Topic: Simple equations

Question: Solve for the variable.

$$x + 5 = 10$$

Answer choices:

A $x = 5$

B $x = 10$

C $x = 15$

D $x = 20$

Solution: A

We need to get x by itself on the left-hand side. In order to do that, we'll subtract 5 from both sides in order to move the 5 over to the right-hand side. Remember, in order to keep the equation balanced, everything we do to one side of the equation must also be done to the other side.

$$x + 5 - 5 = 10 - 5$$

$$x + 0 = 5$$

0 is the identity number for addition and subtraction, which means that you can add 0 to anything or subtract 0 from anything, and you don't change the value (the identity) of the original thing. Which means that $x + 0$ is just x, because adding 0 to x doesn't change its identity.

$$x = 5$$

Topic: Simple equations

Question: Solve for the variable.

$$4x + 2 = 10$$

Answer choices:

A $x = 4$

B $x = 2$

C $x = 8$

D $x = 10$

Solution: B

We need to get x by itself on the left-hand side. In order to do that, we'll first subtract 2 from both sides in order to move the 2 over to the right-hand side. Remember, in order to keep the equation balanced, everything we do to one side of the equation must also be done to the other side.

$$4x + 2 - 2 = 10 - 2$$

$$4x + 0 = 8$$

0 is the identity number for addition and subtraction, which means that you can add 0 to anything or subtract 0 from anything, and you don't change the value (the identity) of the original thing. Which means that $4x + 0$ is just $4x$, because adding 0 to $4x$ doesn't change its identity.

$$4x = 8$$

We don't yet have x by itself; it's still multiplied by 4. In order to get rid of the 4, we need to perform the inverse operation of multiplication, which means we need to divide by 4. As always, we'll have to do this to both sides of the equation.

$$\frac{4x}{4} = \frac{8}{4}$$

$$1 \cdot x = 2$$

1 is the identity number for multiplication and division, which means that you can multiply or divide by 1, and you don't change the value (the identity). Which means that $1 \cdot x$ is just x, because multiplying by 1 doesn't change its identity.

$x = 2$

Topic: Simple equations

Question: Solve for the variable.

$$-3x + 4 = 16$$

Answer choices:

A $x = 4$

B $x = -4$

C $x = 12$

D $x = 3$

Solution: B

We need to get x by itself on the left-hand side. In order to do that, we'll first subtract 4 from both sides in order to move the 4 over to the right-hand side. Remember, in order to keep the equation balanced, everything we do to one side of the equation must also be done to the other side.

$$-3x + 4 - 4 = 16 - 4$$

$$-3x + 0 = 12$$

0 is the identity number for addition and subtraction, which means that you can add 0 to anything or subtract 0 from anything, and you don't change the value (the identity) of the original thing. Which means that $-3x + 0$ is just $-3x$, because adding 0 to $-3x$ doesn't change its identity.

$$-3x = 12$$

We don't yet have x by itself; it's still multiplied by -3. In order to get rid of the -3, we need to perform the inverse operation of multiplication, which means we need to divide by -3. As always, we'll have to do this to both sides of the equation.

$$\frac{-3x}{-3} = \frac{12}{-3}$$

$$1 \cdot x = -4$$

1 is the identity number for multiplication and division, which means that you can multiply or divide by 1, and you don't change the value (the identity). Which means that $1 \cdot x$ is just x, because multiplying by 1 doesn't change its identity.

$x = -4$