

1. The function  $y = f(x)$  is shown graphed below over the interval  $-8 \leq x \leq 8$ .

(a) Evaluate each of the following;

$$f(-2) = \quad f(8) = \quad f(-8) = \quad f(4) =$$

(b) Find all the relative maximum and minimum values of the function. State the values of  $x$  where they occur as well.

(c) What are the absolute maximum and absolute minimum values of the function? At what  $x$ -values do they occur?

(d) What are the  $x$  and  $y$ -intercept(s) of the function? List each of the following as an ordered pair  $(x, y)$ .

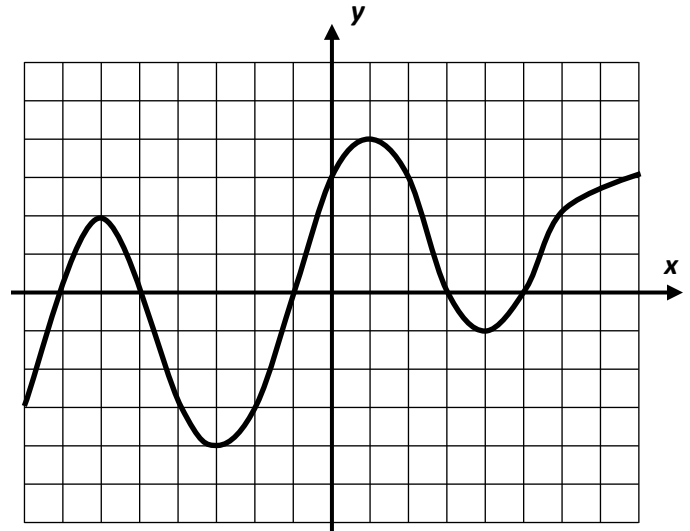
$x$ -intercept(s) (zeroes): \_\_\_\_\_

$y$ -intercept(s): \_\_\_\_\_

(e) Give an interval over which the function is increasing. Give an interval over which it is decreasing.

(f) Use your graph to find all solutions to the equation  $f(x) = 3$ . Illustrate your solution graphically.

(g) Is the function positive or negative on the interval  $-1 < x < 3$ ? How can you quickly tell?



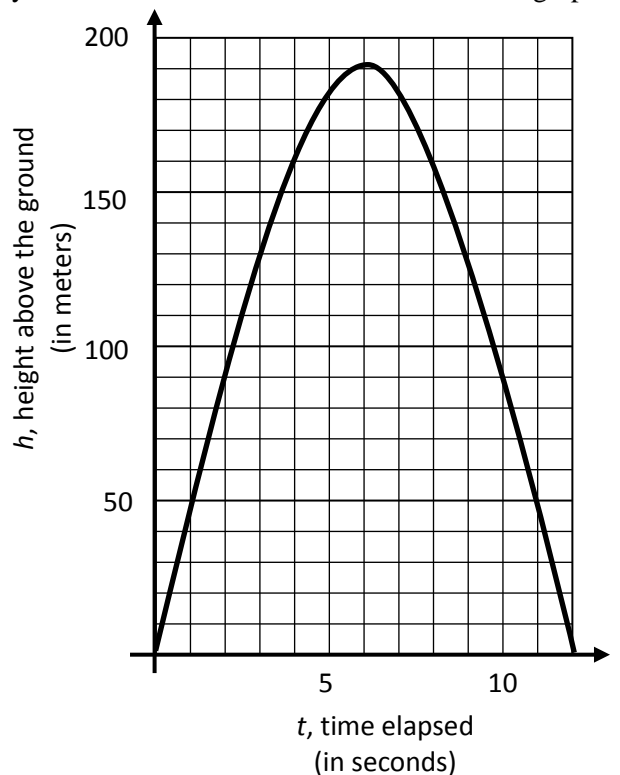
2. The following graph shows the height,  $h$ , above the ground of a toy rocket  $t$  seconds after it was fired. Use the graph of  $h(t)$  to answer the following questions.

(a) What was the maximum height the rocket reached?  
After how many seconds?

(b) How many seconds was the rocket in flight?

(c) Interpret  $h(2) = 90$ .

(d) Give the interval for  $t$  over which the height of the rocket is decreasing.



3. On the following set of axis, create the graph of a function  $f(x)$  with the following characteristics:

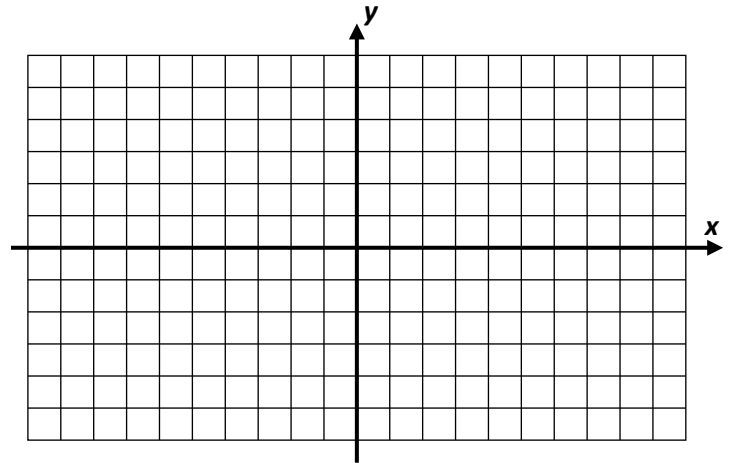
Passes through the points,

$(-8, 0)$ ,  $(5, -2)$  and  $(8, 3)$

Has an absolute maximum at  $f(-4) = 5$

Has an absolute minimum at  $f(2) = -6$

Decreasing on the interval on the interval  $-4 \leq x \leq 2$



R1. Solve for x:  $12x - (4x + 6) + 2(5) = 82 + 10$

R2. Solve for x:  $2x + \frac{1}{3} = 2$

R3. Subtract:  $(8x^2 - 5x + 4) - (3x^2 + 5x + 2)$

R4. Simplify:  $(2x + 7)(3x - 1)$

1. (a)  $f(-2) = -3$

$f(8) = 3$

$f(-8) = -3$

$f(4) = -1$

(b) Relative maximum  $(-6, 2)$  and  $(1, 4)$

Relative minimum  $(-3, -4)$  and  $(4, -1)$

(c) Absolute maximum  $(1, 4)$

Absolute minimum  $(-3, -4)$

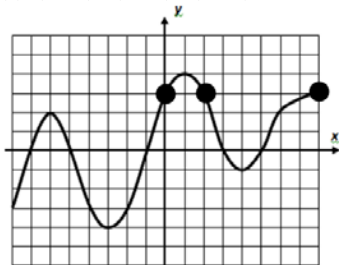
(d) x-intercepts  $(-7, 0)$ ,  $(-5, 0)$ ,  $(-1, 0)$ ,  $(3, 0)$ ,  $(5, 0)$

y-intercept(s)  $(0, 3)$

(e) Increasing  $-3 \leq x \leq 1$

Decreasing  $1 \leq x \leq 4$

(f)  $(0, 3)$ ,  $(2, 3)$ ,  $(8, 3)$



(g) Positive because it is above the x-axis.

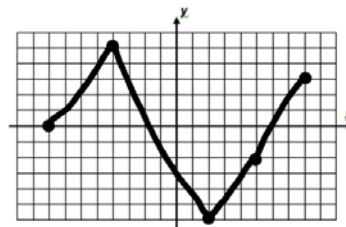
2. (a) 190m in 6 seconds

(b) 12 seconds

(c) at 2 seconds the rocket was 90 ft in the air

(d)  $6 \leq x \leq 12$

3. One possibility



R1.  $x = 9.5$

R2.  $x = \frac{5}{6}$

R3.  $5x^2 - 10x + 2$

R4.  $6x^2 + 19x - 7$