Name _____ Period _____ Score _____

HW67: Cumulative Review F

Find the indicated limit.

1. $\lim_{x\to -3} \dfrac{\dfrac{1}{x+1}+\dfrac{1}{2}}{x+3}$

2. $\lim_{x\to 2} \dfrac{x-2}{4-\sqrt{7x+2}}$

Determine for what numbers, if any, the given function is discontinuous.
Use the definition of continuity to show the discontinuity.

3. $f(x)=\dfrac{x-2}{x^2-3x-4}$

4. $f(x)=\begin{cases}\dfrac{x^2-4}{x-2} & \text{if } x\neq 2\\ 4 & \text{if } x=2\end{cases}$

Differentiate.

5. $y=x^2\cos x$

Differentiate.

6. $y=5^{(-3x+2)}$

Find dy/dx.

7. $y - x^2 y^2 = 6$

Find the derivative using log. differentiation.

8. $y = \dfrac{3x^2 \sin^2 x}{x^2 - 2}$

Find the equation of the tangent line at the given value or point.

9. $y = 2\sin x$ at $x = \dfrac{2\pi}{3}$

10. $x^2 - xy = 5$ at $(-1, 4)$

Find the intervals on which f(x) is increasing and decreasing.

11. $f(x) = \dfrac{x}{x+2}$

12. $f(x) = \sqrt{x^2 - 1}$

Find the intervals on which f(x) is concave up and concave down.

13. $f\left(x\right)=4x^3-2x^2+5x-1$

14. $f\left(x\right)=e^{-x}+4e^{-2x}$

Find the minimum and maximum on the given interval. Round answers to the nearest tenth if necessary.

15. $f\left(x\right)=xe^{-x},\quad \left[0,2\right]$

16. $f\left(x\right)=x^5-80x,\quad \left[0,2\right]$