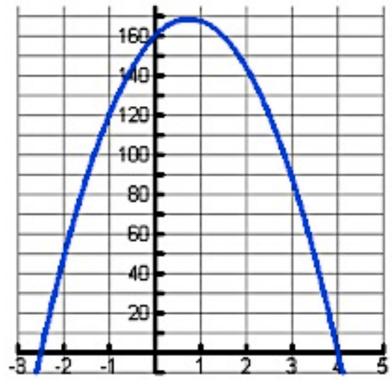
Homework 1.13 Characteristics of Quadratics

Use the scenario to answer the below questions.

Michael Keener is catapulting a boulder off a cliff to hit the road runner. Let (t) represent the number of seconds that the boulder catapults off the cliff and h(t) denote the height of the boulder, in feet, above the base of the cliff. Ignoring air resistance, Michael developed the following formula to express the path of the boulder: $h(t) = -16t^2 + 24t + 160$.



1. What does the x-axis represent? ________________________ The y-axis? ________________________

2. What part of the graph is insignificant? Why?

3. What was the height of the boulder before it was launched? ____________

4. What special point on the graph is associated with this information? ________________________________

5. If Michael simply pushed a boulder off the cliff, how would the graph look different?

6. How long will it take before the boulder reaches the bottom of the cliff? ____________________

What special point on the graph is associated with this information? _______________

7. After how many seconds does the boulder change direction? ________________

How high is the boulder when it changes direction? ______________________

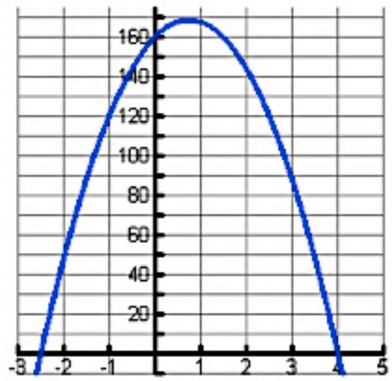
What is this significant point called on the graph? ______________________

8. If Michael changes his mind, how many seconds does he have to stop the boulder from going over the cliff?

Homework 1.13 Characteristics of Quadratics **Solutions**

Use the scenario to answer the below questions.

Michael Keener is catapulting a boulder off a cliff to hit the road runner. Let (t) represent the number of seconds that the boulder catapults off the cliff and h(t) denote the height of the boulder, in feet, above the base of the cliff. Ignoring air resistance, Michael developed the following formula to express the path of the boulder: $h(t) = -16t^2 + 24t + 160$.



1. What does the x-axis represent? time The y-axis? height

2. What part of the graph is insignificant? Why?
The negative side of the coordinate plane because negative time is impossible.

3. What was the height of the boulder before it was launched?160 feet

4. What special point on the graph is associated with this information? y-intercept

5. If Michael simply pushed a boulder off the cliff, how would the graph look different? The object would not go up.

6. How long will it take before the boulder reaches the bottom of the cliff? 4 seconds

What special point on the graph is associated with this information? x-intercept

7. After how many seconds does the boulder change direction? 0.75 seconds

How high is the boulder when it changes direction? 170 feet

What is this significant point called on the graph? vertex

8. If Michael changes his mind, how many seconds does he have to stop the boulder from going over the cliff? 1.5 seconds

Homework 1.13 Characteristics of Quadratics (Page 2)

Identify the characteristic from the given graph.

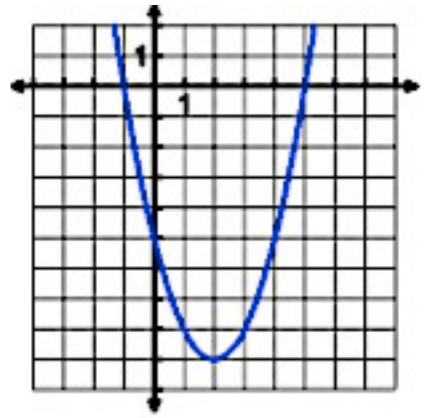
1.

a. Domain: ________ b. Range: ________

c. Extrema: ________ d. Axis of Sym: ________

e. Increasing: ________ f. Decreasing: ________

h. X intercept(s): ________ i. Y intercept: ________



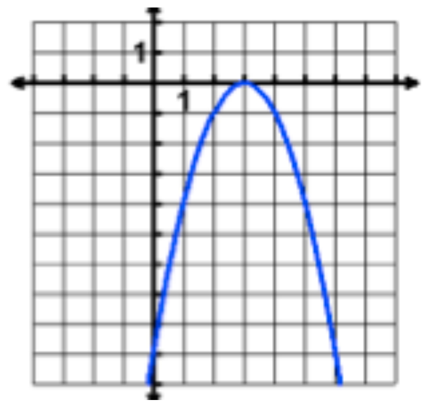
2.

a. Domain: ________ b. Range: ________

c. Extrema: ________ d. Axis of Sym: ________

e. Increasing: ________ f. Decreasing: ________

h. X intercept(s): ________ i. Y intercept: ________



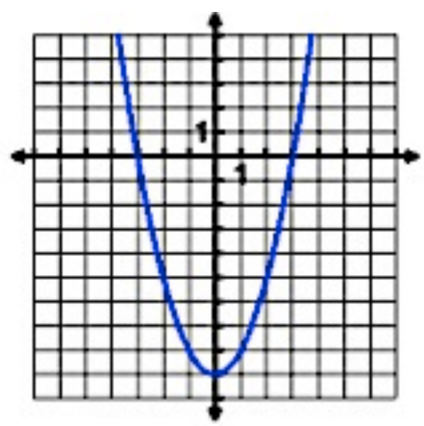
3.

a. Domain: ________ b. Range: ________

c. Extrema: ________ d. Axis of Sym: ________

e. Increasing: ________ f. Decreasing: ________

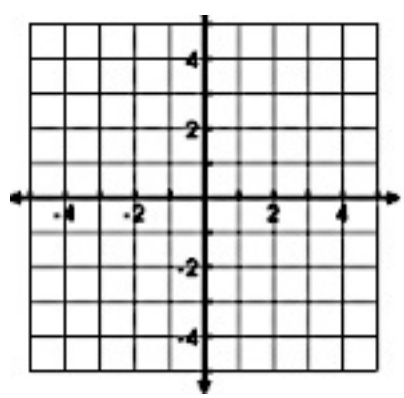
h. X intercept(s): ________ i. Y intercept: ________



Use the information to sketch a quadratic.

Domain: all real numbers
Vertex: (1, 2)

Increasing: $-\infty < x < 1$
Decreasing: $1 < x < \infty$
There is no stretch or shrink (a = 1)



Homework 1.13 Characteristics of Quadratics (Page 2) **Solutions**

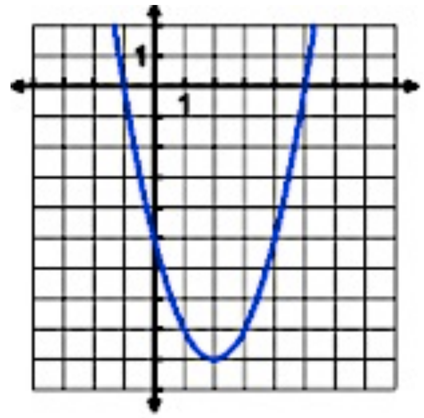
Identify the characteristic from the given graph.

1. a. Domain: $(-\infty, \infty)$ b. Range: $[-9, \infty)$

c. Extrema: $(2, -9)$ minimum d. Axis of Sym: $x = 2$

e. Increasing: $(2, \infty)$ f. Decreasing: $(-\infty, 2)$

h. X intercept(s): (-1, 0), (5, 0) i. Y intercept: (0, 5)

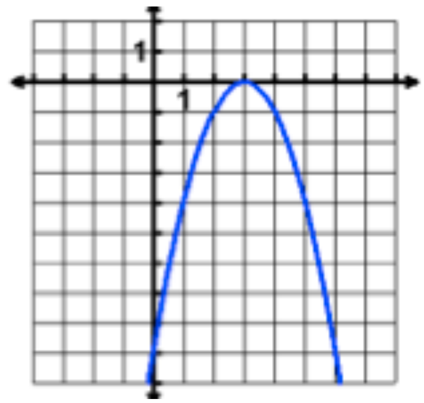


2. a. Domain: $(-\infty, \infty)$ b. Range: $(-\infty, 0]$

c. Extrema: (3,0) maximum d. Axis of Sym: $x = 3$

e. Increasing: $(-\infty, 3)$ f. Decreasing: $(3, \infty)$

h. X intercept(s): (3,0) i. Y intercept: (0, -10)

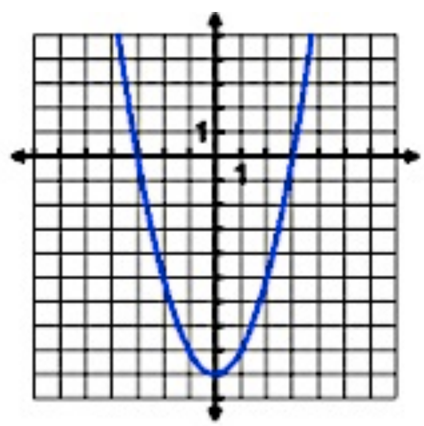


3. a. Domain: $(-\infty, \infty)$ b. Range: $[-9, \infty)$

c. Extrema: $(0\ -9)$ minimum d. Axis of Sym: $x = -9$

e. Increasing: $(0, \infty)$ f. Decreasing: $(-\infty, 0)$

h. X intercept(s): (-3, 0), (3, 0) i. Y intercept: (0, -9)



Use the information to sketch a quadratic.

Domain: all real numbers
Vertex: (1, 2)

Increasing: $-\infty < x < 1$
Decreasing: $1 < x < \infty$
There is no stretch or shrink (a = 1)