Question ID 635e58a2

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Algebra	Linear equations in one variable	Medium

ID: 635e58a2

If $9(4-3x)+2=8(4-3x)+18$, what is the value of $4-3x$?

A. -16

B. -4

C. 4

D. 16

ID: 635e58a2 Answer

Correct Answer: D

Rationale

Choice D is correct. The value of $4-3x$ can be found by isolating this expression in the given equation. Subtracting 2 from both sides of the given equation yields $9(4-3x)=8(4-3x)+16$. Subtracting $8(4-3x)$ from both sides of this equation yields $9(4-3x)-8(4-3x)=16$, which gives $1(4-3x)=16$, or $4-3x=16$. Therefore, the value of $4-3x$ is 16.

Choice A is incorrect and may result from conceptual or calculation errors.

Choice B is incorrect. This is the value of x, not $4-3x$.

Choice C is incorrect and may result from conceptual or calculation errors.

Question Difficulty: Medium

Question ID 953ee38d

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Algebra	Linear equations in one variable	Medium

ID: 953ee38d

A bowl contains 20 ounces of water. When the bowl is uncovered, the amount of water in the bowl decreases by 1 ounce every 4 days. If 9 ounces of water remain in this bowl, for how many days has it been uncovered?

A. 3

B. 7

C. 36

D. 44

ID: 953ee38d Answer

Correct Answer: D

Rationale

Choice D is correct. It's given that the bowl starts with 20 ounces of water and has 9 ounces of water remaining after a period of time has passed. The amount of water the bowl has lost during the time period can be found by subtracting the remaining amount of water from the amount of water the bowl starts with, which yields $20 - 9$ ounces, or 11 ounces. This means the bowl loses 11 ounces of water during that period of time. It's given that the amount of water decreases by 1 ounce every 4 days. Letting t represent the number of days the bowl has been uncovered, it follows that $\frac{1}{4} = \frac{11}{t}$. Multiplying both sides of this equation by $4t$ yields $t = 44$. Therefore, the bowl has been uncovered for 44 days.

Choice A is incorrect and may result from conceptual or calculation errors.

Choice B is incorrect and may result from conceptual or calculation errors.

Choice C is incorrect. This is the value of t for the equation $\frac{1}{4} = \frac{9}{t}$, not $\frac{1}{4} = \frac{11}{t}$.

Question Difficulty: Medium

Question ID a25615ce

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Algebra	Linear equations in one variable	Medium

ID: a25615ce

A line segment that has a length of 115 centimeters (cm) is divided into three parts. One part is 47 cm long. The other two parts have lengths that are equal to each other. What is the length, in cm, of one of the other two parts of equal length?

ID: a25615ce Answer

Correct Answer: 34

Rationale

The correct answer is 34. It's given that a line segment has a length of 115 cm and is divided into three parts, where one part is 47 cm long and the other two parts have lengths that are equal. If x represents the length, in cm, of each of the two parts of equal length, then the equation $47 + x + x = 115$, or $47 + 2x = 115$, represents this situation. Subtracting 47 from each side of this equation yields $2x = 68$. Dividing each side of this equation by 2 yields $x = 34$. Therefore, the length, in cm, of one of the two parts of equal length is 34.

Question Difficulty: Medium

Question ID b728de55

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Algebra	Linear equations in one variable	Medium

ID: b728de55

If $\frac{6}{7}p + 18 = 54$, what is the value of $7p$?

ID: b728de55 Answer

Correct Answer: 294

Rationale

The correct answer is 294. Subtracting 18 from each side of the given equation yields $\frac{6}{7}p = 36$. Multiplying each side of this equation by $\frac{7}{6}$ yields $p = 42$. Multiplying each side of this equation by 7 yields $7p = 294$. Therefore, the value of $7p$ is 294.

Question Difficulty: Medium

Question ID 0f1cfed0

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Algebra	Linear equations in one variable	Medium

ID: 0f1cfed0

A candle is made of 17 ounces of wax. When the candle is burning, the amount of wax in the candle decreases by 1 ounce every 4 hours. If 6 ounces of wax remain in this candle, for how many hours has it been burning?

A. 3

B. 6

C. 24

D. 44

ID: 0f1cfed0 Answer

Correct Answer: D

Rationale

Choice D is correct. It's given that the candle starts with 17 ounces of wax and has 6 ounces of wax remaining after a period of time has passed. The amount of wax the candle has lost during the time period can be found by subtracting the remaining amount of wax from the amount of wax the candle was made of, which yields $17 - 6$ ounces, or 11 ounces. This means the candle loses 11 ounces of wax during that period of time. It's given that the amount of wax decreases by 1 ounce every 4 hours. If h represents the number of hours the candle has been burning, it follows that $\frac{1}{4} = \frac{11}{h}$. Multiplying both sides of this equation by $4h$ yields $h = 44$. Therefore, the candle has been burning for 44 hours.

Choice A is incorrect and may result from using the equation $\frac{1}{4} = \frac{h}{11}$ rather than $\frac{1}{4} = \frac{11}{h}$ to represent the situation, and then rounding to the nearest whole number.

Choice B is incorrect. This is the amount of wax, in ounces, remaining in the candle, not the number of hours it has been burning.

Choice C is incorrect and may result from using the equation $\frac{1}{4} = \frac{6}{h}$ rather than $\frac{1}{4} = \frac{11}{h}$ to represent the situation.

Question Difficulty: Medium

Question ID 29dee068

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Algebra	Linear equations in one variable	Medium

ID: 29dee068

$$\frac{1}{3}(x+6)-\frac{1}{2}(x+6)=-8$$

What value of x is the solution to the given equation?

ID: 29dee068 Answer

Correct Answer: 42

Rationale

The correct answer is 42. The expression $(x+6)$ is a factor of both terms on the left-hand side of the given equation. Therefore, the given equation can be written as $(x+6)\left(\frac{1}{3}-\frac{1}{2}\right)=-8$, or $(x+6)\left(-\frac{1}{6}\right)=-8$. Multiplying each side of this equation by -6 yields $x+6=48$. Subtracting 6 from each side of this equation yields $x=42$. Therefore, the value of x that is the solution to the given equation is 42.

Question Difficulty: Medium

Question ID 3586b08b

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Algebra	Linear equations in one variable	Medium

ID: 3586b08b

If $5(x+4)=4(x+4)+29$, what is the value of $x+4$?

A. -4

B. 25

C. 29

D. 33

ID: 3586b08b Answer

Correct Answer: C

Rationale

Choice C is correct. Subtracting $4(x+4)$ from both sides of the given equation yields $1(x+4)=29$, or $x+4=29$. Therefore, the value of $x+4$ is 29.

Choice A is incorrect and may result from conceptual or calculation errors.

Choice B is incorrect. This is the value of x, not $x+4$.

Choice D is incorrect and may result from conceptual or calculation errors.

Question Difficulty: Medium

Question ID 9093aa56

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Algebra	Linear equations in one variable	Medium

ID: 9093aa56

$\frac{1}{4}(x+5)-\frac{1}{3}(x+5)=-7$

What value of x is the solution to the given equation?

A. -12

B. -5

C. 79

D. 204

ID: 9093aa56 Answer

Correct Answer: C

Rationale

Choice C is correct. For the given equation, $(x+5)$ is a factor of both terms on the left-hand side. Therefore, the given equation can be rewritten as $\left(\frac{1}{4}-\frac{1}{3}\right)(x+5)=-7$, or $\left(\frac{3}{12}-\frac{4}{12}\right)(x+5)=-7$, which is equivalent to $-\frac{1}{12}(x+5)=-7$. Multiplying both sides of this equation by -12 yields $x+5=84$. Subtracting 5 from both sides of this equation yields $x=79$.

Choice A is incorrect. This is the value of x for which the left-hand side of the given equation equals $\frac{7}{12}$, not -7.

Choice B is incorrect. This is the value of x for which the left-hand side of the given equation equals 0, not -7.

Choice D is incorrect. This is the value of x for which the left-hand side of the given equation equals $-\frac{209}{12}$, not -7.

Question Difficulty: Medium

Question ID 25ed5921

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Algebra	Linear equations in one variable	Medium

ID: 25ed5921

$$4x + 12 = \frac{a(x+3)}{2}$$

In the given equation, a is a constant. If the equation has infinitely many solutions, what is the value of a?

A. 0

B. 3

C. 8

D. 12

ID: 25ed5921 Answer

Correct Answer: C

Rationale

Choice C is correct. If an equation has infinitely many solutions, then the two sides of the equation must be equivalent. Multiplying each side of the given equation by 2 yields $8x + 24 = a(x + 3)$. Since 8 is a common factor of both terms on the left-hand side of this equation, the equation can be rewritten as $8(x + 3) = a(x + 3)$. The two sides of this equation are equivalent when $a = 8$. Therefore, if the given equation has infinitely many solutions, the value of a is 8.

Alternate approach: If the given equation, $4x + 12 = \frac{a(x+3)}{2}$, has infinitely many solutions, then both sides of this equation are equal for any value of x. If $x = 0$, then substituting 0 for x in the given equation yields $4(0) + 12 = \frac{a(0+3)}{2}$, or $12 = \frac{3}{2}a$. Dividing both sides of this equation by $\frac{3}{2}$ yields $8 = a$.

Choice A is incorrect. If the value of a is 0, the given equation is equivalent to $4x + 12 = 0$, which has one solution, not infinitely many solutions.

Choice B is incorrect. If the value of a is 3, the given equation is equivalent to $4x + 12 = \frac{3(x+3)}{2}$, or $4x + 12 = \frac{3}{2}x + \frac{9}{2}$, which has one solution, not infinitely many solutions.

Choice D is incorrect. If the value of a is 12, the given equation is equivalent to $4x + 12 = \frac{12(x+3)}{2}$, or $4x + 12 = 6x + 18$, which has one solution, not infinitely many solutions.

Question Difficulty: Medium

Question ID f2d396f3

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Algebra	Linear equations in one variable	Medium

ID: f2d396f3

$$66x = 66x$$

How many solutions does the given equation have?

A. Exactly one

B. Exactly two

C. Infinitely many

D. Zero

ID: f2d396f3 Answer

Correct Answer: C

Rationale

Choice C is correct. If the two sides of a linear equation are equivalent, then the equation is true for any value. If an equation is true for any value, it has infinitely many solutions. Since the two sides of the given linear equation $66x = 66x$ are equivalent, the given equation has infinitely many solutions.

Choice A is incorrect and may result from conceptual or calculation errors.

Choice B is incorrect and may result from conceptual or calculation errors.

Choice D is incorrect and may result from conceptual or calculation errors.

Question Difficulty: Medium

Question ID ce6f6062

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Algebra	Linear equations in one variable	Medium

ID: ce6f6062

$$2x + 16 = a(x + 8)$$

In the given equation, a is a constant. If the equation has infinitely many solutions, what is the value of a?

ID: ce6f6062 Answer

Correct Answer: 2

Rationale

The correct answer is 2. An equation with one variable, x, has infinitely many solutions only when both sides of the equation are equal for any defined value of x. It's given that $2x + 16 = a(x + 8)$, where a is a constant. This equation can be rewritten as $2(x + 8) = a(x + 8)$. If this equation has infinitely many solutions, then both sides of this equation are equal for any defined value of x. Both sides of this equation are equal for any defined value of x when $2 = a$. Therefore, if the equation has infinitely many solutions, the value of a is 2.

Alternate approach: If the given equation, $2x + 16 = a(x + 8)$, has infinitely many solutions, then both sides of this equation are equal for any value of x. If $x = 0$, then substituting 0 for x in $2x + 16 = a(x + 8)$ yields $2(0) + 16 = a(0 + 8)$, or $16 = 8a$. Dividing both sides of this equation by 8 yields $2 = a$.

Question Difficulty: Medium

Question ID 6c845af8

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Algebra	Linear equations in one variable	Medium

ID: 6c845af8

If $2(3t - 10) + t = 40 + 4t$, what is the value of $3t$?

ID: 6c845af8 Answer

Correct Answer: 60

Rationale

The correct answer is 60. Subtracting t from both sides of the given equation yields $2(3t - 10) = 40 + 3t$. Applying the distributive property to the left-hand side of this equation yields $6t - 20 = 40 + 3t$. Adding 20 to both sides of this equation yields $6t = 60 + 3t$. Subtracting $3t$ from both sides of this equation yields $3t = 60$. Therefore, the value of $3t$ is 60.

Question Difficulty: Medium