Systems of Equations Practice

1. Terry has a collection of fifty basketball cards. The National Basketball Association cards are worth $3.50 and the collegiate basketball cards are worth $2.00 each. Terry's collection is worth $122.50. Write and solve a system of linear equations that can be used to determine the number of each type of card Terry has. State the solution in the context of the problem.

$n + c = 50$
$3.50n + 2.00c = 122.50$

2. At the grocery store, artichokes are one price and avocados are another. Thomas buys three artichokes and one avocado for $2.70. Cara buys one artichoke and 4 avocados for $6.40. artichoke: x avocado: y
Write and solve a system of equations that can be used to determine the cost of artichokes and avocados. State the solution in the context of the problem.

$3x + 1y = 2.70$
$-3(1x + 4y = 6.40)$

$3x + y = 2.70$
$-3x - 12y = -19.20$
$-11y = -16.50$
$-11 \quad -11$
$y = 1.50$

$x + 4(1.50) = 6.40$
$-6.00 \quad -6.00$
$x = .40$

Solve each system using any method.

3. $3x + 4y = 10$
$4x - 4y = 11$

$7x = 21$
$x = 3$
$3(3) + 4y = 10$
$4y = 1$
$y = \frac{1}{4}$

4. $3(-2x + 5y = 15)$
$6x - 3y = 9$

$-6x + 15y = 45$
$+ \quad 6x - 3y = 9$
$\frac{12y}{12} = \frac{54}{12}$
$y = \frac{9}{2}$

$6x - 3\left(\frac{9}{2}\right) = 9$
$6x - \frac{27}{2} = \frac{18}{2}$
$+\frac{27}{2} \quad +\frac{27}{2}$
$\frac{6x}{6} = \frac{45}{2} \cdot \frac{1}{6}$
$x = \frac{15}{4}$

5. $y = 3x + 7$
$4x + 2y = 12$

$4x + 2(3x + 7) = 12$
$4x + 6x + 14 = 12$
$-14 \quad -14$
$10x = -2$
$x = -\frac{1}{5}$
$y = 3\left(-\frac{1}{5}\right) + 7$
$y = 6\frac{2}{5}$

6. $6x - 4y = 17$
$+ \quad 3x + 4y = 10$

$9x = 27$
$x = 3$
$3(3) + 4y = 10$
$-9 \quad -9$
$4y = 1$
$y = \frac{1}{4}$

7. $4x = 10y + 2$
$\frac{2y}{2} = \frac{x - 14}{2}$

$y = \frac{1}{2}x - 7$
$4x = 10\left(\frac{1}{2}x - 7\right) + 2$
$4x = 5x - 70 + 2$
$x = 68$

$2y = 68 - 14$
$\frac{2y}{2} = \frac{54}{2}$
$y = 27$

$y = 27$

8. A clothing store sells shirts for one price and sweatshirts for another price. Melanie purchases two shirts and six sweatshirts for $60. Chad purchases four shirts and three sweatshirts for $75.
Write and solve a system of linear equations that could be used to determine the cost of one shirt and one sweatshirt. State the solution in the context of the problem.

$-2(2x + 6y = 60)$
$4x + 3y = 75$

$-4x - 12y = -120$
$4x + 3y = 75$
$-9y = -45$
$y = 5$

x = shirts
y = sweatshirts

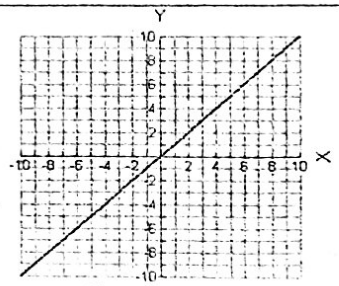
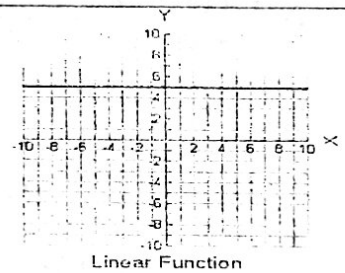
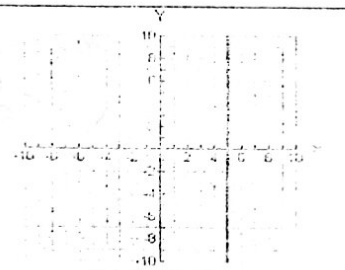
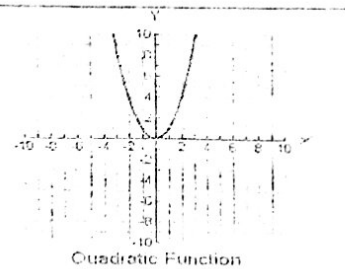
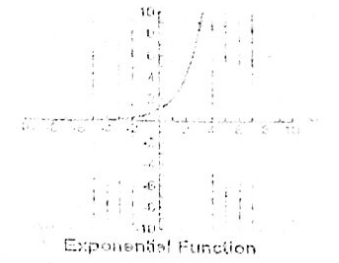
$4x + 3(5) = 75$
$-15 \quad -15$
$4x = 60$
$x = 15$

shirts @ $15
sweatshirts @ $5

Function Chart

Function – for every input there is exactly one output.

- **Domain (x's) can not repeat; must pass the vertical line test**

Graph Looks Like	Equation	Function Name	Function – Yes or No?	Domain? Range?
 Linear Function	$y = x^1$ $y = 1x^1 + 0$ (m=1; b=0)	linear	Yes	D: $\mathbb{R}$ R: $\mathbb{R}$
 Linear Function	$y = 5$ (y = any number) $y = 0x^1 + 5$	constant	Yes	D: $\mathbb{R}$ R: 5
 Linear Function	$x = 5$ (y = any number)	constant	NO	D: ~~$\mathbb{R}$~~ 5 R: $\mathbb{R}$
 Quadratic Function	$y = x^2$	quadratic	Yes	D: $\mathbb{R}$ R: $y \geq 0$ or $[0, \infty)$
 Exponential Function	$y = 2^x$	exponential	Yes	D: $\mathbb{R}$ R: $y > 0$ $(0, \infty)$