Name_____

Calculus Practice: Use Derivatives to Analyze Functions 10b

For each problem, find all points of relative minima and maxima.

1) $f(x) = x^2 - 4x + 2$

2) $y = -x^4 + x^2 - 3$

3) $f(x) = -x^3 - \dfrac{9x^2}{2} - 12x - 9$

4) $y = x^3 - 3x^2 + 1$

5) $y = x^3 - 2x^2 - 1$

6) $y = x^3 - 3x^2 - 1$

7) $y = x^3 - x^2 - 2$

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

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

10) $y = 2x^2 - 8x + 10$

11) $f(x) = x^4 - 4x^2 + 2$

12) $f(x) = x^3 - 3x^2$

13) $y = -x^3 + 3x^2 - 6$

14) $y = x^3 - x^2 - 5x + 4$

15) $y = -2x^2 + 12x - 19$

16) $f(x) = \dfrac{x^2}{2} - 3x + \dfrac{13}{2}$

Name_____

Calculus Practice: Use Derivatives to Analyze Functions 10b

For each problem, find all points of relative minima and maxima.

1) $f(x) = x^2 - 4x + 2$

Relative minimum: $(2, -2)$
No relative maxima.

2) $y = -x^4 + x^2 - 3$

Relative minimum: $(0, -3)$
Relative maxima: $\left(-\dfrac{\sqrt{2}}{2}, -\dfrac{11}{4}\right), \left(\dfrac{\sqrt{2}}{2}, -\dfrac{11}{4}\right)$

3) $f(x) = -x^3 - \dfrac{9x^2}{2} - 12x - 9$

No relative minima.
No relative maxima.

4) $y = x^3 - 3x^2 + 1$

Relative minimum: $(2, -3)$
Relative maximum: $(0, 1)$

5) $y = x^3 - 2x^2 - 1$

Relative minimum: $\left(\dfrac{4}{3}, -\dfrac{59}{27}\right)$
Relative maximum: $(0, -1)$

6) $y = x^3 - 3x^2 - 1$

Relative minimum: $(2, -5)$
Relative maximum: $(0, -1)$

7) $y = x^3 - x^2 - 2$

Relative minimum: $\left(\dfrac{2}{3}, -\dfrac{58}{27}\right)$
Relative maximum: $(0, -2)$

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

Relative minimum: $(0, 0)$
Relative maximum: $\left(\dfrac{2}{3}, \dfrac{4}{27}\right)$

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

Relative minima: $\left(-\dfrac{\sqrt{2}}{2}, -\dfrac{13}{4}\right), \left(\dfrac{\sqrt{2}}{2}, -\dfrac{13}{4}\right)$
Relative maximum: $(0, -3)$

10) $y = 2x^2 - 8x + 10$

Relative minimum: $(2, 2)$
No relative maxima.

11) $f(x) = x^4 - 4x^2 + 2$

Relative minima: $(-\sqrt{2}, -2), (\sqrt{2}, -2)$
Relative maximum: $(0, 2)$

12) $f(x) = x^3 - 3x^2$

Relative minimum: $(2, -4)$
Relative maximum: $(0, 0)$

13) $y = -x^3 + 3x^2 - 6$

Relative minimum: $(0, -6)$
Relative maximum: $(2, -2)$

14) $y = x^3 - x^2 - 5x + 4$

Relative minimum: $\left(\dfrac{5}{3}, -\dfrac{67}{27}\right)$
Relative maximum: $(-1, 7)$

15) $y = -2x^2 + 12x - 19$

No relative minima.
Relative maximum: $(3, -1)$

16) $f(x) = \dfrac{x^2}{2} - 3x + \dfrac{13}{2}$

Relative minimum: $(3, 2)$
No relative maxima.