### Question No. 1 of 10

**Instructions:**
1. Read the problem and answer choices carefully.
2. Work the problems on paper as needed.
3. Pick the answer.
4. Go back to review the core concept tutorial as needed.

#### Question

1. Solve for $x$ in quadratic equation $2x^2 - 3x - 2 = 0$.

   - (A) $x = \{-\frac{1}{2}, 2\}$
   - (B) $x = \{\frac{1}{2}, 1\}$
   - (C) $x = \{2, 3\}$
   - (D) $x = \{-1, 0\}$
   - (E) $x = \{-3, -2\}$

#### Feedback

A. Correct!
This is the solution set of the given equation.

B. Incorrect!
If we replace $x$ with $\frac{1}{2}$ or 1, the quadratic equation will not equal 0.

C. Incorrect!
If we replace $x$ with 2 or 3, the quadratic equation will not equal 0.

D. Incorrect!
If we replace $x$ with 0 or 1, the quadratic equation will not equal 0.

E. Incorrect!
If we replace $x$ with -3 or -2, the quadratic equation will not equal 0.

#### Solution

To solve the equation apply the quadratic formula.

$2x^2 - 3x - 2 = 0$

$$x = \frac{-(-3)\pm\sqrt{(-3)^2-4(2)(-2)}}{2(2)}$$

$$= \frac{3\pm\sqrt{9+16}}{4}$$

$$= \frac{3\pm\sqrt{25}}{4}$$

$$= \frac{3\pm5}{4}$$

$$x = \frac{3+5}{4} = \frac{8}{4} = 2 \quad \text{or} \quad x = \frac{3-5}{4} = \frac{-2}{4} = -\frac{1}{2}$$

The solution set of this equation is $x = \{-\frac{1}{2}, 2\}$.

(A) $x = \{-\frac{1}{2}, 2\}$
Question No. 2 of 10

**Instructions:** (1) Read the problem and answer choices carefully (2) Work the problems on paper as needed (3) Pick the answer (4) Go back to review the core concept tutorial as needed.

<table>
<thead>
<tr>
<th>Question</th>
<th>2. Solve for ( x ) in quadratic equation ( 2x^2 - 2x - 1 = 0 ).</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(A) ( x = {-\frac{1}{2}, 2} )</td>
</tr>
<tr>
<td></td>
<td>(B) ( x = \left{ \frac{1 + \sqrt{3}}{2}, \frac{1 - \sqrt{3}}{2} \right} )</td>
</tr>
<tr>
<td></td>
<td>(C) ( x = {-2\sqrt{3}, 2\sqrt{3}} )</td>
</tr>
<tr>
<td></td>
<td>(D) ( x = {-1, 0} )</td>
</tr>
<tr>
<td></td>
<td>(E) ( x = {-1, 2} )</td>
</tr>
</tbody>
</table>

| Feedback | A. Incorrect! Apply the quadratic formula to get the roots. |
|          | B. Correct! This is the solution set of the given equation. |
|          | C. Incorrect! Apply the quadratic formula to get the roots. |
|          | D. Incorrect! Apply the quadratic formula to get the roots. |
|          | E. Incorrect! Apply the quadratic formula to get the roots. |

<table>
<thead>
<tr>
<th>Solution</th>
<th>Apply the quadratic formula to solve the equation. ( 2x^2 - 2x - 1 = 0 )</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>( x = \frac{-(-2) \pm \sqrt{(-2)^2 - 4(2)(-1)}}{2(2)} )</td>
</tr>
<tr>
<td></td>
<td>( = \frac{2 \pm \sqrt{4 + 8}}{4} )</td>
</tr>
<tr>
<td></td>
<td>( = \frac{2 \pm \sqrt{12}}{4} )</td>
</tr>
<tr>
<td></td>
<td>( = \frac{2 \pm 2\sqrt{3}}{4} )</td>
</tr>
<tr>
<td></td>
<td>( = \frac{1 \pm \sqrt{3}}{2} )</td>
</tr>
<tr>
<td></td>
<td>( (B) \ x = {(1 + \sqrt{3})/2, (1 - \sqrt{3})/2} )</td>
</tr>
</tbody>
</table>
**Question No. 3 of 10**

**Instructions:** (1) Read the problem and answer choices carefully  
(2) Work the problems on paper as needed  
(3) Pick the answer  
(4) Go back to review the core concept tutorial as needed.

<table>
<thead>
<tr>
<th>Question</th>
<th>3. Find the domain of the rational equation.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>[ y = \frac{x-2}{x^2-2x-3} ]</td>
</tr>
</tbody>
</table>
|          | (A) \( x \neq \{-3, 1\} \)  
(B) \( x \neq -4 \)  
(C) \( x \neq \{-3, -1\} \)  
(D) \( x \neq \{-1, 3\} \)  
(E) \( x \neq \{2, 3\} \) |

| Feedback | A. Incorrect!  
If we replace \( x \) with 1, the denominator will not equal 0. |
|----------|--------------------------------------------------|
|          | B. Incorrect!  
If we replace \( x \) with -4, the denominator will not equal 0. |
|          | C. Incorrect!  
If we replace \( x \) with -3, the denominator will not equal 0. |
|          | D. Correct!  
The domain of this equation is all real numbers excluding -1 and 3. |
|          | E. Incorrect!  
If we replace \( x \) with 2, the denominator will not equal 0. |

| Solution | A rational equation is undefined at the values where the denominator is equal to 0.  
Apply the quadratic formula to find the values where the denominator equals 0.  
\[ x^2 - 2x - 3 = 0 \]  
\[ x = \frac{-(-2) \pm \sqrt{(-2)^2-4(1)(-3)}}{2(1)} \]  
\[ = \frac{2 \pm \sqrt{4+12}}{2} \]  
\[ = \frac{2 \pm \sqrt{16}}{2} \]  
\[ = \frac{2 \pm 4}{2} \]  
\[ = 3 \text{ and } -1 \]  
This equation is undefined at \( x = -1 \) and \( x = 3 \). Therefore, the domain of this equation is \( x \neq \{-1, 3\} \). |
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(D) ( x \neq {-1, 3} )</td>
</tr>
</tbody>
</table>
### Question 4 of 10

**Instructions:**
1. Read the problem and answer choices carefully.
2. Work the problems on paper as needed.
3. Pick the answer.
4. Go back to review the core concept tutorial as needed.

**Question:**
Solve for $x$ in the given equation when $y = 0$.

$$y = \frac{x^2 - x - 2}{x^2 + 2x - 3}$$

(A) $x = \{-1, 2\}$
(B) $x = \{-2, -1\}$
(C) $x = \{-3, 1\}$
(D) $x = -4$
(E) $x = \{-1, 3\}$

**Feedback**

A. Correct!
If we replace $x$ with -1 or 2, the numerator of the equation will equal 0.

B. Incorrect!
If we replace $x$ with -2, the numerator will not equal 0.

C. Incorrect!
If we replace $x$ with -3 or 1, the numerator will not equal 0.

D. Incorrect!
If we replace $x$ with -4, the numerator will not equal 0.

E. Incorrect!
If we replace $x$ with 3, the numerator will not equal 0.

**Solution**

A rational equation is equal to 0 when the numerator is equal to 0. Set the numerator equal to 0 and apply the quadratic formula to solve.

$$x^2 - x - 2 = 0$$

$$x = \frac{-(-1)\pm\sqrt{(-1)^2-4(1)(-2)}}{2(1)}$$

$$x = \frac{1\pm\sqrt{1+8}}{2}$$

$$x = \frac{1\pm\sqrt{9}}{2}$$

$$x = \frac{1\pm3}{2}$$

$$x = 2 \text{ and } -1$$

This equation equals 0 at $x = -1$ and $x = 2$.

(A) $x = \{-1, 2\}$
Question No. 5 of 10

**Instructions:** (1) Read the problem and answer choices carefully (2) Work the problems on paper as needed (3) Pick the answer (4) Go back to review the core concept tutorial as needed.

<table>
<thead>
<tr>
<th>Question</th>
<th>5. Find the solution set for the quadratic inequality $x^2 - 4x &gt; 0$.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(A) $x &lt; 0$ or $x &gt; 4$</td>
</tr>
<tr>
<td></td>
<td>(B) $0 &lt; x &lt; 4$</td>
</tr>
<tr>
<td></td>
<td>(C) $x &lt; 0$</td>
</tr>
<tr>
<td></td>
<td>(D) $x &gt; 4$</td>
</tr>
<tr>
<td></td>
<td>(E) $x &lt; 2$</td>
</tr>
</tbody>
</table>

**Feedback**

A. Correct!
The solution of this inequality is $x < 0$ or $x > 4$, which will make the quadratic expression on the left greater than zero.

B. Incorrect!
This solution set does not make the inequality a true statement.

C. Incorrect!
This solution set does not make the inequality a true statement.

D. Incorrect!
This solution set does not make the inequality a true statement.

E. Incorrect!
This solution set does not make the inequality a true statement.

**Solution**

Factor the left side of the inequality and set each factor equal to zero.

$x^2 - 4x > 0$

$x(x - 4) > 0$

$x = 0$ and $x - 4 = 0$

$x = 0$ and $4$

The inequality is true when $x < 0$ or $x > 4$. Therefore, the solution is $(-\infty, 0)$ or $(4, \infty)$.

(A) $x < 0$ or $x > 4$
### Question No. 6 of 10

**Instructions:**
(1) Read the problem and answer choices carefully
(2) Work the problems on paper as needed
(3) Pick the answer
(4) Go back to review the core concept tutorial as needed.

<table>
<thead>
<tr>
<th>Question</th>
<th>6. Which interval represents the solution of ( x^2 - x - 12 &lt; 0 )?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(A) ((-\infty, -3) ) or ((4, \infty))</td>
</tr>
<tr>
<td></td>
<td>(B) ((-\infty, -4) ) or ((3, \infty))</td>
</tr>
<tr>
<td></td>
<td>(C) ((-3, 4))</td>
</tr>
<tr>
<td></td>
<td>(D) ((-4, 3))</td>
</tr>
<tr>
<td></td>
<td>(E) ((3, 4))</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Feedback</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Incorrect!</td>
<td>This solution set does not make the inequality true.</td>
</tr>
<tr>
<td>B. Incorrect!</td>
<td>This solution set does not make the inequality true.</td>
</tr>
<tr>
<td>C. Correct!</td>
<td>This interval makes the inequality true.</td>
</tr>
<tr>
<td>D. Incorrect!</td>
<td>This solution set does not make the inequality true.</td>
</tr>
<tr>
<td>E. Incorrect!</td>
<td>This solution set does not make the inequality true.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Solution</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Factor the left side of the quadratic inequality.</td>
<td></td>
</tr>
<tr>
<td>( x^2 - x - 12 &lt; 0 )</td>
<td></td>
</tr>
<tr>
<td>((x - 4)(x + 3) &lt; 0)</td>
<td></td>
</tr>
<tr>
<td>( x = 4 ) or ( x = -3 )</td>
<td></td>
</tr>
<tr>
<td>The inequality is true when (-3 &lt; x &lt; 4). Therefore, the solution is ((-3, 4)).</td>
<td></td>
</tr>
<tr>
<td><strong>(C) ((-3, 4))</strong></td>
<td></td>
</tr>
</tbody>
</table>
### Question No. 7 of 10

**Instructions:**
1. Read the problem and answer choices carefully
2. Work the problems on paper as needed
3. Pick the answer
4. Go back to review the core concept tutorial as needed.

<table>
<thead>
<tr>
<th>Question</th>
<th>Feedback</th>
<th>Solution</th>
</tr>
</thead>
</table>
| 7. Factor the quadratic equation \( x^2 + 3x - 10 = 0 \). | **A. Correct!**
Multiplying these binomials will result in the original equation. |
| | **B. Incorrect!**
Multiplying these binomials will not result in the original equation. |
| | **C. Incorrect!**
Multiplying these binomials will not result in the original equation. |
| | **D. Incorrect!**
Multiplying these binomials will not result in the original equation. |
| | **E. Incorrect!**
Multiplying these binomials will not result in the original equation. |
| | **Multiplying (x + 5) and (x - 2) will result in the original equation.** |
| | \( (x + 5)(x - 2) = 0 \) |
| | \( x^2 - 2x + 5x - 10 = 0 \) |
| | \( x^2 + 3x - 10 = 0 \) |
| | **(A) \( (x + 5)(x - 2) = 0 \)** |
8. Find all the real solutions of the equation \(2(x - 2)^2 - 6 = -2\).

   (A) no real solutions
   (B) \(x = \{-2, 2\}\)
   (C) \(x = -2\)
   (D) \(x = \{-4, 4\}\)
   (E) \(x = 2 \pm \sqrt{2}\)

**Feedback**

A. Incorrect! This equation has real solutions.

B. Incorrect! Substituting these values into the equation returns a false statement.

C. Incorrect! Substituting these values into the equation returns a false statement.

D. Incorrect! Substituting these values into the equation returns a false statement.

E. Correct! These are the real solutions of this equation.

**Solution**

Isolate the squared binomial and use the square root method to find the solutions.

\[
2(x - 2)^2 - 6 = -2
\]
\[
2(x - 2)^2 - 6 + 6 = -2 + 6
\]
\[
2(x - 2)^2 = 4
\]
\[
(x - 2)^2 = 2
\]
\[
x - 2 = \pm \sqrt{2}
\]
\[
x = 2 \pm \sqrt{2}
\]

(E) \(x = 2 \pm \sqrt{2}\)
Question No. 9 of 10

**Instructions:** (1) Read the problem and answer choices carefully (2) Work the problems on paper as needed (3) Pick the answer (4) Go back to review the core concept tutorial as needed.

| Question | The following graph represents the function $y = 3x^2 + x - 2$. Determine the roots of the equation.

(A) $x = \{1, 0\}$  
(B) $x = \{-1, 1\}$  
(C) $x = \{-1, \frac{2}{3}\}$  
(D) $x = \{-1, \frac{1}{2}\}$  
(E) No real roots

| Feedback | A. Incorrect!  
The roots are given by the $x$-intercepts point.

B. Incorrect!  
The roots are given by the $x$-intercepts point.

C. Correct!  
The roots are given by the $x$-intercepts point.

D. Incorrect!  
The roots are given by the $x$-intercepts point.

E. Incorrect!  
The roots are given by the $x$-intercepts point.

| Solution | The roots of $3x^2 + x - 2 = 0$ are given by the $x$-intercepts. The $x$-intercepts are $(-1, 0)$ and $(2/3, 0)$.  
(C) $x = \{-1, 2/3\}$ |
**Question No. 10 of 10**

**Instructions:** (1) Read the problem statement and answer choices carefully (2) Work the problems on paper as needed (3) Pick the answer (4) Go back to review the core concept tutorial as needed.

**Question 10.** The points (-1, 0), (3, 4), (1, -2), (2, 0), and (-2, 4) are on the graph of \( f(x) = x^2 - x - 2 \). Which of these responses gives the roots of equation \( x^2 - x - 2 = 0 \)?

- (A) \( x = \{-1, 3\} \)
- (B) \( x = \{-2, -1\} \)
- (C) \( x = \{-2, 2\} \)
- (D) \( x = \{-1, 2\} \)
- (E) No real roots

**Feedback**

A. Incorrect!
The roots are given by the \( x \)-intercepts point.

B. Incorrect!
The roots are given by the \( x \)-intercepts point.

C. Incorrect!
The roots are given by the \( x \)-intercepts point.

D. Correct!
The roots are given by the \( x \)-intercepts point.

E. Incorrect!
The roots are given by the \( x \)-intercepts point.

**Solution**
The two points (-1, 0) and (2, 0) are the \( x \)-intercepts and they give the roots of the given equation. The roots are \( x = -1 \) and \( x = 2 \).

(D) \( x = \{-1, 2\} \)