FULL NAME _____
ID NUMBER _____

Read the directions.

1. (4 points) Find the vertex of the following quadratic function.

$$f(x) = 3x^2 - 14x + \frac{58}{3}$$

A. 0
B. $(0, 0)$
C. $(\frac{7}{3}, 3)$
D. $(3, \frac{3}{5})$
E. (a, b)

2. (3 points) Which of the following radical equations has a solution?

A. $\sqrt{2x - 17} + 3 = 0$
B. $-7 = \sqrt{6x - 2}$
C. $\sqrt{x} + 10 = 0$
D. $\sqrt{x + 10} = 3$
E. $5 + \sqrt{2x + \frac{1}{2}} = 0$

3. (3 points) Solve the inequality and write your answer as an INTERVAL.

$$|3x + 2| < 7$$

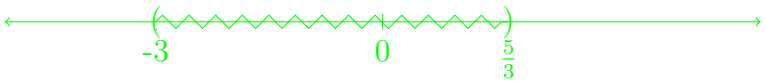
Solution. Writing $|3x + 2| < 7$ is equivalent to writing

$$-7 < 3x + 2 < 7.$$

Then we solve this compound inequality as follows:

$$\begin{aligned} -7 < 3x + 2 < 7 &\iff -9 < 3x < 5 \\ &\iff -3 < x < \frac{5}{3}. \end{aligned}$$

Drawn on the x-axis, this is



Written as an interval, this is $(-3, \frac{5}{3})$.

Total: _____/10

4. (0 points) How tall is a leprechaun? 3 foot 6

USEFUL FORMULAS

- $m = \dfrac{y_2 - y_1}{x_2 - x_1}$
- $y = mx + b$
- $Ax + By = C$
- $y - y_1 = m(x - x_1)$
- $a^2 - b^2 = (a + b)(a - b)$
- $a^3 + b^3 = (a + b)(a^2 - ab + b^2)$
- $a^3 - b^3 = (a - b)(a^2 + ab + b^2)$
- $(a + b)^2 = a^2 + 2ab + b^2$
- $(a - b)^2 = a^2 - 2ab + b^2$
- $d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$
- $\left(\dfrac{x_1 + x_2}{2}, \dfrac{y_1 + y_2}{2}\right)$
- $(x - h)^2 + (y - k)^2 = r^2$
- $x = \dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$
- $I = Prt$
- $A = P + Prt$
- $a^2 + b^2 = c^2$
- $\dfrac{f(x + h) - f(x)}{h}$
- $d = rt$
- $a^m a^n = a^{m+n}$
- $a^0 = 1$
- $\dfrac{a^m}{a^n} = a^{m-n}$
- $(a^m)^n = a^{m \cdot n}$
- $(ab)^m = a^m b^m$
- $\dfrac{1}{a^n} = a^{-n}$
- $\left(\dfrac{a}{b}\right)^n = \dfrac{a^n}{b^n}, (b \neq 0)$
- $i = \sqrt{-1}$
- $i^2 = -1$