Mathematics Placement Questionnaire

1) Please fill out the Questionnaire below.
2) Please take the appropriate Placement Exam and record your answers on the answer key.
3) Please return both sheets to:

The Office of the Registrar
Hamilton College
198 College Hill Road
Clinton, New York 13323

Name_____
High school _____

Mathematics Courses You Have Taken Year of HS graduation_____

	Descriptive Math Course Title(s)	Course Grade(s)	
9th grade	_____	_____	
10th grade	_____	_____	
11th grade	_____	_____	
12th grade	_____	_____	(Expected)

Special Notes: _____
_____
_____

Calculus Information

Does your HS offer a full-year AP Calculus course?_____ Did you take it?_____
Does your HS offer a full-year non-AP Calculus course?_____ Did you take it?_____

IF you took an AP Calculus course and the AP exam, what was your score?
AB Exam Score_____ BC Exam Score_____
(If you have not yet received your score, please put a "?" on the AB or the BC line and tell us your score, by letter or e-mail, as soon as you receive it.)
IF you took an AP course but not the exam, please state why_____

Self-Assessment

How do YOU assess your mathematics preparation:

_____Not prepared to start Calculus
_____Prepared to start Calculus I
_____Prepared to start Calculus II
_____Prepared to start at a higher level

How likely are you to take a math course during your first year at Hamilton

_____Very Likely _____Maybe _____Unlikely

Career Interests (it's OK to be undecided)_____

Possible majors or areas of concentration _____

Name_____ Did you use a calculator? Y N

Exam I
25 min. time limit

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Exam II
40 min. time limit

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Do not write in this space

Exam I **TIME LIMIT: 40 minutes**

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1. Find $f'(1)$ for $f(x) = \dfrac{x+2}{x+1}$.

   (A) $-\dfrac{1}{4}$ (B) $\dfrac{1}{4}$ (C) $\dfrac{5}{4}$ (D) $\dfrac{5}{2}$

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2. Given $y^3 + x^2 = xy^2 + 3$, find $\dfrac{dy}{dx}$ when $x = 2$ and $y = 1$.

   (A) 3 (B) 0 (C) -1 (D) -4

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3. Find $\lim\limits_{x \to 2} f(x)$ given that $f(x) = \begin{cases} x & \text{when } x < 2 \\ x^2 & \text{when } x \geq 2 \end{cases}$.

   (A) 2 (B) $\begin{cases} 2 \\ 4 \end{cases}$ (C) 4 (D) Does Not Exist

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4. Determine the area of the region bounded by the curves $y = x$ and $y = x^2$.

   (A) $\dfrac{1}{3}$ (B) $\dfrac{1}{2}$ (C) $\dfrac{1}{6}$ (D) $\dfrac{5}{6}$

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5. Given that $f'(c) > 0$ and $f''(c) > 0$, what can you conclude about f at $x = c$?

   (A) local maximum
   (B) local minimum
   (C) no maximum or minimum
   (D) point of inflection

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6. Determine the open interval(s) where the function $f(x) = x^3 - 12x$ is decreasing.

   (A) $(-\infty, -2), (2, +\infty)$ (B) $(-2, 2)$ (C) $(-2, +\infty)$ (D) $(-\infty, 2)$

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7. $\lim\limits_{x \to 2} 4 = ?$

   (A) 4 (B) 2 (C) 0 (D) Does Not Exist

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8. The area of a circle is increasing at the rate of 6 square inches per minute. Determine how fast the radius is changing when the radius is 3 inches.

   (A) $\sqrt{\dfrac{6}{\pi}}$ *in/min.* (B) $\dfrac{1}{\pi}$ *in/min.* (C) $\dfrac{3}{\pi}$ *in/min.* (D) 2 *in/min.*

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9. $\int (2x+1)^4 dx = ?$

   (A) $\dfrac{2}{5}(2x+1)^5 + C$ (B) $\dfrac{1}{5}(2x+1)^5 + C$

   (C) $\dfrac{5}{2}(2x+1)^5 + C$ (D) $\dfrac{1}{10}(2x+1)^5 + C$

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10. Find $\frac{dy}{dx}$ for $y = \cos^3(2x)$.

(A) $-2\sin^3(2x)$ (B) $2\sin^3(2x)$
(C) $-6\cos^2(2x)\sin(2x)$ (D) $6\cos^2(2x)\sin(2x)$

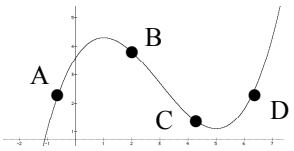
11. Determine an equation of the tangent line to the curve $y = x^2$ at the point (2,4).

(A) $y - 4 = 2x(x - 2)$ (B) $y = 4x - 4$
(C) $y - 4 = -\frac{1}{2x}(x - 2)$ (D) $y = 4x$

12. If $f(x) = x^2$, then $f(x + h) =$

(A) $x^2 + h$ (B) $x^2 + h^2$ (C) $x^2 + 2xh + h^2$ (D) x^2

13. At which of the four labeled points on the graph are $\frac{dy}{dx}$ and $\frac{d^2y}{dx^2}$ both negative?



(A) A (B) B (C) C (D) D

14. $\int \sin(2x)\,dx = ?$

(A) $-\frac{1}{2x}\cos(x^2) + C$ (B) $\frac{1}{2}\cos(2x) + C$
(C) $-\frac{1}{2}\cos(2x) + C$ (D) $2\cos(2x) + C$

15. Find $f'(x)$ for $f(x) = (x^2 - 3x)^4$.

(A) $4(2x - 3)^3$ (B) $4(x^2 - 3x)^3(2x - 3)$
(C) $4(x^2 - 3x)^3(2x - 3)(2)$ (D) $4(x^2 - 3x)^3$

16. $\lim_{x \to 3} \frac{x^2 - 9}{x - 3} = ?$

(A) 0 (B) $\frac{0}{0}$ (C) 6 (D) Does Not Exist