Name_____

Calculus Practice: Use Derivatives to Analyze Functions 4b

For each problem, find the open intervals where the function is increasing and decreasing.

1) $y = -2x^2 + 8x - 3$

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

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

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

5) $f(x) = x^3 - 4x^2 + 5$

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

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

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

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

10) $f(x) = -x^4 - x^3 + 4x^2 - 6$

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

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

13) $f(x) = -x^5 + 2x^3 + 1$

14) $f(x) = -x^5 + 3x^3 + 1$

15) $y = x^5 - 3x^3$

16) $y = x^5 - 3x^3 + 3$

Name_____

Calculus Practice: Use Derivatives to Analyze Functions 4b

For each problem, find the open intervals where the function is increasing and decreasing.

1) $y = -2x^2 + 8x - 3$

Increasing: $(-\infty, 2)$ Decreasing: $(2, \infty)$

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

Increasing: $(-\infty, -1)$ Decreasing: $(-1, \infty)$

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

Increasing: $(-1, \infty)$ Decreasing: $(-\infty, -1)$

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

Increasing: $(-\infty, 2)$ Decreasing: $(2, \infty)$

5) $f(x) = x^3 - 4x^2 + 5$

Increasing: $(-\infty, 0), \left(\dfrac{8}{3}, \infty\right)$ Decreasing: $\left(0, \dfrac{8}{3}\right)$

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

Increasing: $(-\infty, 0), \left(\dfrac{8}{3}, \infty\right)$ Decreasing: $\left(0, \dfrac{8}{3}\right)$

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

Increasing: $(-\infty, 0), \left(\dfrac{2}{3}, \infty\right)$ Decreasing: $\left(0, \dfrac{2}{3}\right)$

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

Increasing: $(-\infty, 0), \left(\dfrac{2}{3}, \infty\right)$ Decreasing: $\left(0, \dfrac{2}{3}\right)$

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

Increasing: $\left(-\dfrac{\sqrt{6}}{2}, 0\right), \left(\dfrac{\sqrt{6}}{2}, \infty\right)$ Decreasing: $\left(-\infty, -\dfrac{\sqrt{6}}{2}\right), \left(0, \dfrac{\sqrt{6}}{2}\right)$

10) $f(x) = -x^4 - x^3 + 4x^2 - 6$

Increasing: $\left(-\infty, \dfrac{-3 - \sqrt{137}}{8}\right), \left(0, \dfrac{-3 + \sqrt{137}}{8}\right)$ Decreasing: $\left(\dfrac{-3 - \sqrt{137}}{8}, 0\right), \left(\dfrac{-3 + \sqrt{137}}{8}, \infty\right)$

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

Increasing: $\left(-\infty, -\dfrac{\sqrt{2}}{2}\right), \left(0, \dfrac{\sqrt{2}}{2}\right)$ Decreasing: $\left(-\dfrac{\sqrt{2}}{2}, 0\right), \left(\dfrac{\sqrt{2}}{2}, \infty\right)$

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

Increasing: $\left(-\infty, -\dfrac{\sqrt{2}}{2}\right), \left(0, \dfrac{\sqrt{2}}{2}\right)$ Decreasing: $\left(-\dfrac{\sqrt{2}}{2}, 0\right), \left(\dfrac{\sqrt{2}}{2}, \infty\right)$

13) $f(x) = -x^5 + 2x^3 + 1$

Increasing: $\left(-\dfrac{\sqrt{30}}{5}, \dfrac{\sqrt{30}}{5}\right)$ Decreasing: $\left(-\infty, -\dfrac{\sqrt{30}}{5}\right), \left(\dfrac{\sqrt{30}}{5}, \infty\right)$

14) $f(x) = -x^5 + 3x^3 + 1$

Increasing: $\left(-\dfrac{3\sqrt{5}}{5}, \dfrac{3\sqrt{5}}{5}\right)$ Decreasing: $\left(-\infty, -\dfrac{3\sqrt{5}}{5}\right), \left(\dfrac{3\sqrt{5}}{5}, \infty\right)$

15) $y = x^5 - 3x^3$

Increasing: $\left(-\infty, -\dfrac{3\sqrt{5}}{5}\right), \left(\dfrac{3\sqrt{5}}{5}, \infty\right)$ Decreasing: $\left(-\dfrac{3\sqrt{5}}{5}, \dfrac{3\sqrt{5}}{5}\right)$

16) $y = x^5 - 3x^3 + 3$

Increasing: $\left(-\infty, -\dfrac{3\sqrt{5}}{5}\right), \left(\dfrac{3\sqrt{5}}{5}, \infty\right)$ Decreasing: $\left(-\dfrac{3\sqrt{5}}{5}, \dfrac{3\sqrt{5}}{5}\right)$