

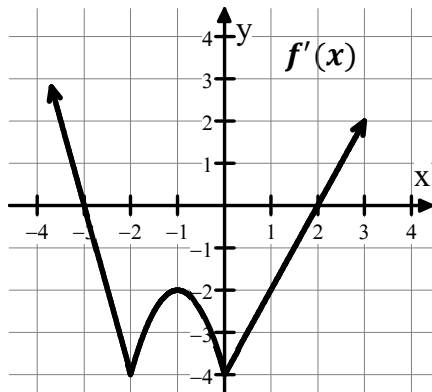
5.3 Increasing and Decreasing Intervals

Calculus

Name: _____

The following graphs show the derivative of f , f' . Identify the intervals when f is increasing and decreasing. Include a justification statement.

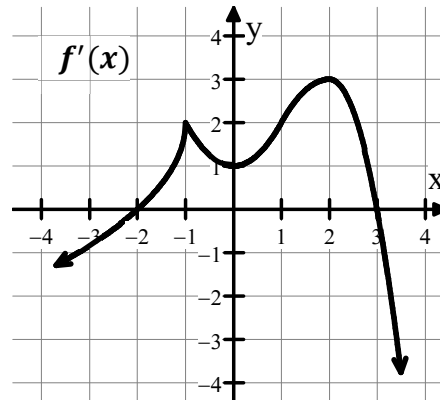
1.



Increasing:

Decreasing:

2.



Increasing:

Decreasing:

For each function, find the intervals where it is increasing and decreasing, and **JUSTIFY** your conclusion. Construct a sign chart to help you organize the information, but do not use a calculator.

3. $h(x) = -x^5 + \frac{5}{2}x^4 + \frac{40}{3}x^3 + 5$

4. $f(x) = xe^{\frac{1}{x}}$

5. $g(x) = e^{\cos x}$ on the interval $[0, 2\pi]$

The derivative f' is given for each problem. Use a calculator to help you answer each question about f .

6. $f'(x) = \cos(x^2)$ for $0 < x \leq 3$. On what intervals is f decreasing?

7. $f'(x) = \cos x + \sin(3x)$ for $0 \leq x \leq \pi$. On what intervals is f increasing?

For #8-9, calculator use is encouraged.

8. A particle is moving along the y -axis at a rate modeled by $r(t) = \sin(e^t)$ feet per minute where t is measured in minutes. Is the particle moving up or down at $t = 10$ minutes? Why?

9. A particle's position on the x -axis can be modeled by $x(t) = 0.04t^3 + 5.7t^2 - 3$ where $x(t)$ is measured in meters and t is measured in seconds. Is the particle moving left or right at $t = 17$ seconds? Why?

Answers to 5.3 CA #1

1. Increasing on $(-\infty, -3)$ and $(2, \infty)$ because $f'(x) > 0$. Decreasing on $(-3, 2)$ because $f'(x) < 0$.	2. Increasing on $(-2, 3)$ because $f'(x) > 0$. Decreasing on $(-\infty, -2)$ and $(3, \infty)$ because $f'(x) < 0$.	3. Increasing on $(-2, 0)$ and $(0, 4)$ because $f'(x) > 0$. Decreasing on $(-\infty, -2)$ and $(4, \infty)$ because $f'(x) < 0$.
4. Increasing on $(-\infty, 0)$ and $(1, \infty)$ because $f'(x) > 0$. Decreasing on $(0, 1)$ because $f'(x) < 0$.	5. Increasing on $(\pi, 2\pi)$ because $f'(x) > 0$. Decreasing on $(0, \pi)$ because $f'(x) < 0$.	6. $(1.253, 2.1708)$ and $(2.8024, 3)$
7. $(0, 1.178)$ and $(2.356, 2.7488)$	8. $r(10) \approx -0.6887$. Moving down because $r(10) < 0$.	9. $x'(17) \approx 228.48$ Moving right because $x'(17) > 0$.