Quadratics-Which Way Do They Ask This Time?

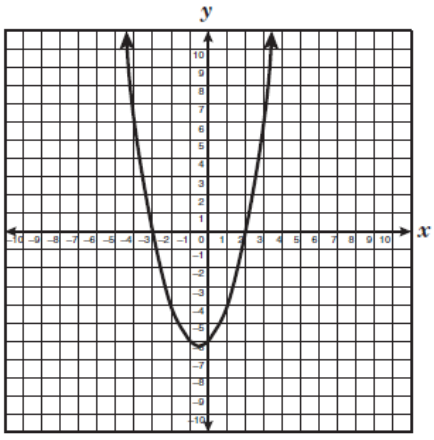
Teacher Notes

With all the ways we have to solve quadratic equations, how do we know which is the most efficient way to solve them in multiple choice questions? Is there a way to work the problems even if the question is asked in different ways?

Look at the questions given below. There are several ways that the questions about quadratic equations can be worded and the answer choices can be presented. Students can be asked to find roots, solutions, zeros, x-intercepts, or solution sets. Each of these has a slightly different way the answers should be presented. The work for the student can be the same for all of these presentations of the problems.

In the first question below, the graph is given for the function and the question asks for a zero of the function. By looking at the given graph, the student can look for the points at which the graph intersects the x-axis. The ordered pairs for these intersections are (-3, 0) and (2, 0). The possible zeros are -3 and 2.

14 The graph of $f(x) = x^2 + x - 6$ is shown below.



Which of the following is a zero of this function?

F –6

G 3

H –2

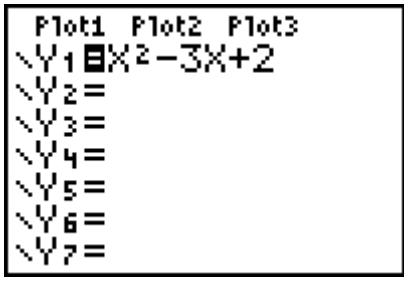
J 2

The zero that is given as an answer choice is 2.

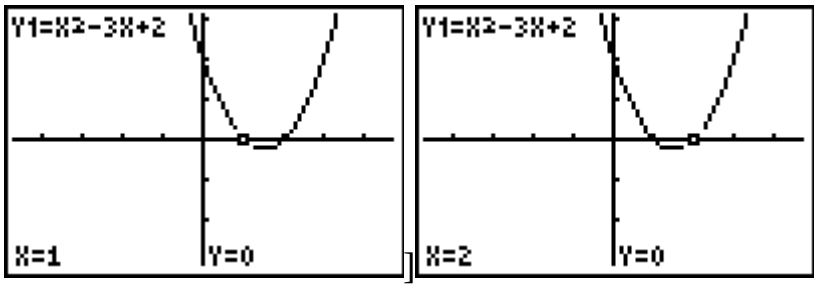
When students look at the graphs of any quadratics, the answers can be found by identifying the x-intercepts.

25 What are the roots of the quadratic equation $x^2 - 3x + 2 = 0$?

A –2 and –1
B –2 and 1
C 2 and –1
D 2 and 1



By tracing on the graph, the x-intercepts can be found.



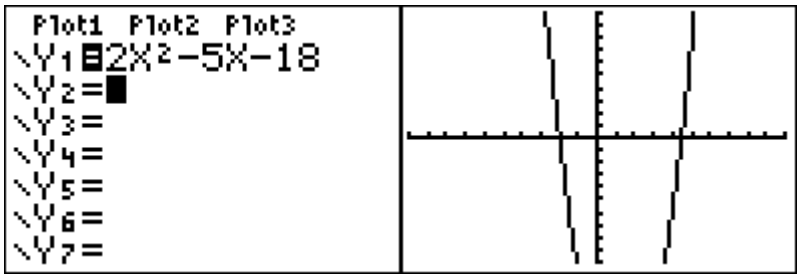
A student can look at the graph for the x-intercepts. The x-values of the intercepts are the roots.

This question asks for the value of x when y=0, another way to ask for an x-intercept.

31 In the equation $y = 2x^2 - 5x - 18$, which is a value of x when $y = 0$?

A -18
B $1\frac{1}{2}$
C 2
D $4\frac{1}{2}$

A student can look at the graph to find the x-intercepts, the values of x for which the value of y is 0.



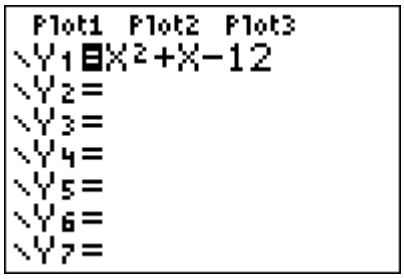
One x-value, -2, can be interpreted from the graph. The other is difficult to read exactly but is greater than 4. The only possible answer choice is $4\frac{1}{2}$.

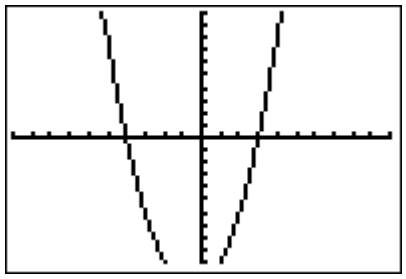
15 What are the x-intercepts of the graph of the equation $y = x^2 + x - 12$?

A (4, 0), (3,0)
B (–4, 0), (3, 0)
C (4, 0), (–3, 0)
D (4, 0), (–3, 0)

Enter the equation and graph in a standard viewing window.

Looking at the graph, you can see that the graph crosses the x-axis at both a positive and negative values. This means that either B or D is the correct answer choice.

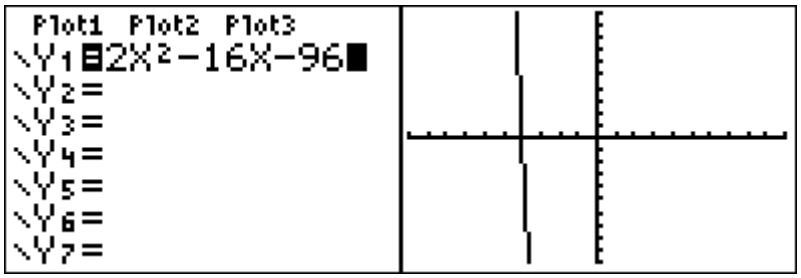




You can tell specifically that the x-intercepts are (-4, 0) and (3, 0).

43 What is the solution set for the equation $2x^2 - 16x - 96 = 0$?

A {4, 12}
B {−4, 12}
C {−4, −12}
D {4, −12}



When students watch the graphing process, they will recognize that the second x-intercept is not visible in this standard viewing window. They can be sure that it is a positive number greater than 10. The other solution is -4, meaning the only possible correct answer choice is {-4, 12}.