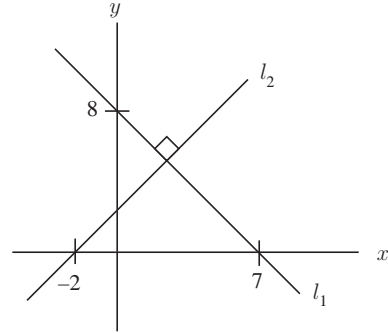


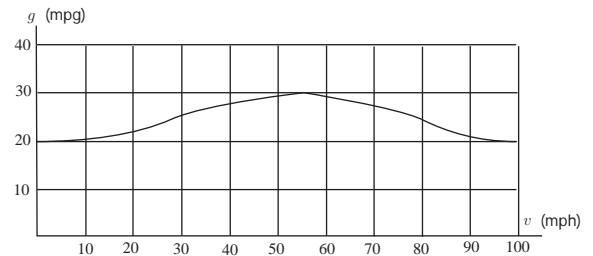
Show all relevant work!

1. Find the equation of the line  $\ell_2$ .



2. Using algebra, determine the point of intersection for lines  $\ell_1$  and  $\ell_2$  in problem (1) above.

3. The graph to the right shows the fuel consumption (in miles per gallon, mpg) of a car traveling at various speeds.



- (a) How much gas is used on a 300 mile trip at 40 mph?

- (b) How much gas is saved by traveling 60 mph instead of 70 mph on a 200 mile trip?

- (c) According to this graph, what is the most fuel efficient speed to travel? Explain.

4. The table above gives the weights of ten different cars (in thousands of pounds) paired with their fuel efficiency (measured in gallons required to drive 100 miles).

- (a) Write the equation of the best-fit line for fuel efficiency as a function of weight. (You may use technology).

- (b) What do you predict the fuel efficiency for a car weighing 3000 pounds would be? (Show your calculations or explain).

- (c) Explain the meaning of the slope in your equation in part (a).

5. For the function  $g(x) = x^2 - x$ , find the (simplified) average rate of change between the points

- (a)  $(-1, g(-1))$  and  $(3, g(3))$

- (b)  $(x, g(x))$  and  $(x + h, g(x + h))$

**Fuel Efficiency vs. Weight in 10 Cars**

Car	Weight	Fuel Efficiency
AMC Concord	5.5	3.4
Chevrolet Caprice	5.9	3.8
Ford Country Squire Wagon	6.5	4.1
Chevrolet Chevette	3.3	2.2
Toyota Corona	3.6	2.6
Ford Mustang	4.6	2.9
Mazda GLC	2.9	2.0
AMC Sprint	3.6	2.7
VW Rabbit	3.1	1.9
Buick Century	4.9	3.4

6. Which of the functions below is linear? Explain.

(a)

$x$	0	2	5	7	11
$f(x)$	1	5	9	13	17

(b)

$x$	0	2	5	7	11
$g(x)$	15	9	0	-6	-18

(c)

$x$	0	2	4	6	8
$h(x)$	1	3	6	10	15

7. When the plug is pulled in a bathtub, the water begins draining out. After 4 minutes 18 gallons of water remain in the tub and after 12 minutes, only 8 gallons remain.

(a) Write an equation for the volume of water ( $V$ ) remaining in the tub as a function of time ( $t$ ) in minutes since the plug was pulled.

(b) Interpret the meaning of the slope in this context.

(c) Explain the meaning of both the vertical and horizontal intercepts in the context of this problem.