

Part A No calculators allowed on Part A.

1. For each of the following lines, find the x - and y -intercept and graph the line.

(a). $6x - 3y = -24$

$x\text{-int} : (-4, 0) \quad y\text{-int} : (0, 8)$

(b). $y = 3x - 4$

$x\text{-int} : (4/3, 0) \quad y\text{-int} : (0, -4)$

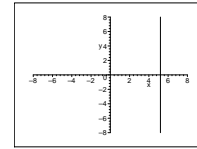
2. For the given graph, the slope of the line is (circle one)

positive

negative

0

undefined



undefined

3. Given the quadratic function $y = -x^2 + 6x - 8$,

(a). Find the (x, y) coordinate of the vertex; Is it a maximum or a minimum?

(3, 1); maximum

(b). Find the x - and y - intercepts, if they exist.

 $x\text{-int} : (2, 0), (4, 0); \quad y\text{-int} : (0, -8)$

(c). Graph the function (w/o calculator). Label the vertex and intercepts.

Part B You may use a calculator on Part B.

4. Find the equation of each line given the following information.

[Write your answer in the form $y = mx + b$.]

(a). line passes through the points $(-3, 4)$ $(9, 8)$

$y = \frac{1}{3}x + 5$

(b). line with a y -intercept of 5 and perpendicular to $3x + 5y = 4$

$y = \frac{5}{3}x + 5$

5. A car starts with a full tank of gas. After driving 20 miles there are 11 gallons of gas left. After driving 100 miles there are still 7 gallons left.

(a). Write a linear equation for the number of gallons of gas left as a function of the number of miles driven.

$x = \text{miles driven and } y = \text{gallons left} \quad \Rightarrow \quad y = -\frac{1}{20}x + 12$

(b). If you have 3 gallons left, how far have you driven?

180 miles

(c). How many gallons of gas does the tank hold when it is full?

12

6. Solve the following systems of linear equations algebraically. Show all your work. If the system is dependent or inconsistent, clearly state so.

(a).
$$\begin{cases} 3x + 2y = 3 \\ -x + 5y = 16 \end{cases}$$

(b).
$$\begin{cases} 2x - 6y = 10 \\ -3x + 9y = -15 \end{cases}$$

(c).
$$\begin{cases} x + 3y - 8z = 20 \\ y - 3z = 11 \\ 2y + 7z = -4 \end{cases}$$

(a). $(-1, 3)$

(b). dependent

(c). $x = -11, y = 5, z = -2$

7. A customer buys a blend of two coffees in the coffee shop: Kenyan, costing \$8.50 per pound and Jamaican Blue Mountain, costing \$14.60 per pound. He buys 3 pounds of the coffee blend which costs him \$31.55. How many pounds of each kind of coffee went into the mixture?

2.01 lbs of Kenyan; 0.99 lbs of Jamaican Blue

8. Solve the following equations

(a). by factoring: (i). $4x^2 - 25 = 0$ Ans: $x = \frac{5}{2}, -\frac{5}{2}$ (ii). $2x^2 - 12 = x^2 + x$ Ans: $x = 4, -3$

(d). by using the quadratic formula: (i). $4x^2 - 25 = 0$ Ans: $x = \frac{5}{2}, -\frac{5}{2}$ (ii). $9x^2 - 12x + 4 = 0$ Ans: $x = \frac{2}{3}$

(g). by any method you choose: (i). $2x^2 - 7x - 4 = 0$ Ans: $x = 4, -\frac{1}{2}$ (ii). $(x - 3)(1 - x) = -3$ Ans: $x = 0, 4$

9. Given the function $y = 32 - 2x^2$

(a). Find the x and y coordinate of the vertex. Is it a maximum or minimum? $(0, 32)$ is a maximum

(b). Find the x - and y -intercepts. y -int: $(0, 32)$; x -int: $(4, 0), (-4, 0)$ (c). Sketch the graph.

10. If the profit from the sale of x number of stereos is given by $P = 90x - 200 - x^2$,

(a). How many units must be sold to obtain a profit of 1200? 20 or 70 stereos

(b). How many units must be sold to maximize profit? 45 stereos

(c). What is the maximum profit? \$1825

11. Find the equation of the parabola through the points $(0, -3)$ $(1, 4)$ $(-1, -6)$ $y = 2x^2 + 5x - 3$

12. Solve the following inequalities. Write your answers in interval notation and graph it on the number line.

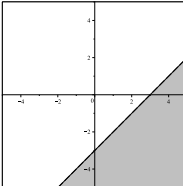
(a). $2x + 1 > 4$ $(\frac{3}{2}, \infty)$ (b). $2(7x - 3) \leq 12x + 16$ $(-\infty, 11]$

13. The percentage of adults who smoke cigarettes can be modeled by the equation $p = 43.3 - 0.504t$ where t is the number of years past 1960.

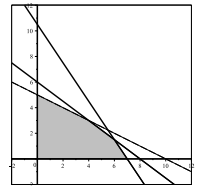
(a). What percent does this model predict for 2013? [Hint: What value of t represents 2013?] 16.59%

(b). In which year does the model predict that the percentage of adults who smoke cigarettes will be less than 10%. 2027

14. Graph the solution region for each of the following.

(a). $3(x + y) < 6x - 9$ 

(b).
$$\begin{cases} x + 2y < 10 \\ 3x + 4y \leq 24 \\ 3x + 2y \leq 21 \\ x \geq 0 \\ y \geq 0 \end{cases}$$



15. Graph the solution region for the given system of inequalities. Find the corners.

$$\begin{cases} 3x - y \leq 4 \\ 2x - y \geq -3 \\ x \geq 0 \\ y \geq 0 \end{cases}$$

Corners: $(0, 0), (0, 3), (4/3, 0), (7, 17)$

