1.1 Linear equations in one variable

1 Difficulty: Easy

i If $3x - 8 = 7$, what is the value of $3x + 8$?

A. -1

B. 5

C. 13

D. 23

ii One pound of grapes costs $\$2$. At this rate, how many dollars will c pounds of grapes cost?

A. $2c$

B. $2 + c$

C. $\frac{2}{c}$

D. $\frac{c}{2}$

iii How many solutions exist to the equation $10 = 2x + 4$?

A. None

B. Exactly 1

C. Exactly 3

D. Infinitely many

iv Cathy has n CDs. Gerry has 3 more than twice the number of CDs that Cathy has. In terms of n, how many CDs does Gerry have?

A. $3n - 2$

B. $3n + 2$

C. $2n - 3$

D. $2n + 3$

v For what value of w does $w - 10 = 2(w + 5)$?

A. 5

B. 0

C. -15

D. -20

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2 Difficulty: Medium

vi If x is the solution to the equation $3(2x-6)-11=4(x-3)+6$, what is the value of $x-3$?

A. $\frac{23}{2}$

B. $\frac{17}{2}$

C. $\frac{15}{2}$

D. $-\frac{15}{2}$

vii A tree had a height of 6 feet when it was planted. The equation $2n+6=14$ can be used to find how many years n it took the tree to reach a height of 14 feet. Which of the following is the best interpretation of the number 2 in this context?

A. The number of years it took the tree to double its height

B. The average number of feet that the tree grew per year

C. The height, in feet, of the tree when the tree was 1 year old

D. The average number of years it takes similar trees to grow 14 feet

viii In the equation $a(3-x)-b=-1-2x$, a and b are constants. If the equation has infinitely many solutions, what are the values of a and b?

A. $a=2$ and $b=1$

B. $a=2$ and $b=7$

C. $a=-2$ and $b=5$

D. $a=-2$ and $b=-5$

ix What value of p is the solution of the equation $2(p+1)+8(p-1)=5p$?

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x A museum rents tablets to visitors. The museum earns revenue of $\$14$ for each tablet rented for the day. On Wednesday, the museum earned $\$406$ in profit from renting tablets after paying daily expenses of $\$112$. How many tablets did the museum rent on Wednesday? (profit=total revenue−total expenses)

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3 Difficulty: Hard

xi In the equation $\frac{12x+28}{4} - \frac{s}{13} = r(x-8)$, s and r are constants, and $s > 0$. If the equation has infinitely many solutions, what is the value of s?

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xii Alan drives an average of 100 miles each week. His car can travel an average of 25 miles per gallon of gasoline. Alan would like to reduce his weekly expenditure on gasoline by $\$5$. Assuming gasoline costs $\$4$ per gallon, which equation can Alan use to determine how many fewer average miles, m, he should drive each week?

A. $\frac{25}{4}m = 95$

B. $\frac{25}{4}m = 5$

C. $\frac{4}{25}m = 95$

D. $\frac{4}{25}m = 5$

xiii If $\frac{x+6}{3} = \frac{x+6}{13}$, the value of $x + 6$ is between which of the following pairs of values?

A. -7 and -3

B. -2 and 2

C. 2 and 7

D. 8 and 13

xiv The equation $9x + 5 = a(x + b)$, where a and b are constants, has no solutions. Which of the following must be true?

I. $a = 9$

II. $b = 5$

III. $b \neq \frac{5}{9}$

A. None

B. I only

C. I and II only

D. I and III only

xv What value of t is the solution to the equation $0.8t - 0.46 = 8(t - 0.001) + 1.9$?

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