

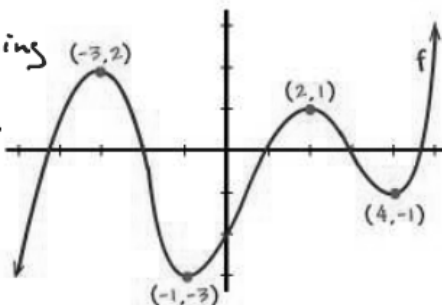
What you will learn about:
End Behaviors
Intervals of Increasing/Decreasing

move Left → Right

y-values tell
if function is
increasing or decreasing

Answer in intervals
are x-values

Identify intervals on which the function is decreasing and increasing.



Inc $(-\infty, -3) \cup (-1, 2) \cup (4, \infty)$

Dec $(-3, -1) \cup (2, 4)$

For each function identify the intervals of increasing and decreasing.

Local min
-.82

Local max
.82

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

Dec $(-\infty, -.82) \cup$
 $(.82, \infty)$

Inc $(-.82, .82)$

$$f(x) = x^3 - 11x^2 + 39x - 47$$

Inc $(-\infty, 3) \cup (4.3, \infty)$

Dec $(3, 4.3)$

Local max
 $x = 3$

Local min
 $x = 4.3$

$$g(x) = \frac{x^2}{4x+4}$$

Inc $(-\infty, -2), (0, \infty)$

Dec $(-2, -1) \cup (-1, 0)$

$$h(t) = \frac{3t^2 - 3}{t^3}$$

End Behaviors

What happens on extreme ends

$$\lim_{x \rightarrow \infty} f(x) / \lim_{x \rightarrow -\infty} f(x)$$

Degree is even Both

End Behaviors go same direction

L.C. is pos Both end Behaviors go up

L.C. is Negative Both end Behaviors go Down.

Degree is odd end Behaviors go opposite Direction

Describe the end behaviors for each function.

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

$$\lim_{x \rightarrow \infty} f(x) = \infty$$

$$\lim_{x \rightarrow -\infty} f(x) = -\infty$$

$$h(t) = t^5 - 4t^3 + 5t + 2$$

$$\lim_{t \rightarrow \infty} h(t) = \infty$$

$$\lim_{t \rightarrow -\infty} h(t) = -\infty$$

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

$$\lim_{x \rightarrow \infty} f(x) = -\infty$$

$$\lim_{x \rightarrow -\infty} f(x) = \infty$$

$$f(x) = (x-3)(x+5)(x-1)$$

$$\lim_{x \rightarrow \infty} f(x) = \infty$$

$$\lim_{x \rightarrow -\infty} f(x) = -\infty$$

$$g(x) = x^4 - 4x^2 - x - 5$$

$$\lim_{x \rightarrow \pm\infty} f(x) = \infty$$

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

$$\lim_{x \rightarrow \pm\infty} p(x) = -\infty$$

$$B) f(x) = (x-3)(5-6x)(x-1)$$

$$\lim_{x \rightarrow \infty} f(x) = -\infty$$

$$\lim_{x \rightarrow -\infty} f(x) = \infty$$

$$D = 3$$

$$L.C. = -6$$

$D = 4$ $L.C. = 1$
 C) $f(x) = (x - 3)^2(x + 5)(x - 1)$

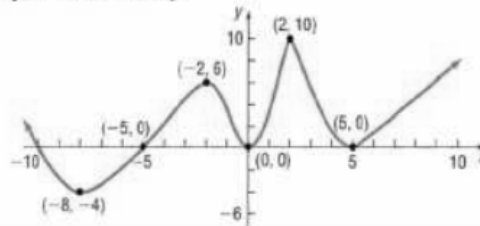
$\lim_{x \rightarrow \pm\infty} f(x) = \infty$

$Degree = 4$
 D) $f(x) = (x - 3)(5 - 6x)^3$

$\lim_{x \rightarrow \pm\infty} f(x) = -\infty$

$L.C. = -$

In problems 1-8, use the given graph of the function f .



- | | |
|---|---|
| 1 | Is f increasing on the interval $(-8, -2)$? |
| 2 | Is f increasing on the interval $(2, 10)$? |
| 3 | List the interval(s) on which f is increasing. Justify your answer. |
| 4 | List the interval(s) on which f is decreasing. Justify your answer. |
| 5 | List the value(s) of x at which f has a local maximum. Justify your answer. |
| 6 | List the value(s) of x at which f has a local minimum. Justify your answer. |
| 7 | Find the x -intercepts. |
| 8 | Find the y -intercepts. |