

NAME: \_\_\_\_\_ Score \_\_\_\_\_/10  
Please **print** your name

**All calculations are to be exact. NO DECIMALS.  
If you use a formula, write the formula before using it.**

1. Analyze the function whose rule is  $f(x) = x^2 - 5x - 14$ . Your analysis should answer each of the following questions.

a) What kind of function is  $f$  and what does that tell you about the graph?

$f$  is a quadratic function. Therefore its graph is a parabola which opens up or down.

b) How do you find the  $x$ -intercepts?

The  $x$ -intercepts are real zeros of the function. Zeros of the function are found by solving the equation resulting from  $f(x) = 0$ .

c) What are the  $x$ -intercepts?

In this case we must solve the equation  $x^2 - 5x - 14 = 0$ . Factoring yields  $(x - 7)(x + 2) = 0$  and then The Zero Factor Property yields 7 and -2 as the two solutions of the equation. Both are real numbers so the  $x$ -intercepts are 7 and -2. More correctly written as  $(7, 0)$  and  $(-2, 0)$ .

d) What is the vertex?

The vertex is  $\left(-\frac{b}{2a}, f\left(-\frac{b}{2a}\right)\right) = \left(\frac{5}{2}, f\left(\frac{5}{2}\right)\right) = \left(\frac{5}{2}, -\frac{81}{4}\right)$

e) Sketch the graph.

