Calculus BC Schedule--Chapter 6

Differential Equations and Math Modeling

Date	Lesson	HW Assignment
4-Jan	**NO SCHOOL**--*Teacher Institute Day*	**NO Additional Homework**
5-Jan	**NO SCHOOL**--*Remote Learning Planning*	**HW1**--Video on General & Particular Solutions
6-Jan	6.4 Exponential Growth & Decay	**HW2**--p.327 #3,9,13,18, p.357 #3,5,7,9
7-Jan	6.1 Slope Fields	**HW3**--p.328 #35-40 (only sketch the particular solution)
8-Jan	6.1 Slope Fields	**HW4**--p.328 #41,45,47,51, p.328 #29,32
11-Jan	*PLT Planning Day*	**Study for Test**
12-Jan	6.1 Slope Fields	**HW5**--p.328 #36,37,39, Video on Logistic Diff Eqs
13-Jan	6.5 Logistic Growth	**HW5**--p.369 #23,33,44, Study for Test
14-Jan	Chapter 6 Review **Quick M/C Quiz for Unit 6**	**Study for Test**
15-Jan	**Chapter 6 Test**	**HW1**--Video on Area Btn Curves

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Differential Equations and Math Modeling

Unit 6: Differential Equations & Mathematical Modeling

FUN-7

Solving differential equations allows us to determine functions and develop models.

LEARNING OBJECTIVE	ESSENTIAL KNOWLEDGE
FUN-7.A Interpret verbal statements of problems as differential equations involving a derivative expression.	**FUN-7.A.1** Differential equations relate a function of an independent variable and the function's derivatives.
FUN-7.B Verify solutions to differential equations.	**FUN-7.B.1** Derivatives can be used to verify that a function is a solution to a given differential equation. **FUN-7.B.2** There may be infinitely many general solutions to a differential equation.
FUN-7.C Estimate solutions to differential equations.	**FUN-7.C.1** A slope field is a graphical representation of a differential equation on a finite set of points in the plane. **FUN-7.C.2** Slope fields provide information about the behavior of solutions to first-order differential equations.
FUN-7.C Estimate solutions to differential equations.	**FUN-7.C.3** Solutions to differential equations are functions or families of functions.
FUN-7.C Estimate solutions to differential equations.	**FUN-7.C.4** Euler's method provides a procedure for approximating a solution to a differential equation or a point on a solution curve. BC ONLY
FUN-7.D Determine general solutions to differential equations.	**FUN-7.D.1** Some differential equations can be solved by separation of variables. **FUN-7.D.2** Antidifferentiation can be used to find general solutions to differential equations.
FUN-7.E Determine particular solutions to differential equations.	**FUN-7.E.1** A general solution may describe infinitely many solutions to a differential equation. There is only one particular solution passing through a given point. **FUN-7.E.2** The function F defined by $F(x)=y_0+\int_a^x f(t)dt$ is a particular solution to the differential equation $\frac{dy}{dx}=f(x)$, satisfying $F(a)=y_0$. **FUN-7.E.3** Solutions to differential equations may be subject to domain restrictions.
FUN-7.F Interpret the meaning of a differential equation and its variables in context.	**FUN-7.F.1** Specific applications of finding general and particular solutions to differential equations include motion along a line and exponential growth and decay. **FUN-7.F.2** The model for exponential growth and decay that arises from the statement "The rate of change of a quantity is proportional to the size of the quantity" is $\frac{dy}{dt}=ky$.
FUN-7.G Determine general and particular solutions for problems involving differential equations in context.	**FUN-7.G.1** The exponential growth and decay model, $\frac{dy}{dt}=ky$, with initial condition $y=y_0$ when $t=0$, has solutions of the form $y=y_0e^{kt}$.
FUN-7.H Interpret the meaning of the logistic growth model in context. BC ONLY	**FUN-7.H.1** The model for logistic growth that arises from the statement "The rate of change of a quantity is jointly proportional to the size of the quantity and the difference between the quantity and the carrying capacity" is $\frac{dy}{dt}=ky(a-y)$. BC ONLY **FUN-7.H.2** The logistic differential equation and initial conditions can be interpreted without solving the differential equation. BC ONLY **FUN-7.H.3** The limiting value (carrying capacity) of a logistic differential equation as the independent variable approaches infinity can be determined using the logistic growth model and initial conditions. BC ONLY **FUN-7.H.4** The value of the dependent variable in a logistic differential equation at the point when it is changing fastest can be determined using the logistic growth model and initial conditions. BC ONLY