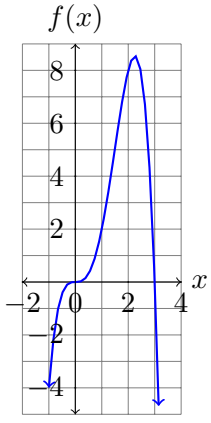
COLLEGE ALGEBRA QUIZ

(1) What is the maximum number of x-intercepts that the graph of $P(x) = x^5 - x^8$ can have?
Solution: 8

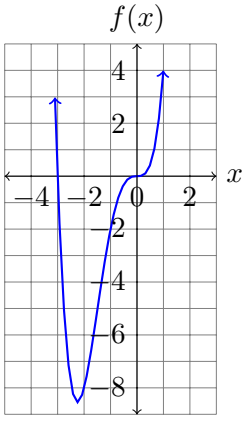
This question is part of a multi-part question. They must answer the first part before they are given the second part. Since we want the student to be able to evaluate the zeros, y-intercept, end behavior just from seeing the equation – then use that information to determine the appropriate graph.

(2) Given, $f(x) = -x^4 + 3x^3$.
(a) Determine the end behavior,
Solution:
as $x \to -\infty$, $f(x) \to -\infty$; $x \to \infty$, $f(x) \to -\infty$
(b) Determine the zeros,
Solution: zeros are 0 and 3
(c) Determine the y-intercept.
Solution: (0,0)
(d) Which of the following is the graph of $f(x)$.

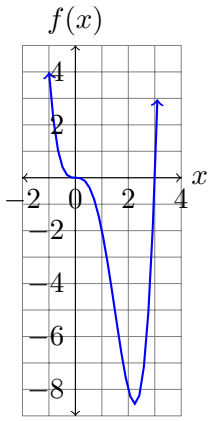
(i)



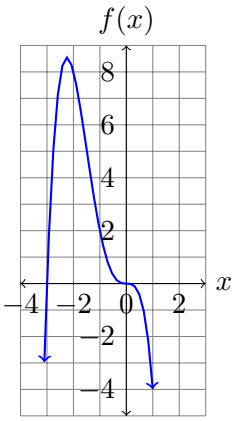
(ii)



(iii)

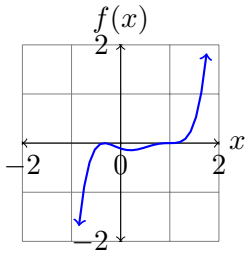


(iv)

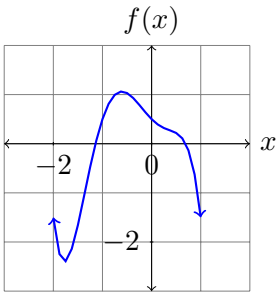


(3) Given, $g(x) = (x-1)^3(x+\frac{1}{3})^2$.
(a) Determine the end behavior,
Solution:
as $x \to -\infty$, $g(x) \to -\infty$; $x \to \infty$, $g(x) \to \infty$
(b) Determine the zeros,
Solution: zeros are 1 and $-\frac{1}{3}$
(c) Determine the y-intercept.
Solution: $(0,-\frac{1}{9})$
(d) Which of the following is the graph of $f(x)$.

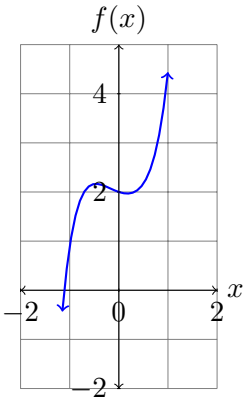
(i)



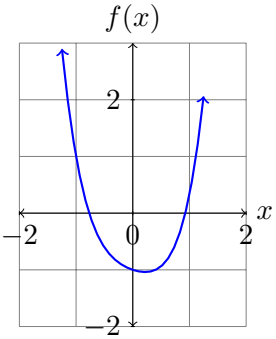
(ii)



(iii)



(iv)



(4) Given, $h(x) = x^3 + 4x^2 - x - 4$.

(a) Determine the end behavior,

Solution:

as $x \to -\infty$, $h(x) \to -\infty$; $x \to \infty$, $h(x) \to \infty$

(b) Determine the zeros,

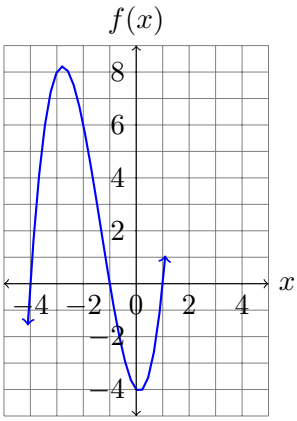
Solution: zeros are ± 1 and -4

(c) Determine the y-intercept.

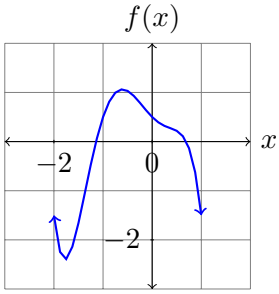
Solution: (0,-4)

(d) Which of the following is the graph of $f(x)$.

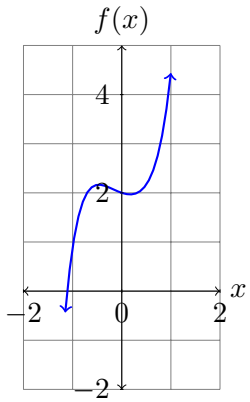
(i)



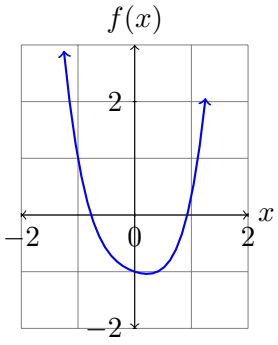
(ii)



(iii)



(iv)



(5) Determine the zeros of $f(x) = x^4 - 3x^3 - 9x^2 - 5x$, then answer the following questions,
(a) On which interval(s) is $f(x)$ positive (above the x axis)?
Solution: $(-\infty, -1), (-1, 0)(5, \infty)$
(b) On which interval(s) is $f(x)$ negative (below the x axis)?
Solution: $(0, 5)$

(6) Using the intermediate value theorem, does $f(x) = 5x^2 - 4x - 6$ have a zero between 1 and 2?
Solution: f(1) = -5, f(2) = 6. Since $1 \neq 2$, and f(1) and f(2) have opposite signs, then there is at least one real zero between 1 and 2.

(7) Using the intermediate value theorem, does $g(x) = x^3 - 3x^2 + 0.2x + 5$ have a zero between -1 and 1?
Solution: g(-1) = 0.8, g(1) = 3.2. Since $-1 \neq 1$, but g(-1) and g(1) have the same signs, then the intermediate value theorem cannot be used to determine if there are any zeros between -1 and 1.