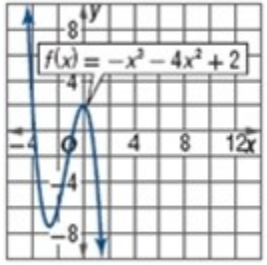
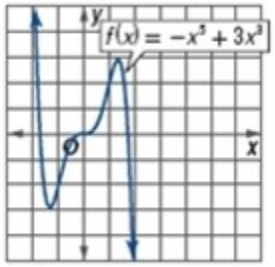
1-4 Extrema and Average Rates of Change

Use the graph of each function to estimate intervals to the nearest 0.5 unit on which the function is increasing, decreasing, or constant. Support the answer numerically.

2. 

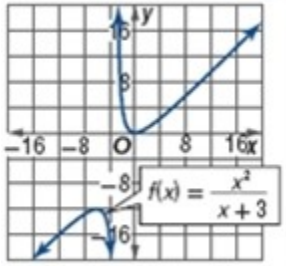
ANSWER:

f is decreasing on $(-\infty, -2.5)$, increasing on $(-2.5, 0)$, and decreasing on $(0, \infty)$.

4. 

ANSWER:

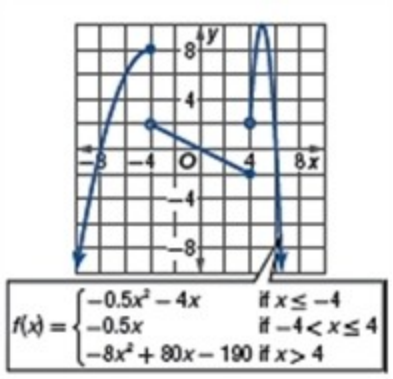
f is decreasing on $(-\infty, -1.5)$, increasing on $(-1.5, 1.5)$, and decreasing on $(1.5, \infty)$.

6. 

ANSWER:

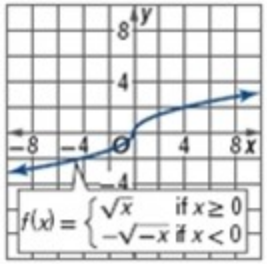
f is increasing on $(-\infty, -6)$, decreasing on $(-6, -3)$, decreasing on $(-3, 0)$, and increasing on $(0, \infty)$.

1-4 Extrema and Average Rates of Change

8. 

ANSWER:

f is increasing on $(-\infty, -4)$, decreasing on $(-4, 4)$, increasing on $(4, 5)$, and decreasing on $(5, \infty)$.

10. 

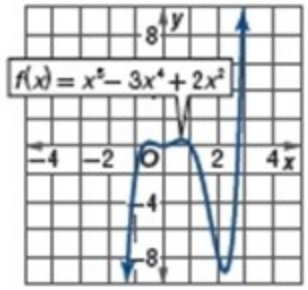
ANSWER:

f is increasing on $(-\infty, \infty)$.

1-4 Extrema and Average Rates of Change

Estimate and classify the extrema for the graph of each function. Support the answers numerically.

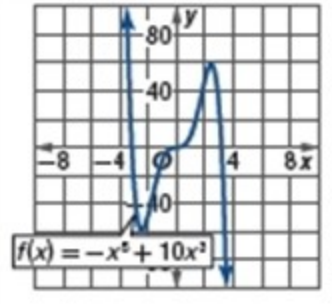
12.



ANSWER:

rel. max: (–0.52, 0.28), (0.68, 0.43); rel. min: (0, 0), (2.24, –9.1)

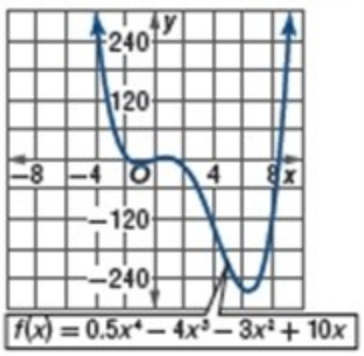
14.



ANSWER:

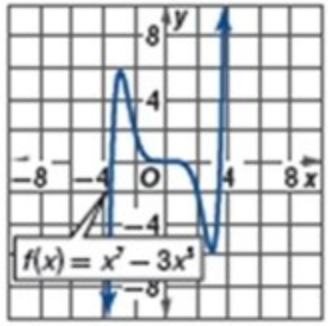
rel. min: (–2.45, –58.79); rel. max: (2.45, 58.79)

1-4 Extrema and Average Rates of Change

16. 

ANSWER:

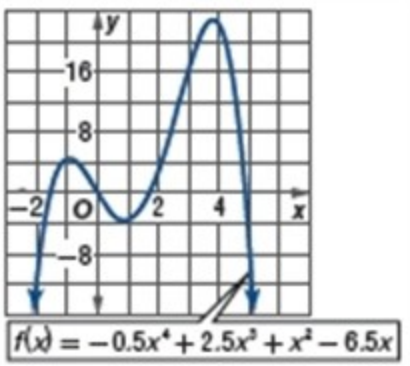
rel. min: (–1.08, –8.58); rel. max: (0.73, 4.29); abs. min: (6.35, –268.71)

18. 

ANSWER:

rel. max: (–1.46, 5.76); rel. min: (1.46, –5.76)

1-4 Extrema and Average Rates of Change

20. 

ANSWER:

rel. max: (–0.95, 4.53); rel. min: (0.91, –3.55); abs. max: (3.79, 22.67)

GRAPHING CALCULATOR Approximate to the nearest hundredth the relative or absolute extrema of each function. State the *x*-values where they occur.

22. $f(x) = 3x^3 - 6x^2 + 8$

ANSWER:

rel. max: (0, 8); rel. min: (1.33, 4.44)

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

ANSWER:

abs. max: (2.25, 6.54)

26. $f(x) = x^5 - 2x^3 - 6x - 2$

ANSWER:

rel. max: (−1.36, 6.54); rel. min: (1.36, −10.54)

28. $g(x) = x^6 - 4x^4 + x$

ANSWER:

rel. max: (0.41, 0.30); rel. min: (1.62, −7.85); abs. min: (−1.64, −11.12)