

Given

$$f(x) = -2\sqrt{6}(x + 3\sqrt{3})(x - 5\sqrt{3})$$

- a. What are the zeros?
- b. What are the coordinates of the vertex?
- c. What's the vertex form equation?
- d. What is the y-intercept?
- e. What's the standard form equation?

$$a) \quad x = -3\sqrt{3} \text{ and } 5\sqrt{3}$$

$$b) \quad h = \frac{-3\sqrt{3} + 5\sqrt{3}}{2}$$

$$= \frac{2\sqrt{3}}{2}$$

$$= \sqrt{3}$$

$$k = -2\sqrt{6}(\sqrt{3} + 3\sqrt{3})(\sqrt{3} - 5\sqrt{3})$$

NOT NECESSARY

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$$= -2\sqrt{6}(4\sqrt{3})(-4\sqrt{3})$$

$$= -2\sqrt{6}(-16\sqrt{3}\sqrt{3})$$

$$= -2\sqrt{6}(-48)$$

$$= 96\sqrt{6}$$

$$\text{Vertex} = (\sqrt{3}, 96\sqrt{6})$$

$$c) y = -2\sqrt{6}(x - \sqrt{3})^2 + 96\sqrt{6}$$

d) Use factored form equation, when  $x=0$

$$(-2\sqrt{6})(3\sqrt{3})(-5\sqrt{3})$$

$$= (-2\sqrt{6})(-15\sqrt{9})$$

$$= (-2\sqrt{6})(-45)$$

$$\boxed{= 90\sqrt{6}}$$

e) expand out factored form

$$f(x) = -2\sqrt{6}(x + 3\sqrt{3})(x - 5\sqrt{3})$$

$$f(x) = -2\sqrt{6}(x^2 - 5\sqrt{3}x + 3\sqrt{3}x - 15\sqrt{9})$$

$$f(x) = -2\sqrt{6}(x^2 - 2\sqrt{3}x - 45)$$

$$f(x) = -2\sqrt{6}x^2 + 4\sqrt{18}x + 90\sqrt{6}$$

$$\boxed{f(x) = -2\sqrt{6}x^2 + 12\sqrt{2}x + 90\sqrt{6}}$$