

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Solve the inequality. Give answer in interval notation.

1) $(x + 7)(x + 6)(x + 3) < 0$

2) $(x + 8)(x^2 - 49) > 0$

Sketch the graph of the polynomial function.

3) $f(x) = -2x(x - 1)(x + 2)$

4) $P(x) = -3x(x - 2)^2$

Graph the function.

5) $f(x) = x(x + 1)(x - 2)(x + 4)$

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Evaluate the function for the given values of a and b. Then use the intermediate value theorem to determine which of the statements below is true.

6) $a = -2$ and $b = -1$

$$f(x) = 4x^5 - 3x^3 + 5x^2 + 7$$

- A) $f(-2)$ and $f(-1)$ have the same sign, therefore the intermediate value theorem cannot be used to determine whether f has a real zero between -2 and -1 .
- B) $f(-2)$ and $f(-1)$ have the same sign, therefore the function f has a real zero between -2 and -1 .
- C) $f(-2)$ and $f(-1)$ have opposite signs, therefore the function f has a real zero between -2 and -1 .
- D) $f(-2)$ and $f(-1)$ have opposite signs, therefore the function f does not have a real zero between -2 and -1 .

7) $a = 0$, $b = 4$

$$f(x) = x^3 + 2x^2 + 3x + 2$$

- A) $f(0)$ and $f(4)$ have opposite signs, therefore f does not have a real zero between 0 and 4 .
- B) $f(0)$ and $f(4)$ have the same sign, therefore the intermediate value theorem cannot be used to determine whether f has a real zero between 0 and 4 .
- C) $f(0)$ and $f(4)$ have opposite signs, therefore f has a real zero between 0 and 4 .
- D) $f(0)$ and $f(4)$ have the same sign, therefore f does not have a real zero between 0 and 4 .

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Find the equation and sketch the graph of the function.

- 8) A quadratic function with x -intercept $(2, 0)$ and y -intercept $(0, 4)$.
- 9) A quadratic function with x -intercepts $(5, 0)$ and $(-4, 0)$ and y -intercept $(0, 2)$.
- 10) A cubic function with x -intercepts $(2, 0)$, $(-3, 0)$, and $(4, 0)$ and y -intercept $(0, 9)$.

Solve the problem.

- 11) A rectangular piece of cardboard measuring 16 inches by 40 inches is to be made into a box with an open top by cutting equal size squares from each corner and folding up the sides. Let x represent the length of a side of each such square. For what value of x will the volume be a maximum? If necessary, round to 2 decimal places.