

5.6 Determining Concavity

Calculus

Name: _____

CA #2

Find the point(s) of inflection for each function. Justify your answer.

1. $f(x) = 5 + 3x^2 - x^3$

2. $h(x) = (3x^2 - 2)^2$

3. $f(x) = x + 2 \sin x$ on the interval $(0, 2\pi)$

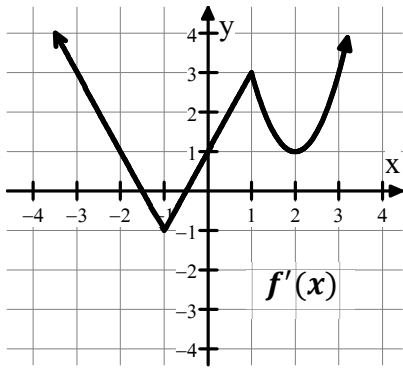
State the intervals of concavity.

4. $x(t) = t^3 - 15t^2$

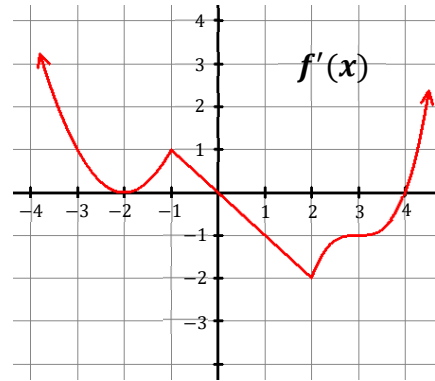
5. $g(x) = \cos\left(\frac{x}{2}\right)$ on the interval $(0, 2\pi)$

The graph of $f'(x)$ is shown. Find the point(s) of inflection.

6.

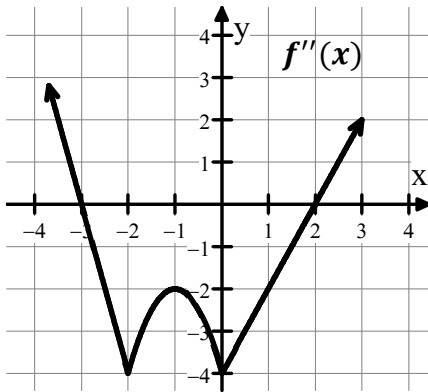


7.

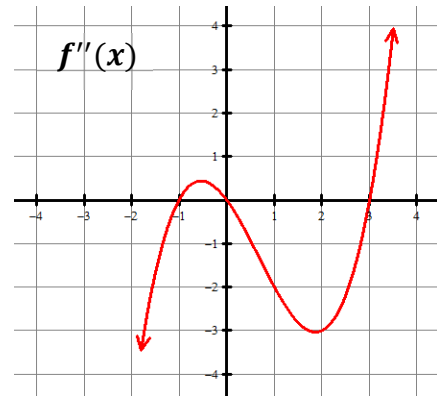


The graph of $f''(x)$ is shown. State the intervals of concavity of $f(x)$ and find the point(s) of inflection.

8.



9.



Does the line tangent to the graph of h at the given value of x lie above or below the graph of h ? Why?

10. $h(x) = (1 - x^2)^2$ at $x = -3$

11. $h(x) = -\cos(2x)$ at $x = \frac{\pi}{3}$

Answers to 5.6 CA #2

1. $x = 1$ because $f''(x)$ changes sign.	2. $x = \pm\sqrt{\frac{2}{9}}$ because $h''(x)$ changes sign.	3. $x = \pi$ because $f''(x)$ changes sign.
4. Concave down: $(-\infty, 5)$ Concave up: $(5, \infty)$	5. Concave down: $(0, \pi)$ Concave up: $(\pi, 2\pi)$	6. $x = -1, 1, 2$
7. $x = -2, -1, 2$	8. $x = -3, 2$ Concave up: $(-\infty, -3)$ and $(2, \infty)$ Concave down: $(-3, 2)$	9. $x = -1, 0, 3$ Concave up: $(-1, 0)$ and $(3, \infty)$ Concave down: $(-\infty, 1)$ and $(0, 3)$
10. Below because $h''(-3) > 0$	11. Above because $h''(\frac{\pi}{3}) < 0$	