I.

(I.1) Solution:

Back to Questions

$$\left|\frac{2-x}{3}\right| \leq 2 \Leftrightarrow$$

Solution Set I.

(I.1) **Solution:**

Back to Questions

$$\left|\frac{2-x}{3}\right| \leq 2 \Leftrightarrow$$

$$\frac{|2-x|}{|3|} \leq 2 \Leftrightarrow$$

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(I.1) Solution:

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$$3\frac{|2-x|}{3} \le 3(2) \Leftrightarrow$$

Solution Set I.

(I.1) Solution:

Back to Questions

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$$|2-x| \le 6,$$

Solution Set I.

(I.1) Solution:

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$$\left|\frac{2-x}{3}\right| \leq 2 \Leftrightarrow$$

$$\frac{|2-x|}{|3|} \leq 2 \Leftrightarrow$$

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$$3\frac{|2-x|}{3} \leq 3(2) \Leftrightarrow$$

$|2-x| \leq 6$, so the inequality is satisfied by all numbers within 6 units of 2, therefore the solution is

Solution Set I.

(I.1) Solution:

Back to Questions

$$\left|\frac{2-x}{3}\right| \leq 2 \Leftrightarrow$$

$$\frac{|2-x|}{|3|} \leq 2 \Leftrightarrow$$

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$$3\frac{|2-x|}{3} \leq 3(2) \Leftrightarrow$$

$|2-x| \leq 6$, so the inequality is satisfied by all numbers within 6 units of 2, therefore the solution is

$(2-6, 2+6) =$

Solution Set I.

(I.1) Solution:

Back to Questions

$$\left|\frac{2-x}{3}\right| \leq 2 \Leftrightarrow$$

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$$\frac{|2-x|}{3} \leq 2 \Leftrightarrow$$

$$3\frac{|2-x|}{3} \leq 3(2) \Leftrightarrow$$

$|2-x| \leq 6$, so the inequality is satisfied by all numbers within 6 units of 2, therefore the solution is

$(2-6, 2+6) =$ $(-4, 8)$

(a)

Solution Set I.

(I.1) Solution:

Back to Questions

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$|2-x| \leq 6$, so the inequality is satisfied by all numbers within 6 units of 2, therefore the solution is

$(2-6, 2+6) = (-4, 8)$

(a) $a = 4$ **(b)**

Solution Set I.

(I.1) Solution:

Back to Questions

$$\left|\frac{2-x}{3}\right| \leq 2 \Leftrightarrow$$

$$\frac{|2-x|}{|3|} \leq 2 \Leftrightarrow$$

$$\frac{|2-x|}{3} \leq 2 \Leftrightarrow$$

$$3\frac{|2-x|}{3} \leq 3(2) \Leftrightarrow$$

$|2-x| \leq 6$, so the inequality is satisfied by all numbers within 6 units of 2, therefore the solution is

$(2-6, 2+6) =$ $(-4, 8)$

(a) $a = 4$ **(b)** $b = 8$

(I.2) **Solution:**

Back to Questions

$$\left|\frac{3-x}{2}\right| \geq 2 \Leftrightarrow$$

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Back to Questions

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(I.2) **Solution:**

Back to Questions

$$\left|\frac{3-x}{2}\right| \geq 2 \Leftrightarrow$$

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$$\frac{|3-x|}{2} \geq 2 \Leftrightarrow$$

$$2\frac{|3-x|}{2} \geq 2(2) \Leftrightarrow$$

(I.2) **Solution:**

Back to Questions

$$\left|\frac{3-x}{2}\right| \geq 2 \Leftrightarrow$$

$$\frac{|3-x|}{|2|} \geq 2 \Leftrightarrow$$

$$\frac{|3-x|}{2} \geq 2 \Leftrightarrow$$

$$2\frac{|3-x|}{2} \geq 2(2) \Leftrightarrow$$

$|3-x| \geq 4$, so the inequality is satisfied by all numbers further than 4 units from 3, so the solution is

$(-\infty, 3-4) \cup (3+4, \infty) =$

(I.2) **Solution:**

Back to Questions

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$|3-x| \geq 4$, so the inequality is satisfied by all numbers further than 4 units from 3, so the solution is

$(-\infty, 3-4) \cup (3+4, \infty) =$ $(-\infty, -1) \cup (7, \infty)$

(a)

(I.2) Solution:

Back to Questions

$$\left|\frac{3-x}{2}\right| \geq 2 \Leftrightarrow$$

$$\frac{|3-x|}{|2|} \geq 2 \Leftrightarrow$$

$$\frac{|3-x|}{2} \geq 2 \Leftrightarrow$$

$$2\frac{|3-x|}{2} \geq 2(2) \Leftrightarrow$$

$|3-x| \geq 4$, so the inequality is satisfied by all numbers further than 4 units from 3, so the solution is

$(-\infty, 3-4) \cup (3+4, \infty) =$ $(-\infty, -1) \cup (7, \infty)$

(a) $a = 1$ **(b)**

(I.2) Solution:

Back to Questions

$\left|\dfrac{3-x}{2}\right| \geq 2 \Leftrightarrow$

$\dfrac{|3-x|}{|2|} \geq 2 \Leftrightarrow$

$\dfrac{|3-x|}{2} \geq 2 \Leftrightarrow$

$2\dfrac{|3-x|}{2} \geq 2(2) \Leftrightarrow$

$|3-x| \geq 4$, so the inequality is satisfied by all numbers further than 4 units from 3, so the solution is

$(-\infty, 3-4) \cup (3+4, \infty) = (-\infty, -1) \cup (7, \infty)$

(a) $a = 1$ **(b)** $b = 7$

Back to Questions

(I.3) **Solution:**

$\frac{|x-2|}{3} \geq 1$ is equivalent to $|x-2| \geq 3$ so the distance of x from 2 must be greater than or equal to 3.

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(I.3) **Solution:**

$\dfrac{|x-2|}{3} \geq 1$ is equivalent to $|x-2| \geq 3$ so the distance of x from 2 must be greater than or equal to 3. This means that x must lie at least 3 units to left of 2, i.e., to the left of -1, or at least 3 units to the right of 2, i.e., to the right of 5.

Back to Questions

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$\frac{|x-2|}{3} \geq 1$ is equivalent to $|x-2| \geq 3$ so the distance of x from 2 must be greater than or equal to 3. This means that x must lie at least 3 units to left of 2, i.e., to the left of -1, or at least 3 units to the right of 2, i.e., to the right of 5. Thus the set of numbers which satisfies the given inequality is

Back to Questions

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$(-\infty, 2-3] \cup [2+3, \infty)$

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$(-\infty, 2-3] \cup [2+3, \infty)$ $(-\infty, 1] \cup [5, \infty)$

(a) $a =$

Back to Questions

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$(-\infty, 2-3] \cup [2+3, \infty)$ $(-\infty, 1] \cup [5, \infty)$

(a) $a =$ 1 **(b)** $b =$

Back to Questions

(I.3) Solution:

$\frac{|x-2|}{3} \geq 1$ is equivalent to $|x-2| \geq 3$ so the distance of x from 2 must be greater than or equal to 3. This means that x must lie at least 3 units to left of 2, i.e., to the left of -1, or at least 3 units to the right of 2, i.e., to the right of 5. Thus the set of numbers which satisfies the given inequality is
$(-\infty, 2-3] \cup [2+3, \infty)$ $(-\infty, 1] \cup [5, \infty)$

(a) $a =$ 1 **(b)** $b =$ 5

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(I.4) Solution:

The inequality is equivalent to $|x - 1| < 17$, satisfied by the set of all numbers within 17 of 1, so the solution set is $(1 - 17, 1 + 17) =$

Back to Questions

(I.4) Solution:

The inequality is equivalent to $|x - 1| < 17$, satisfied by the set of all numbers within 17 of 1, so the solution set is $(1 - 17, 1 + 17) =$ $(-16, 18)$. Thus we have:

(a) $a =$

Back to Questions

(I.4) **Solution:**

The inequality is equivalent to $|x - 1| < 17$, satisfied by the set of all numbers within 17 of 1, so the solution set is $(1 - 17, 1 + 17) =$ $(-16, 18)$. Thus we have:

(a) $a =$ 6 **(b)** $b =$

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(I.4) Solution:

The inequality is equivalent to $|x - 1| < 17$, satisfied by the set of all numbers within 17 of 1, so the solution set is $(1 - 17, 1 + 17) = (-16, 18)$. Thus we have:

(a) $a = 6$ **(b)** $b = 8$

Back to Questions

(I.5) **Solution:**

$$-2 \leq \frac{3-x}{2} \leq 2$$

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(I.5) **Solution:**

$$-2 \le \frac{3-x}{2} \le 2$$

$$\iff -4 \le 3 - x \le 4$$

Back to Questions

(I.5) **Solution:**

$$-2 \leq \frac{3-x}{2} \leq 2$$

$$\iff -4 \leq 3 - x \leq 4$$

$$\iff -7 \leq -x \leq 1$$

Back to Questions

(I.5) **Solution:**

$$-2 \leq \frac{3-x}{2} \leq 2$$

$$\Longleftrightarrow -4 \leq 3 - x \leq 4$$

$$\Longleftrightarrow -7 \leq -x \leq 1$$

$$\Longleftrightarrow -1 \leq x \leq 7$$

(a) $a =$

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(I.5) **Solution:**

$$-2 \leq \frac{3-x}{2} \leq 2$$

$$\iff -4 \leq 3 - x \leq 4$$

$$\iff -7 \leq -x \leq 1$$

$$\iff -1 \leq x \leq 7$$

(a) $a =$ 1 **(b)** $b =$

Back to Questions

(I.5) **Solution:**

$$-2 \leq \frac{3-x}{2} \leq 2$$

$$\iff -4 \leq 3 - x \leq 4$$

$$\iff -7 \leq -x \leq 1$$

$$\iff -1 \leq x \leq 7$$

(a) $a = 1$ **(b)** $b = 7$

Back to Questions

(I.6) **Solution:**

$|3 - x| \geq 2$ is satisfied by all numbers a distance at least 2 away from 3,

Back to Questions

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$|3 - x| \geq 2$ is satisfied by all numbers a distance at least 2 away from 3,

so the solution is $(-\infty, 3 - 2] \cup [3 + 2, \infty)$=

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(I.6) **Solution:**

$|3 - x| \geq 2$ is satisfied by all numbers a distance at least 2 away from 3,

so the solution is $(-\infty, 3 - 2] \cup [3 + 2, \infty)$= $(-\infty, 1] \cup [5, \infty)$

(a) $a =$

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(I.6) Solution:

$|3 - x| \geq 2$ is satisfied by all numbers a distance at least 2 away from 3,

so the solution is $(-\infty, 3-2] \cup [3+2, \infty) =$ $(-\infty, 1] \cup [5, \infty)$

(a) $a = 1$ **(b)** $b =$

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(I.6) **Solution:**

$|3 - x| \geq 2$ is satisfied by all numbers a distance at least 2 away from 3, so the solution is $(-\infty, 3-2] \cup [3+2, \infty) = (-\infty, 1] \cup [5, \infty)$

(a) $a = 1$ **(b)** $b = 5$

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(I.7) **Solution:**

$|5 - x| \geq 4$ is satisfied by all numbers a distance at least 4 away from 5,

Back to Questions

(I.7) Solution:

$|5 - x| \geq 4$ is satisfied by all numbers a distance at least 4 away from 5,

so the solution is $(-\infty, 5 - 4] \cup [5 + 4, \infty)$=

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(I.7) Solution:

$|5 - x| \geq 4$ is satisfied by all numbers a distance at least 4 away from 5,

so the solution is $(-\infty, 5-4] \cup [5+4, \infty) = (-\infty, 1] \cup [9, \infty)$

(a) $a =$

Back to Questions

(I.7) **Solution:**

$|5 - x| \geq 4$ is satisfied by all numbers a distance at least 4 away from 5, so the solution is $(-\infty, 5 - 4] \cup [5 + 4, \infty) = (-\infty, 1] \cup [9, \infty)$

(a) $a = 1$ **(b)** $b =$

Back to Questions

(I.7) Solution:

$|5 - x| \geq 4$ is satisfied by all numbers a distance at least 4 away from 5,

so the solution is $(-\infty, 5-4] \cup [5+4, \infty)$= $(-\infty, 1] \cup [9, \infty)$

(a) a = 1 **(b)** b = 9

Back to Questions

(I.8) **Solution:**

$-2 \leq \dfrac{x-5}{2} \leq 2 \iff$

$-4 \leq x - 5 \leq 4 \iff$

$1 \leq x \leq 9$, so the interval is

Back to Questions

(I.8) **Solution:**

$-2 \leq \dfrac{x-5}{2} \leq 2 \iff$

$-4 \leq x - 5 \leq 4 \iff$

$1 \leq x \leq 9$, so the interval is (1,9)

(a) $a =$

Back to Questions

(I.8) Solution:

$-2 \leq \dfrac{x-5}{2} \leq 2 \iff$

$-4 \leq x - 5 \leq 4 \iff$

$1 \leq x \leq 9$, so the interval is (1,9)

(a) $a =$ 1 **(b)** $b =$

Back to Questions

(I.8) Solution:

$-2 \leq \dfrac{x-5}{2} \leq 2 \iff$

$-4 \leq x - 5 \leq 4 \iff$

$1 \leq x \leq 9$, so the interval is $(1,9)$

(a) $a = 1$ **(b)** $b = 9$

(I.9) **Solution:**

Back to Questions

$|2x - 11| < 5 \iff$

$2\left|x - \frac{11}{2}\right| < 5 \iff$

$\left|x - \frac{11}{2}\right| < \frac{5}{2} \iff$

$\frac{11}{2} - \frac{5}{2} < x < \frac{11}{2} + \frac{5}{2} \iff$

$\frac{6}{2} < x < \frac{16}{2} \iff$

$3 < x < 8$, so the interval is

(I.9) **Solution:**

Back to Questions

$|2x - 11| < 5 \iff$

$2\left|x - \frac{11}{2}\right| < 5 \iff$

$\left|x - \frac{11}{2}\right| < \frac{5}{2} \iff$

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$\frac{6}{2} < x < \frac{16}{2} \iff$

$3 < x < 8$, so the interval is (3,8)

(a) $a =$

(I.9) Solution:

Back to Questions

$|2x - 11| < 5 \iff$

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$\frac{6}{2} < x < \frac{16}{2} \iff$

$3 < x < 8$, so the interval is (3,8)

(a) $a =$ 3 **(b)** $b =$

(I.9) Solution:

Back to Questions

$$|2x - 11| < 5 \iff$$

$$2\left|x - \frac{11}{2}\right| < 5 \iff$$

$$\left|x - \frac{11}{2}\right| < \frac{5}{2} \iff$$

$$\frac{11}{2} - \frac{5}{2} < x < \frac{11}{2} + \frac{5}{2} \iff$$

$$\frac{6}{2} < x < \frac{16}{2} \iff$$

$3 < x < 8$, so the interval is (3,8)

(a) $a =$ 3 **(b)** $b =$ 8