Calculus Practice: Use Derivatives to Analyze Functions 13b

For each problem, find all points of absolute minima and maxima on the given interval.

1) $y = -\frac{1}{5}(x+3)^{\frac{5}{3}} + 2(x+3)^{\frac{2}{3}};\quad (-\infty, -1)$

2) $y = (7x-35)^{\frac{1}{3}};\quad (-\infty, 6]$

3) $f(x) = -\frac{1}{6}x^{\frac{7}{3}} + \frac{14}{3}x^{\frac{1}{3}};\quad (-1, 3)$

4) $y = -(-x+5)^{\frac{1}{2}};\quad (1, 4)$

5) $y = -(2x-8)^{\frac{2}{3}};\quad (0, 5]$

6) $f(x) = -(-x+3)^{\frac{1}{2}};\quad (-6, 0)$

7) $y = -\frac{1}{5}(x+3)^{\frac{5}{3}} + 2(x+3)^{\frac{2}{3}} - 1;\quad (-6, \infty)$

8) $y = \frac{1}{5}(x+3)^{\frac{5}{3}} - 2(x+3)^{\frac{2}{3}} - 1;\quad (1, 3]$

9) $y = -\frac{3}{16}(x+1)^{\frac{4}{3}} + \frac{3}{2}(x+1)^{\frac{1}{3}} - 2;\quad (-\infty, \infty)$

10) $f(x) = -\frac{x^2}{4x-4};\quad (-\infty, -1]$

11) $f(x) = -2\sec(2x)$; $[-\frac{\pi}{6}, \frac{\pi}{6})$

12) $f(x) = -\csc(x)$; $[-\frac{\pi}{4}, \frac{\pi}{4}]$

13) $y = \cot(2x)$; $(-\frac{\pi}{4}, -\frac{\pi}{6})$

14) $y = -2\cos(x)$; $(-\frac{\pi}{3}, -\frac{\pi}{4}]$

15) $y = -\cot(x)$; $(-\frac{\pi}{6}, \frac{\pi}{4})$

16) $f(x) = 2\csc(2x)$; $(\frac{\pi}{4}, \frac{\pi}{3}]$

17) $y = -\csc(x)$; $[-\frac{\pi}{4}, -\frac{\pi}{6})$

18) $f(x) = -\csc(2x)$; $[-\frac{\pi}{3}, -\frac{\pi}{4})$

19) $y = -2\csc(x)$; $[-\frac{\pi}{4}, -\frac{\pi}{6})$

20) $y = -\cot(x)$; $[\frac{\pi}{4}, \frac{\pi}{3})$

Calculus Practice: Use Derivatives to Analyze Functions 13b

For each problem, find all points of absolute minima and maxima on the given interval.

1) $y = -\frac{1}{5}(x+3)^{\frac{5}{3}} + 2(x+3)^{\frac{2}{3}}$; $(-\infty, -1)$

Absolute minimum: $(-3, 0)$
No absolute maxima.

2) $y = (7x-35)^{\frac{1}{3}}$; $(-\infty, 6]$

No absolute minima.
Absolute maximum: $\left(6, \sqrt[3]{7}\right)$

3) $f(x) = -\frac{1}{6}x^{\frac{7}{3}} + \frac{14}{3}x^{\frac{1}{3}}$; $(-1, 3)$

No absolute minima.
Absolute maximum: $\left(2, 4\sqrt[3]{2}\right)$

4) $y = -(-x+5)^{\frac{1}{2}}$; $(1, 4)$

No absolute minima.
No absolute maxima.

5) $y = -(2x-8)^{\frac{2}{3}}$; $(0, 5]$

No absolute minima.
Absolute maximum: $(4, 0)$

6) $f(x) = -(-x+3)^{\frac{1}{2}}$; $(-6, 0)$

No absolute minima.
No absolute maxima.

7) $y = -\frac{1}{5}(x+3)^{\frac{5}{3}} + 2(x+3)^{\frac{2}{3}} - 1$; $(-6, \infty)$

No absolute minima.
No absolute maxima.

8) $y = \frac{1}{5}(x+3)^{\frac{5}{3}} - 2(x+3)^{\frac{2}{3}} - 1$; $(1, 3]$

No absolute minima.
Absolute maximum: $\left(3, \frac{-4\sqrt[3]{36} - 5}{5}\right)$

9) $y = -\frac{3}{16}(x+1)^{\frac{4}{3}} + \frac{3}{2}(x+1)^{\frac{1}{3}} - 2$; $(-\infty, \infty)$

No absolute minima.
Absolute maximum: $\left(1, \frac{-16 + 9\sqrt[3]{2}}{8}\right)$

10) $f(x) = -\frac{x^2}{4x-4}$; $(-\infty, -1]$

Absolute minimum: $\left(-1, \frac{1}{8}\right)$
No absolute maxima.

11) $f(x) = -2\sec(2x)$; $[-\frac{\pi}{6}, \frac{\pi}{6})$

Absolute minimum: $\left(-\frac{\pi}{6}, -4\right)$

Absolute maximum: $(0, -2)$

12) $f(x) = -\csc(x)$; $[-\frac{\pi}{4}, \frac{\pi}{4}]$

No absolute minima.
No absolute maxima.

13) $y = \cot(2x)$; $(-\frac{\pi}{4}, -\frac{\pi}{6})$

No absolute minima.
No absolute maxima.

14) $y = -2\cos(x)$; $(-\frac{\pi}{3}, -\frac{\pi}{4}]$

Absolute minimum: $\left(-\frac{\pi}{4}, -\sqrt{2}\right)$

No absolute maxima.

15) $y = -\cot(x)$; $(-\frac{\pi}{6}, \frac{\pi}{4})$

No absolute minima.
No absolute maxima.

16) $f(x) = 2\csc(2x)$; $(\frac{\pi}{4}, \frac{\pi}{3}]$

No absolute minima.

Absolute maximum: $\left(\frac{\pi}{3}, \frac{4\sqrt{3}}{3}\right)$

17) $y = -\csc(x)$; $[-\frac{\pi}{4}, -\frac{\pi}{6})$

Absolute minimum: $\left(-\frac{\pi}{4}, \sqrt{2}\right)$

No absolute maxima.

18) $f(x) = -\csc(2x)$; $[-\frac{\pi}{3}, -\frac{\pi}{4})$

No absolute minima.

Absolute maximum: $\left(-\frac{\pi}{3}, \frac{2\sqrt{3}}{3}\right)$

19) $y = -2\csc(x)$; $[-\frac{\pi}{4}, -\frac{\pi}{6})$

Absolute minimum: $\left(-\frac{\pi}{4}, 2\sqrt{2}\right)$

No absolute maxima.

20) $y = -\cot(x)$; $[\frac{\pi}{4}, \frac{\pi}{3})$

Absolute minimum: $\left(\frac{\pi}{4}, -1\right)$

No absolute maxima.