Flash Card Construction Instructions

The left column is the question and the right column is the answers. Cut out the flash cards and paste the question to one side of a note card and the answer to the other side. Be careful to paste the correct answer to its corresponding question!

Arc length (between a and b) 6.4	$s = \int_a^b \sqrt{1 + [f'(x)]^2}dx$
Arc length (between c and d) 6.4	$s = \int_c^d \sqrt{1 + [g'(y)]^2}dy$
$\int udv$ 7.2	$uv - \int vdu$
What does LIATE stand for? 7.2	L – logarithmic part I – inverse trigonometric part A – algebraic part T – trigonometric part E – exponential part
L'Hopital's Rule 7.7	$\lim_{x \to c} \frac{f(x)}{g(x)} = \lim_{x \to c} \frac{f'(x)}{g'(x)}$

Improper Integrals/Infinite Limits $\int_a^{\infty} f(x)dx$ 7.8	$\lim_{b\to\infty} \int_a^b f(x)dx$
Improper Integrals/Infinite Limits $\int_{-\infty}^{b} f(x)dx$ 7.8	$\lim_{a\to-\infty} \int_a^b f(x)dx$
Improper Integrals/Infinite Limits $\int_{-\infty}^{\infty} f(x)dx$ 7.8	$\int_{-\infty}^{c} f(x)dx + \int_c^{\infty} f(x)dx$
Improper Integrals/Infinite Discontinuities $\int_a^b f(x)dx$ 7.8	$\lim_{c\to b^-} \int_a^c f(x)dx$
Improper Integrals/Infinite Discontinuities $\int_a^b f(x)dx$ 7.8	$\lim_{c\to a^+} \int_c^b f(x)dx$
Improper Integrals/Infinite Discontinuities $\int_a^b f(x)dx$ 7.8	$\int_a^c f(x)dx + \int_c^b f(x)dx$
$\int_1^{\infty} \frac{dx}{x^p}$ 7.8	$\frac{1}{p-1}$ $p > 1$ diverges $p \leq 1$

What are the 6 convergence/divergence tests we study 8.6	• nth term test • intregral test • ratio test • direct comparison test • limit comparison test • alternating series test
What are the 4 infinite series we study 8.6	• geometric • telescoping • p-series • alternating series
What is the condition of convergence for the geometric series? 8.6	$\|r\| < 1$
What is the sum of a geometric series? 8.6	$S = \frac{a}{1-r}$
What is the format of a geometric series? 8.6	$\sum_{n=0}^{\infty} ar^n$
What is the format of a p-series? 8.6	$\sum_{n=1}^{\infty} \frac{1}{n^p}$
When does a p-series diverge? 8.6	$0 < p \leq 1$
When does a p-series converge? 8.6	$p > 1$
What is the format of an alternating series? 8.6	$\sum_{n=1}^{\infty} (-1)^{n-1} a_n$

What are the conditions for an alternating series to converge? 8.6	• $\lim_{n\to\infty} a_n = 0$ • $a_{n+1} \leq a_n$
What is the condition(s) required for the ratio test to indicate convergence? 8.6	$\lim_{n\to\infty} \left\lvert \frac{a_{n+1}}{a_n} \right\rvert < 1$
What is the condition(s) required for the direct comparison test to indicate convergence? 8.6	• $0 < a_n \leq b_n$ • $\sum_{n=1}^{\infty} b_n \, converges$
What is the condition(s) required for the limit comparison test to indicate convergence? 8.6	• $\lim_{n\to\infty} \frac{a_n}{b_n} = L > 0$ • $\sum_{n=1}^{\infty} b_n \, converges$
What is the format of a Taylor polynomial 8.7	$P_n(x) = f(c) + f'c(x-c) + \cdots \frac{f^{(n)}(c)}{n!}(x-c)^n$
What is the format of a Maclaurin polynomial 8.7	$P_n(x) = f(0) + f'(0)x + \cdots \frac{f^{(n)}(0)}{n!}(x)^n$
What is the format of the Lagrange form of the reminder 8.7	$R_n(x) = \frac{f^{(n+1)}(z)}{(n+1)!}(x-c)^{n+1}$
What is the format of a power series 8.8	$\sum_{n=0}^{\infty} a_n(x-c)^n$
What are the three types of power series convergence 8.8	• single point • radius • absolute (everywhere)

Power Series for $\frac{1}{x}$ 8.10	$1-(x-1)+(x-1)^2-(x-1)^3+\cdots$ Interval of convergence $0 < x < 2$
Power Series for $\frac{1}{1+x}$ 8.10	$1-x+x^2-x^3+x^4-\cdots$ Interval of convergence $-1 < x < 1$
Power Series for lnx 8.10	$(x-1)-\frac{(x-1)^2}{2}+\frac{(x-1)^3}{3}-\cdots$ Interval of convergence $0 < x < 2$
Power Series for e^x 8.10	$1+x+\frac{x^2}{2!}+\frac{x^3}{3!}+\cdots$ Interval of convergence $-\infty < x < \infty$
Power Series for $sinx$ 8.10	$x-\frac{x^3}{3!}+\frac{x^5}{5!}-\frac{x^7}{7!}+\cdots$ Interval of convergence $-\infty < x < \infty$
Power Series for $cosx$ 8.10	$1-\frac{x^2}{2!}+\frac{x^4}{4!}-\frac{x^6}{6!}+\cdots$ Interval of convergence $-\infty < x < \infty$
Power Series for $arctanx$ 8.10	$x-\frac{x^3}{3}+\frac{x^5}{5}-\frac{x^7}{7}+\cdots$ Interval of convergence $-1 < x < 1$
Power Series for $arcsinx$ 8.10	$x+\frac{x^3}{2*3}+\frac{1*3x^5}{2*4*5}+\frac{1*3*5x^7}{2*4*6*7}+\cdots$ Interval of convergence $-1 < x < 1$
Power Series for $(1+x)^k$ 8.10	$1+kx+\frac{k(k-1)x^2}{2!}+\cdots$ Interval of convergence $-1 < x < 1*$

Standard form of a parabola (Vertical axis) 9.1	$(x-h)^2 = 4p(y-k)$
Standard form of a parabola (horizontal axis) 9.1	$(y-k)^2 = 4p(x-h)$
Standard form of an ellipse (Major axis is horizontal) 9.1	$\frac{(x-h)^2}{a^2} + \frac{(y-k)^2}{b^2} = 1$
Standard form of an ellipse (Major axis is vertical) 9.1	$\frac{(x-h)^2}{b^2} + \frac{(y-k)^2}{a^2} = 1$
Standard form of an hyperbola (Transverse axis is horizontal) 9.1	$\frac{(x-h)^2}{a^2} - \frac{(y-k)^2}{b^2} = 1$
Standard form of an hyperbola (Transverse axis is vertical) 9.1	$\frac{(y-k)^2}{a^2} - \frac{(x-h)^2}{b^2} = 1$
Parametric form of the derivative 9.3	$\frac{dy}{dx} = \frac{\frac{dy}{dt}}{\frac{dx}{dt}}$
Arc length in parametric form 9.3	$s = \int_a^b \sqrt{[f'(t)]^2 + [g'(t)]^2}\, dt$
Slope in Polar Form 9.4	$\frac{dy}{dx} = \frac{\frac{dy}{d\theta}}{\frac{dx}{d\theta}} = \frac{f(\theta)cos\theta + f'(\theta)sin\theta}{-f(\theta)sin\theta + f'(\theta)cos\theta}$
Area in Polar Coordinates 9.5	$A = \frac{1}{2}\int_\alpha^\beta r^2 d\theta, \;\; r = f(\theta)$
Velocity (vectors) 9.8	$v(t) = r'(t) = \langle x'(t), y'(t) \rangle$

Acceleration (vectors) 9.8	$a(t) = r''(t) = \langle x''(t), y''(t) \rangle$
Speed (vectors) 9.8	$\sqrt{[x'(t)]^2 + [y'(t)]^2}$
Displacement (vectors) $\int_a^b v(t)dt$ 9.8	$\langle \int_a^b x'(t)dt, \int_a^b y'(t)dt \rangle$
Total Distance (vectors) $\int_a^b \|v(t)\|dt$ 9.8	$\int_a^b \sqrt{[x'(t)]^2 + [y'(t)]^2}\, dt$