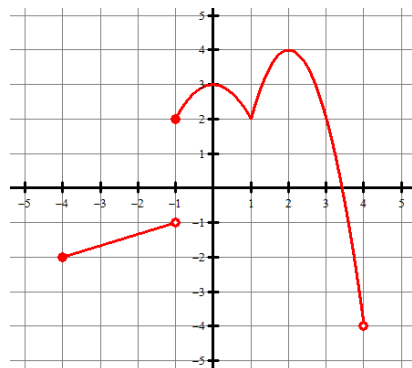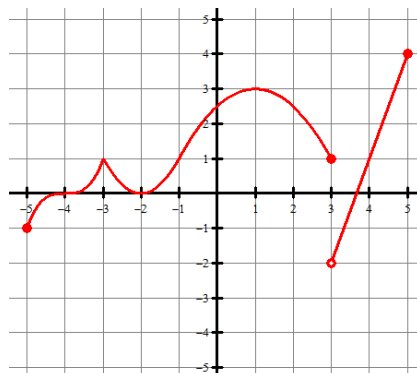**5.1 Extreme Value**

Corrective Assignment

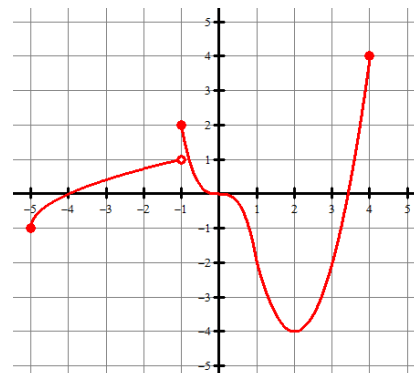### Find the extreme values and where they occur.

1.

2.

3.

Find the critical points.

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

5. $g(t) = (t+2)^{\frac{2}{3}}$

6. $h(x) = x + \frac{32}{x^2}$

7. $f(x) = x^2 \ln x$

8. $h(x) = 2\cos(2x)$

   where $-2\pi \le x \le 2\pi$

9. $g(x) = x^2 e^x$

Find the absolute maximum and minimum values of the function on the given interval.

10. $f(x) = -x^2 + 3x,$ $[0, 3]$

11. $f(x) = x^3 - 12x,$ $[0, 4]$

12. $f(x) = \dfrac{16x}{x^2+16},$ $[-5, -1]$

13. $f(x) = 3x^{\frac{2}{3}} - 2x,$ $[-1, 1]$

14. $f(x) = \cos \pi x,$ $\left[0, \dfrac{3}{2}\right]$

15. $f(x) = \dfrac{\ln x}{x}$ $[1, 3]$

ANSWERS TO CORRECTIVE ASSIGNMENT

1. local min of -2 when $x = -4$ local min of 2 when $x = -1, 1$ local max of 3 when $x = 0$ abs max of 4 when $x = 2$	2. local min of -1 when $x = -5$ local max of 1 when $x = -3$ local min of 0 when $x = -2$ local max of 3 when $x = 1$ local min of 1 when $x = 3$ abs max of 4 when $x = 5$	3. local min of -1 when $x = -5$ local max of 2 when $x = -1$ abs min of -4 when $x = 2$ abs max of 4 when $x = 4$

4. $x = 0, 2$	5. $x = -2$	6. $x = 0, 4$	7. $x = e^{-\frac{1}{2}}$	8. $x = 0, \pm\dfrac{\pi}{2}, \pm\pi$ 9. $x = 0, -2$

10. $f(0) = 0$ abs min $f\left(\dfrac{3}{2}\right) = \dfrac{9}{4}$ abs max $f(3) = 0$ abs min	11. $f(0) = 0$ $f(2) = -16$ abs min $f(4) = 16$ abs max	12. $f(-5) = -\dfrac{80}{41}$ $f(-4) = -2$ abs min $f(-1) = -\dfrac{16}{17}$ abs max
13. $f(-1) = 5$ abs max $f(0) = 0$ abs min $f(1) = 1$	14. $f(0) = 1$ abs max $f(1) = -1$ abs min $f\left(\dfrac{3}{2}\right) = 0$	15. $f(1) = 0$ abs min $f(e) = \dfrac{1}{e}$ abs max $f(3) = \dfrac{\ln 3}{3}$