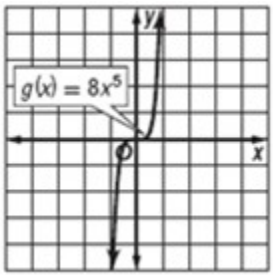
2-1 Power and Radical Functions

Graph and analyze each function. Describe the domain, range, intercepts, end behavior, continuity, and where the function is increasing or decreasing.

2. $g(x) = 8x^5$

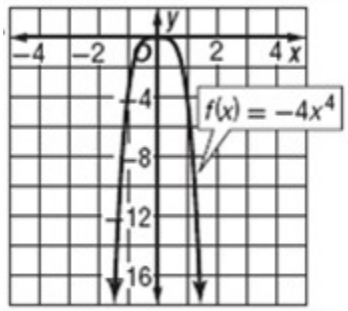
ANSWER:



D = $(-\infty, \infty)$, R = $(-\infty, \infty)$; intercept: 0; $\lim_{x \to -\infty} f(x) = -\infty$ and $\lim_{x \to \infty} f(x) = \infty$; continuous for all real numbers; increasing: $(-\infty, \infty)$

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

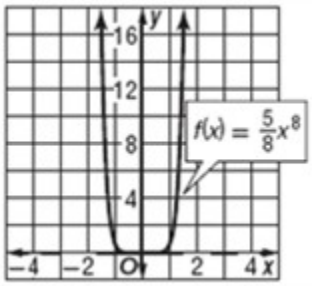
ANSWER:



D = $(-\infty, \infty)$, R = $(-\infty, 0]$; intercept: 0; $\lim_{x \to -\infty} f(x) = -\infty$ and $\lim_{x \to \infty} f(x) = -\infty$; continuous for all real numbers; increasing: $(-\infty, 0)$; decreasing: $(0, \infty)$

6. $f(x) = \frac{5}{8}x^8$

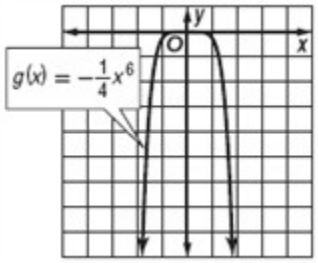
ANSWER:



D = $(-\infty, \infty)$, R = $[0, \infty)$; intercept: 0; $\lim_{x \to -\infty} f(x) = \infty$ and $\lim_{x \to \infty} f(x) = \infty$; continuous for all real numbers; decreasing: $(-\infty, 0)$; increasing: $(0, \infty)$

8. $g(x) = -\frac{1}{4}x^6$

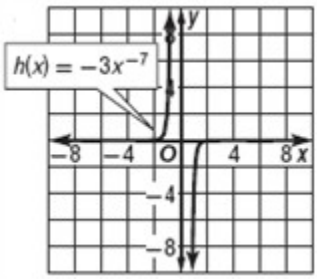
ANSWER:



D = $(-\infty, \infty)$, R = $(-\infty, 0]$; intercept: 0; $\lim_{x \to -\infty} f(x) = -\infty$ and $\lim_{x \to \infty} f(x) = -\infty$; continuous for all real numbers; increasing: $(-\infty, 0)$; decreasing: $(0, \infty)$

10. $h(x) = -3x^{-7}$

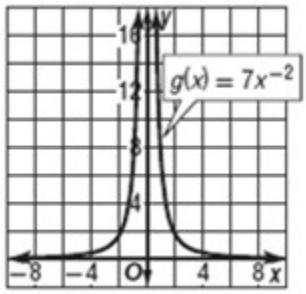
ANSWER:



D = $(-\infty, 0) \cup (0, \infty)$, R = $(-\infty, 0) \cup (0, \infty)$; no intercepts; $\lim_{x \to -\infty} f(x) = 0$ and $\lim_{x \to \infty} f(x) = 0$; infinite discontinuity at $x = 0$; increasing: $(-\infty, 0)$ and $(0, \infty)$

12. $g(x) = 7x^{-2}$

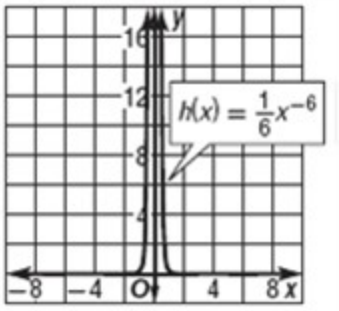
ANSWER:



D = $(-\infty, 0) \cup (0, \infty)$, R = $(0, \infty)$; no intercepts; $\lim_{x \to -\infty} f(x) = 0$ and $\lim_{x \to \infty} f(x) = 0$; infinite discontinuity at $x = 0$; increasing: $(-\infty, 0)$; decreasing: $(0, \infty)$

14. $h(x) = \frac{1}{6}x^{-6}$

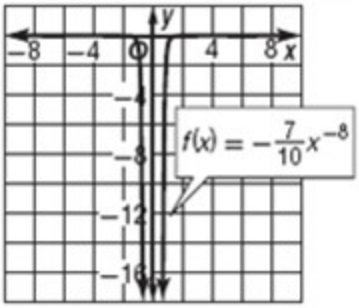
ANSWER:



D = $(-\infty, 0) \cup (0, \infty)$, R = $(0, \infty)$; no intercepts; $\lim_{x \to -\infty} f(x) = 0$ and $\lim_{x \to \infty} f(x) = 0$; infinite discontinuity at $x = 0$; increasing: $(-\infty, 0)$; decreasing: $(0, \infty)$

16. $f(x) = -\frac{7}{10}x^{-8}$

ANSWER:

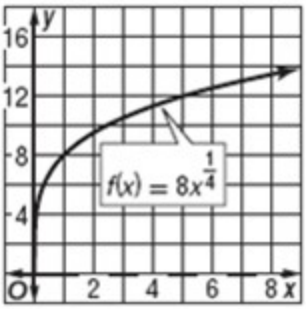


D = $(-\infty, 0) \cup (0, \infty)$, R = $(-\infty, 0)$; no intercepts; $\lim_{x \to -\infty} f(x) = 0$ and $\lim_{x \to \infty} f(x) = 0$; infinite discontinuity at $x = 0$; decreasing: $(-\infty, 0)$; increasing: $(0, \infty)$

Graph and analyze each function. Describe the domain, range, intercepts, end behavior, continuity, and where the function is increasing or decreasing.

18. $f(x) = 8x^{\frac{1}{4}}$

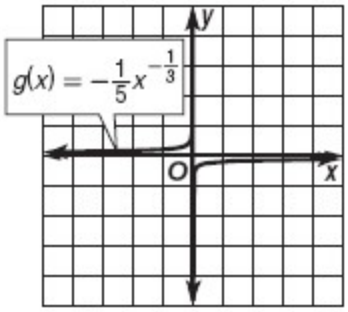
ANSWER:



D = $[0, \infty)$, R = $[0, \infty)$; intercept: 0; $\lim_{x \to \infty} f(x) = \infty$; continuous on $[0, \infty)$; increasing: $(0, \infty)$

20. $g(x) = -\frac{1}{5}x^{-\frac{1}{3}}$

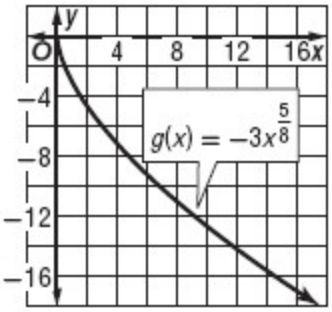
ANSWER:



D = $(-\infty, 0) \cup (0, \infty)$, R = $(-\infty, 0) \cup (0, \infty)$; no intercepts; $\lim_{x \to -\infty} f(x) = 0$ and $\lim_{x \to \infty} f(x) = 0$; infinite discontinuity at $x = 0$; increasing: $(-\infty, 0)$ and $(0, \infty)$

22. $g(x) = -3x^{\frac{5}{8}}$

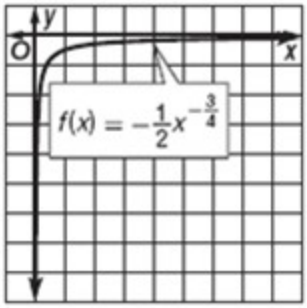
ANSWER:



D = $[0, \infty)$, R = $(-\infty, 0]$; intercept: 0; $\lim_{x \to \infty} f(x) = -\infty$; continuous on $[0, \infty)$; decreasing: $(0, \infty)$

24. $f(x) = -\frac{1}{2}x^{-\frac{3}{4}}$

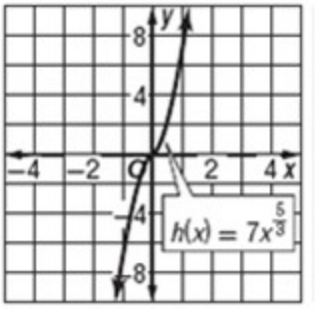
ANSWER:



D = $(0, \infty)$, R = $(-\infty, 0)$; no intercepts; $\lim_{x \to \infty} f(x) = 0$; continuous on $(0, \infty)$; increasing: $(0, \infty)$

26. $h(x) = 7x^{\frac{5}{3}}$

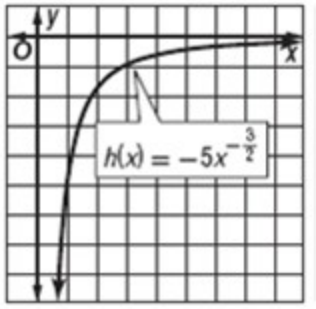
ANSWER:



D = $(-\infty, \infty)$, R = $(-\infty, \infty)$; intercept: 0; $\lim_{x \to -\infty} f(x) = -\infty$ and $\lim_{x \to \infty} f(x) = \infty$; continuous for all real numbers; increasing: $(-\infty, \infty)$

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

ANSWER:



D = $(0, \infty)$, R = $(-\infty, 0)$; no intercepts; $\lim_{x \to \infty} f(x) = 0$; continuous on $(0, \infty)$; increasing: $(0, \infty)$