

Tell whether the point $(3,4)$ is a solution to the linear equation. Explain your decision.

1) $-4x + 2y = -4$

$-4x + y = -8$

$C: -4(3) + 2(4) = -4$
 $-4 = -4 \checkmark$

$C: -4(3) + 4 = -8$
 $-8 = -8 \checkmark$

$(3,4)$ IS A SOLUTION TO THE SYSTEM
 BECAUSE THE POINT CHECKS IN BOTH EQUATIONS.

Tell whether the point $(1,5)$ is a solution to the linear equation. Explain your decision.

2) $5x + 4y = -15$

$y = -8x + 3$

$C: 5(1) + 4(5) = -15$
 $25 \neq -15$

$C: 5 = -8(1) + 3$
 $5 \neq -5$

$(1,5)$ IS NOT A SOLUTION TO THE SYSTEM
 BECAUSE THE POINT DOES NOT
 CHECK IN EITHER EQUATION

ALG.d

Date _____ Period _____

ALG.d.2

Remember to
Check solution in ORIGINAL EQUATIONS!!

Solve each system by substitution. Clearly show EACH STEP. Circle your answer.

1) $-4x - 3y = -18$
 $y = 4x - 10$
C: $-18 = -18$ ✓
C: $2 = 2$ ✓

$$\begin{aligned} -4x - 3(4x - 10) &= -18 \\ -4x - 12x + 30 &= -18 \\ -16x + 30 &= -18 \\ -30 & -30 \\ \hline -16x &= -48 \\ -16 & -16 \\ \hline x &= 3 \end{aligned}$$

FIND Y

$$y = 4(3) - 10$$

$$y = 2$$

2) $y = -3x - 13$
 $2x - 4y = -4$
C: $-1 = -1$ ✓
C: $-4 = -4$ ✓

$$\begin{aligned} 2x - 4(-3x - 13) &= -4 \\ 2x + 12x + 52 &= -4 \\ 14x + 52 &= -4 \\ -52 & -52 \\ \hline 14x &= -56 \\ 14 & 14 \\ \hline x &= -4 \end{aligned}$$

FIND Y

$$y = -3(-4) - 13$$

$$y = -1$$

Solve each system by elimination. Clearly show EACH STEP. Circle your answer.

3) $-2x - 10y = -4$
 $2x - 2y = -8$
C: $-4 = -4$ ✓
C: $-8 = -8$ ✓

$$\begin{aligned} -12y &= -12 \\ -12 & -12 \\ \hline y &= 1 \end{aligned}$$

FIND X: $2x - 2(1) = -8$

$$\begin{aligned} 2x - 2 &= -8 \\ +2 & +2 \\ \hline 2x &= -6 \\ \frac{2x}{2} &= \frac{-6}{2} \end{aligned}$$

$$x = -3$$

4) $(3x - 9y = -21) \cdot 4 \rightarrow 12x - 36y = -84$
 $(4x + 6y = 8) \cdot -3 \rightarrow -12x - 18y = -24$

$$\begin{aligned} -54y &= 108 \\ -54 & -54 \\ \hline y &= +2 \end{aligned}$$

FIND X:

$$\begin{aligned} 4x + 6(2) &= 8 \\ 4x + 12 &= 8 \\ -12 & -12 \\ \hline 4x &= -4 \\ \frac{4x}{4} &= \frac{-4}{4} \\ x &= -1 \end{aligned}$$

5) $7x + 10y = -18$
 $-1(7x + 3y = 24) \rightarrow -7x - 3y = -24$

$$\begin{aligned} 7y &= -42 \\ 7 & 7 \\ \hline y &= -6 \end{aligned}$$

FIND X:

$$\begin{aligned} 7x + 3(-6) &= 24 \\ 7x - 18 &= 24 \\ +18 & +18 \\ \hline 7x &= 42 \\ \frac{7x}{7} &= \frac{42}{7} \end{aligned}$$

$$x = 6$$

C: $-18 = -18$
C: $24 = 24$

C: $-21 = -21$
C: $8 = 8$

DON'T FORGET
TO CHECK!

ALG.d

ALG.d.3

Solve each system by substitution or elimination. Clearly show EACH STEP. Circle your answer.

(S) 1) $y = 4x + 2$
 $5x + 2y = -9$

$$5x + 2(4x + 2) = -9$$

$$5x + 8x + 4 = -9$$

$$13x + 4 = -9$$

$$\begin{array}{r} 13x + 4 = -9 \\ -4 \quad -4 \\ \hline 13x = -13 \\ \frac{13x}{13} = \frac{-13}{13} \end{array}$$

$$x = -1$$

FIND Y:

$$y = 4(-1) + 2$$

$$y = -2$$

$$C: -2 = -2 \checkmark$$

$$C: -9 = -9 \checkmark$$

(E) 2) $6x - 5y = -22$
 $-1(6x - 8y = -28) \rightarrow -6x + 8y = 28$

$$\begin{array}{r} 8y = 6 \\ \frac{8y}{8} = \frac{6}{8} \\ y = \frac{3}{4} \end{array}$$

$$y = 2$$

FIND X:

$$6x - 5(2) = -22$$

$$6x - 10 = -22$$

$$\begin{array}{r} 6x - 10 = -22 \\ +10 \quad +10 \\ \hline 6x = -12 \\ \frac{6x}{6} = \frac{-12}{6} \\ x = -2 \end{array}$$

$$x = -2$$

$$x = -2$$

(E) 3) $6x + 4y = 0$
 $-7x - 4y = -4$

$$\begin{array}{r} 6x + 4y = 0 \\ -7x - 4y = -4 \\ \hline -x = -4 \\ \frac{-x}{-1} = \frac{-4}{-1} \\ x = 4 \end{array}$$

$$x = 4$$

$$\text{FIND Y: } -7(4) - 4y = -4$$

$$-28 - 4y = -4$$

$$\begin{array}{r} -28 - 4y = -4 \\ +28 \quad +28 \\ \hline -4y = 24 \\ \frac{-4y}{-4} = \frac{24}{-4} \\ y = -6 \end{array}$$

$$y = -6$$

(E) 4) $(-10x + 2y = -28) \cdot 4 \rightarrow -40x + 8y = -112$
 $(4x - 3y = 9) \cdot 10 \rightarrow 40x - 30y = 90$

$$\begin{array}{r} -40x + 8y = -112 \\ 40x - 30y = 90 \\ \hline -22y = -22 \\ \frac{-22y}{-22} = \frac{-22}{-22} \\ y = 1 \end{array}$$

$$y = 1$$

FIND X:

$$4x - 3(1) = 9$$

$$4x - 3 = 9$$

$$\begin{array}{r} 4x - 3 = 9 \\ +3 \quad +3 \\ \hline 4x = 12 \\ \frac{4x}{4} = \frac{12}{4} \\ x = 3 \end{array}$$

$$x = 3$$

$$C: -28 = -28 \checkmark$$

$$C: 9 = 9 \checkmark$$

(S) 5) $y = 4x - 15$
 $-3x + 5y = 17$

$$-3x + 5(4x - 15) = 17$$

$$-3x - 20x - 75 = 17$$

$$-23x - 75 = 17$$

$$\begin{array}{r} -23x - 75 = 17 \\ +75 \quad +75 \\ \hline -23x = 92 \\ \frac{-23x}{-23} = \frac{92}{-23} \\ x = -4 \end{array}$$

$$x = -4$$

FIND Y:

$$y = -4(-4) - 15$$

$$y = 1$$

ALG.d

Date _____ Period _____

ALG.d.4

Solve each word problem using substitution or elimination.

- 1) Ben's school is selling tickets to a fall musical. On the first day of ticket sales the school sold 3 adult tickets and 5 child tickets for a total of \$61. The school took in \$67 on the second day by selling 1 adult ticket and 11 child tickets. Find the price of an adult ticket and the price of a child ticket.

Key Info (draw picture):

DAY #1 - Sold 3 adult tickets, 5 child tickets for \$61
 DAY #2 - sold 1 adult ticket, 11 child tickets for \$67.

Define Variable(s) - remember units:

x = price of adult ticket (\$)y = price of child ticket (\$)

Define Equation(s):

DAY 1 Eq1: $(3x + 5y = 61) \cdot 1 \rightarrow 3x + 5y = 61$

DAY 2 Eq2: $(x + 11y = 67) \cdot -3 \rightarrow -3x - 33y = -201$

Solve:

$$\begin{array}{r} -28y = -140 \\ \hline -28 \quad -28 \end{array}$$

$$\boxed{y = 5}$$

FIND X:

$$3x + 5(5) = 61$$

$$\begin{array}{r} 3x + 25 = 61 \\ -25 \quad -25 \\ \hline 3x = 36 \end{array}$$

$$\frac{3x}{3} = \frac{36}{3} \quad \boxed{x = 12}$$

Answer (in words) _____

↳ Adult tickets cost \$12 and child tickets cost \$5.

ALG. 1
(COUNTY)

2) The senior classes at High School A and High School B planned separate trips to New York City. The senior class at High School A rented and filled 4 vans and 9 buses with 467 students. High School B rented and filled 1 van and 12 buses with 575 students. Each van and each bus carried the same number of students. Find the number of students in each van and in each bus.

Key Info (draw picture):

H.S. A - 4 vans, 9 buses → 467 students

H.S. B - 1 VAN, 12 buses → 575 students

Define Variable(s) - remember units:

X = # students in each van

Y = # students in each bus

Define Equation(s):

H.S.A →

Eq1: $4x + 9y = 467$

H.S.B →

Eq2: $(x + 12y = 575) \cdot -4$

Solve:

$$\begin{array}{r}
 4x + 9y = 467 \\
 -4x - 48y = -2300 \\
 \hline
 -39y = -1833 \\
 \hline
 -39 \qquad \qquad -39 \\
 \hline
 y = 47
 \end{array}$$

FIND X

$x + 12(47) = 575$

$$\begin{array}{r}
 x + 564 = 575 \\
 -564 \quad -564 \\
 \hline
 x = 11
 \end{array}$$

$y = 47$

Answer (in words) _____

→ There are 11 students per van and 47 students per bus.