ClassPad for **Methods Units 3&4**

ClassPad Help Series movies are shown [007, 010]

ClassPad OS update from **http://edu.casio.com**

Assumed skills from Methods Units 1&2 include expanding and factorising expressions, substitution into expressions, solving simultaneous equations, split screen graphing in main and rearranging equations.

Main

- Check general settings at bottom of screen: Alg - Standard/Decimal - Real - Deg/Rad
- Always use variables from the VAR menu
- Enter settings in main, then Basic Format and select **Normal 2** as Number Format

M1. [980] Set up/customise Shift Keys - see 'helpsheets' from **www.charliewatson.com/vce**

M2. [011, 012] Combine and simplify: *Transformation, combine* . Note $\boxed{\text{Simp}}$ button also factors.

(a) Combine $\dfrac{x+1}{2-x}+\dfrac{2x}{11}$

(b) Determine the gradient of tangent to $y = ax(x^2 - 1)$ at $x = a$.
Ans: (2x²-15x-11)/(11x-22), 3a³-a

M3. [140, 142, 170] Differentiate, integrate and find limits: *Math2 or Calculation*

(a) $\dfrac{d}{dx}\left(\dfrac{x^2-7}{2x+3}\right)$ (b) $\int x(5-3x^2)^3\,dx$ (c) $\lim\limits_{h\to 0}\dfrac{2^h-1}{h}$

Ans: (2x2+6x+14)/(2x+3)2, -(3x2-5)4/24, 0.693

M4. [141] Find equation of tangent to $y = \sqrt{x+4}$ at (-3, 1): *Calculation, line, tanLine*
Ans: y=0.5x+2.5

M5. [202, 203, 240] Solve equations and inequalities: *Math1 or Advanced/solve*.

(a) $x^2 < 7x+1$ (b) $\int_0^{50} 3e^{-kx}\,dx = 100$ (c) $\sin(2x-30) = -0.5,\ -90 < x < 90$

Ans: -0.14<x<7.14, k=0.0175 x=-60, 0, 4.886

M6. Absolute value from *Math3* and counting technique tools from *Advance*.

(a) $\int_0^3 |t^2-4|\,dt$ (b) If 6 chosen at random from 30 of which 3 are red what is prob that all reds chosen?

Ans: 23/3, 1/203

M7. [045] Define functions: *Interactive, Define*

 $f(x) = (x+2)^{-1}$ and $g(x) = e^{x-2} + 3$. Find $f \circ g$ and the domain and range of $f \circ g$.
Ans: 1/(e(x-2)+5), D: x all reals, R: 0<y<0.2

M8. [172] Use **solve** to find inverses. If f(x)=ln(x+1)-3, determine f⁻¹(x).
Ans: eˣ⁺³-1.

M9. [083] Calculate probabilities for discrete RV's: *Distribution/Inv. Dist, Discrete or Inverse menus.*
Binomial $X \sim B(7, 0.4)$. Find (a) $P(X = 3)$ (b) $P(4 \le X \le 6)$ (c) k , if $P(X \le k) \ge 0.8$.
Ans: 0.2903, 0.2882, k=4

M10. [080, 081] Calc probs using normal distribution: *Distribution/Inv. Dist, Continuous or Inverse menus.*
If $X \sim N(62, 14^2)$ find (a) $P(X < 50)$ (b) $P(65 < X < 75)$ (c) k , if $P(X > k) = 0.1$ (d) 95% quantile.
Ans: 0.1957, 0.2386, 79.9, 85.0

System

- Classpad Name - Power Properties - Reset to fix problems (and Initialize if that doesn't work)
- [990] Keep OS up to date - download free update software from **http://edu.casio.com**

How To Update OS: Video 990 at www.classpad.com.au

eActivity

Make your own [601, 632, 633] or download ready-made eActivities into your ClassPad [991].

E1. [675] Normal probabilities (will solve for any variable - *P, L, U, S* or *M*): *Normal CDf*

(a) If $X \sim N(62, 14^2)$ then find k, if $P(57 < X < k) = 0.3$. (b) Find m if $X \sim (m, 8)$ and $P(X > 33) = 0.75$.

Ans: 67.8, 38.4

E2. Confidence intervals: *Sample n for CI* and *Z score for CI*.
How large a sample is required from population with *p*=0.15 to ensure margin of error is no more than 4% when an 80% confidence interval is constructed?
Ans: 131

E3. Confidence intervals: *CI for proportion*.
There were 36 faulty items in a sample of 225. Calculate 95% confidence interval for estimate of proportion of faulty items in population.
Ans: (11.2%, 20.8%)

E4. Mean and variance of continuous random variables: *Mean Var CTS RV*.
A cts rv X has pdf $f(x) = 0.125x$, $0 \le x \le 4$. Determine $E(X)$ and $Var(X)$.
Ans: 8/3, 8/9, 0.9428

E5. A copy of the binomial CD function is included in the eActivity for convenience, but limited solving capabilities apart from *P*.

E7. Newton-Raphson iteration. Estimate the positive solution to $e^{2x} = 2 - x^2$ correct to two decimal places using $x_0 = 1$.
Ans: 0.32

E8. Area approximations. Estimate the area under the curve $y = 12 - x^3$ between *x*=0 and *x*=2 using the mean of the areas of eight inscribed and eight circumscribed rectangles.
Ans: 19.9375.

E9. [670] Trapped areas: *Area between curves*.

Find the exact area trapped between the graphs of $y = x^2 - 2x - 8$ and $3x - y = 2$.
Ans: 343/6

How to download eActivities, programs, etc on to your ClassPad: Video 991 at www.classpad.com.au

Graph and Table

GT1. [343] Find equation of tangent to $y = 4x + 5 - x^2$ at $(4, 5)$: *Analysis, Sketch.*
Ans: y=21-4x

GT2. fMax/fMin to find global max/min for a function in current ViewWindow: *Analysis, G-Solve fMax - fMin*
Find the maximum and minimum values of $x^2(6 - x)$ in the interval $1 \le x \le 5$.
Ans: max is 32, min is 5

GT3. [344, 349] Integral: Evaluate area trapped between $y = x^3 - 3x^2 + 2$ and $y = x - 1$. *Analysis, G-Solve.*
Ans: 8 sq units

GT4. [172] Use *inverse* from Analysis, Sketch menu: If f(x)=ln(x+1)-3, sketch f⁻¹(x).

Statistics

ST1. [470, 471, 474] Calculate probabilities as for **M9** and **M10** using Calc menu options.

ST2. Calculate mean, standard deviation and variance for a discrete random variable: *x* in list1, *P(X=x)* in list2.
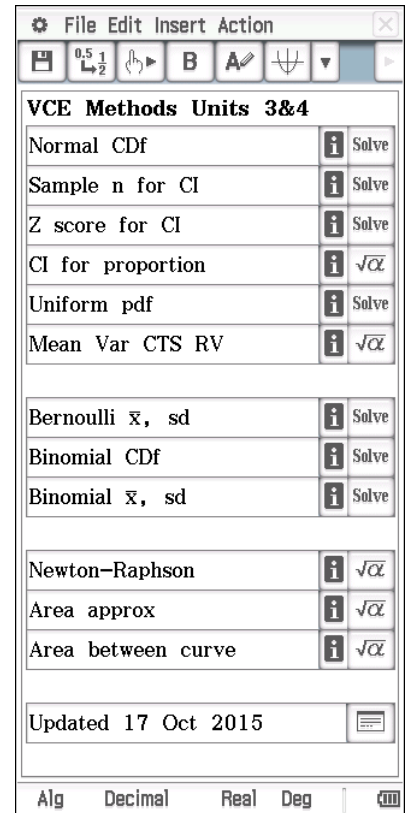
x	2	3	4	5
$P(X = x)$	0.15	0.25	0.4	0.2

Ans: mean is 3.65, sd is 0.9631, variance is 0.9275.

ST3. [476] Calculate a confidence interval for a proportion: *Calc, Interval, One-Prop Z Int.*
There were 36 faulty items in a sample of 225. Calculate 95% confidence interval for estimate of proportion of faulty items in population.
Ans: (11.2%, 20.8%)