

Complete problems 1 and 2 using Desmos:

1. Solve the following systems of equations:

a) $-2x = -16 - 2y$
 $3x - 6y = 30$

$(6, -2)$

b) $15x - 5y = 20$
 $6x - 2y = -8$

No Sol.

2. What is the sum of the x & y values in the solution to the system:

$3x - 2y = -5$
 $4x + 5y = 47$

$(3, 7)$
 10

3. Solve the following systems of equations using substitution:

$x = 7 + 2y$

a) $-5x + 3y = 51$
 $y = 10x - 8$

$5x + 3(10x - 8) = 51$
 $-5x + 30x - 24 = 51$
 $25x - 24 = 51$
 $+ 24 \quad 24$
 $\hline 25x = 75$
 $\frac{25x}{25} = \frac{75}{25}$
 $x = 3$

$y = 10(3) - 8$
 $30 - 8$
 22
 $(3, 22)$

b) $4.5x + 1.5y = 24$
 $x - y = 4$

$x = 4 + y$
 $4.5(4 + y) + 1.5y = 24$
 $18 + 4.5y + 1.5y = 24$
 $18 + 6y = 24$
 $-18 \quad -18$
 $\hline 6y = 6$
 $\frac{6y}{6} = \frac{6}{6}$
 $y = 1$
 $x = 4 + 1$
 $x = 5$
 $(5, 1)$

c) $x - 2y = 7$
 $-x + 2y = 7$

$-(7 + 2y) + 2y = 7$
 $-7 - 2y + 2y = 7$
 $-7 = 7$
 No Solution

4. Solve the following systems of equations using elimination:

a) $2x = 32 + y$
 $y - 5x = 13$

$2x - y = 32$
 $-5x + y = 13$
 $\hline -3x = 45$
 $\frac{-3x}{-3} = \frac{45}{-3}$
 $x = -15$

$(-15, -62)$

$2(-15) = 32 + y$
 $-30 = 32 + y$
 $-32 \quad -32$
 $\hline y = -62$

b) $7x + 2y = 8$
 $4x + 3y = -1$

$7(2) + 2y = 8$
 $14 + 2y = 8$
 $-14 \quad -14$
 $\hline 2y = -6$
 $y = -3$
 $-21x - 6y = -24$
 $8x + 6y = -2$
 $\hline -13x = -26$
 $\frac{-13x}{-13} = \frac{-26}{-13}$
 $x = 2$

$(2, -3)$

5. For what value of k will the given system have infinitely many solutions?

$$\begin{cases} 6x + 9y = -12 \\ 2x + ky = -4 \end{cases} \cdot 3$$

$$\frac{k \cdot 3}{3} = \frac{9}{3}$$

$$\boxed{k = 3}$$

equations
must be same
or multiples
of each other.

6. A website allows users to download individual songs or an entire album. All songs cost the same and all albums cost the same. Anthony pays \$14.94 for 5 songs and 1 album. Taylor pays \$22.95 for 3 songs and 2 albums.

a) Write a system of equations to describe this situation.

$$\begin{cases} 5s + 1a = 14.94 \\ 3s + 2a = 22.95 \end{cases} \quad \begin{cases} 5(.99) + a = 14.94 \\ 4.95 + a = 14.94 \\ -4.95 & -4.95 \\ \hline a = 9.99 \end{cases}$$

b) How much does it cost for each song and each album?

$$\begin{array}{r} -10s - 2a = -29.88 \\ 3s + 2a = 22.95 \\ \hline -7s = -6.93 \\ \underline{-7} \quad \underline{-7} \quad s = .99 \end{array}$$

Song = 99¢
album = \$9.99

c) How much would 19 songs and 3 albums cost to download?

$$19(.99) + 3(9.99) = 18.81 + 29.97 = \$48.78$$

7. Nick has 82 coins in his piggy bank. All are quarters and dimes. Their total value is \$11.65

a) Write a system of equations to describe this situation.

$$\begin{cases} Q + d = 82 \\ .25Q + .10d = 11.65 \end{cases} \quad Q = 82 - d \quad \checkmark$$

b) How many of each type of coin does he have?

$$.25(82 - d) + .10d = 11.65$$

$$20.5 - .25d + .10d = 11.65$$

$$\begin{array}{r} 20.5 - .15d = 11.65 \\ -20.5 & -20.5 \\ \hline \end{array}$$

$$-.15d = -8.85$$

$$d = \boxed{59 \text{ dimes}}$$

$$Q = 82 - d = 82 - 59 = \boxed{23 \text{ quarters}}$$