

ClassPad Advanced Skills



Main

M1. Use Shift Key shortcuts.

M2. Combine, expand, factor and simplify: *use Transformation/combine - factor - simplify*

(a) Combine $\frac{x+1}{2-x} + \frac{2x}{11}$ (b) Simplify $(x+y)^2 - (x-y)^2$

M3. Define your own functions: *use Interactive/Define* (Use 'abc' tab to enter function name)

(a) $f(x) = (2x^2 + 3x)(7x - x^2)$

M4. Differentiate and integrate: *use Calculation/diff - ∫*

(a) $\frac{d}{dx}(2x^2 + 3x)(7x - x^2)$ (b) $\frac{d}{dx}\left(\frac{x^2 - 7}{2x + 3}\right)$ (c) $\int x(5 - 3x^2)^3 dx$

M5. Implicit differentiate: *use Calculation/Impdiff*

(a) $x^3 y^2 - 2xy = 5$

M6. Find gradient and equation of tangent to $y = \frac{x^2 - 7}{2x + 3}$ at $(1, -1.2)$: *use Calculation, tanLine*

M7. Solve equations: *use Advanced/solve*

(a) $\frac{x+1}{2-x} + \frac{2x}{11} \geq 4x$

M8. Solve for x , y and z the equations $2x + 3y - z = 8$, $3x - 1 = 4y + 3z$ and $3y = 4x - 2z + 2$

M9. Calculate probabilities using normal distribution: *use Distribution, normCDF - Inv. Distribution, invNormCDF*

If $X \sim N(62, 14^2)$ then find (a) $P(X < 50)$ (b) $P(65 < X < 75)$ (c) k , if $P(X > k) = 0.1$

M10. Calculate probabilities using Binomial distribution: *use Distribution, binomialPDF or binomial CDF or Inv. Distribution, invBinomialCDF*

If $X \sim B(8, 0.4)$ then find (a) $P(X \leq 3)$ (b) $P(4 \leq X \leq 7)$ (c) k , if $P(X \leq k) \geq 0.9$

M11. Use absolute value $\boxed{|\cdot|}$ and counting technique $\boxed{!}$ \boxed{nPr} \boxed{nCr} tools.

(a) $\int_{-1}^3 |x^2 - 4| dx$ (b) ${}^{50}C_4$.

M12. Use vector and matrix menus:

(a) Find angle between $\begin{bmatrix} 1 \\ -2 \end{bmatrix}$ and $\begin{bmatrix} 3 \\ 2 \end{bmatrix}$.

M13. Use fMax and fMin to find global min and max for a function: *Interactive, Calculation, fMax - fMin*

(a) Find min and max value of $x^3 - 4x^2 - x + 4$ between $x = -1$ and $x = 5$.

eActivity

E1. Normal probabilities: *Use (3AB) Normal prob*

- (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 $P(X > 33) = 0.75$

E2. Trapped area between two functions: *Use (3CD) Area between curve*

Find the area trapped between $y = x^2 - 4x + 2$ and $y = x - 2$.

E3. Ship A is at $-12i+25j$ km and wants to intercept Ship B at $10i-8j$ km and travelling with velocity $7i+24j$ km/h. If A has a speed of 30 km/h, find its velocity vector to intercept B and time taken.

Finance

Compound interest problems: Loan \$30000. Rate 6.6%pa. Monthly repayment \$600.

(a) How long to repay? Last repayment? Total interest?

(b) Repay in 3 years. Repayment?

Graph and Table

GT1. Set a graph background and model curve: *Tap Diamond to left of Analysis...*

GT2. Find equation of tangent to $y = 4x + 5 - x^2$ at $(4, 5)$: *Analysis, Sketch, Tangent menu.*

GT3. Trapped area between two functions: *Use (3CD) Analysis, GSolve, Integral, Intersection*

Find the area trapped between $y = x^2 - 4x + 2$ and $y = x - 2$.

GT4. Use integral and volume of revolution: *Analysis, G-Solve menu.*

Find volume of revolution when the area between $y = \sqrt[3]{x+3}$, $y = 0$, $x = 1$ and $x = 4$ is rotated about the x-axis.

GT5. Draw the graph of $f(x) = \frac{2}{x+1}$ and its inverse: *Analysis, Sketch, Inverse menu.*

Statistics

ST1. Calculate normal probabilities and view graphs: *use Calc, Distribution, Normal CD - Inv. Distribution, Inverse Normal CD*

If $X \sim N(62, 14^2)$ then find (a) $P(65 < X < 75)$ (b) k , if $P(X > k) = 0.1$

ST2. Calculate Binomial probabilities and view graphs: *use Calc, Distribution, Binomial PD or Binomial CD or Inv. Distribution, Inverse Binomial CD*

If $X \sim B(8, 0.4)$ then find (a) $P(X \leq 3)$ (b) $P(4 \leq X \leq 7)$ (c) k , if $P(X \leq k) \geq 0.9$

ST3. Calculate a probability using Central Limit Theorem: *use Calc, Test, OneSampleZTest*

Use the CLT to estimate the probability that a random sample of 30 items drawn from $X \sim N(40, 5.5^2)$ will have a mean of at least 42.

ST4. Calculate a confidence interval: *use Calc, Interval, One-Sample ZInt.*

A population is normally distributed with a standard deviation of 8. Find 95% confidence interval for mean when
(a) sample of size 40 has mean of 65 (b) sample drawn is 55, 60, 71, 57, 62, 59, 61, 52 and 66.

ST5. Calculate a HyperGeometric probability: *use Calc, Distribution, HyperGeometric CD*

If 6 people are chosen at random from a class of 3 left-handed and 27 right-handed students, what is the probability that 2 or more of the 6 are left-handed?

Spreadsheet - remember two types of cell selection

SS1. Predict the sales (1000's kg) for March 1989 from the data shown.

Quarter	t	Sales
March 1986	1	2.1
June	2	1.6
September	3	3.0
December	4	3.1
March 1987	5	3.2
June	6	2.2
September	7	4.0
December	8	4.1
March 1988	9	4.1
June	10	3.0
September	11	5.5
December	12	5.7

Programs

eg AP, GP, mav, repay, saving