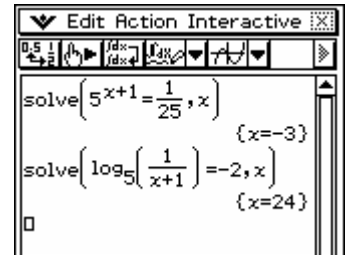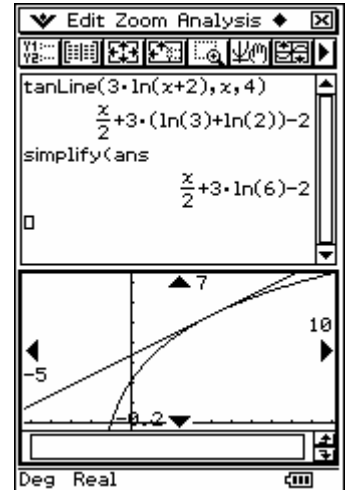# Classpad Examples

1. [3AMAT/S]

Determine exact solutions for the following equations.

(a) $5^{x+1} = \dfrac{1}{25}$ (b) $\log_5 \dfrac{1}{x+1} = -2$

2. [3BMAS]

Write an equation for the tangent to the curve
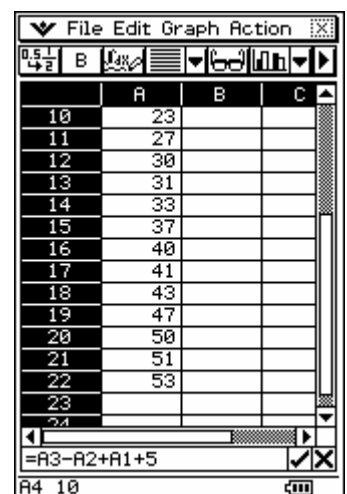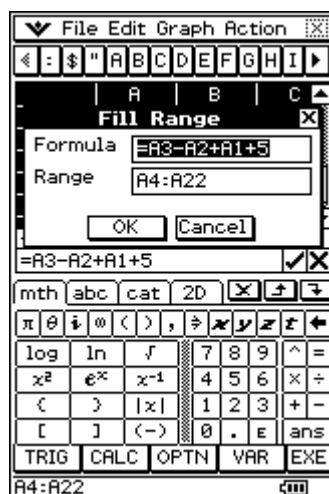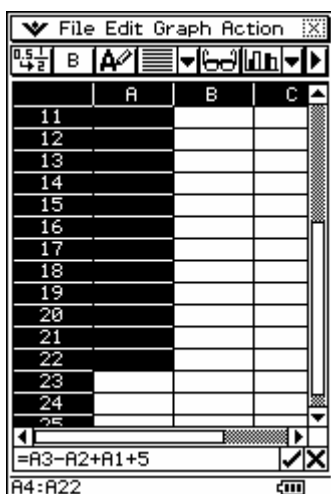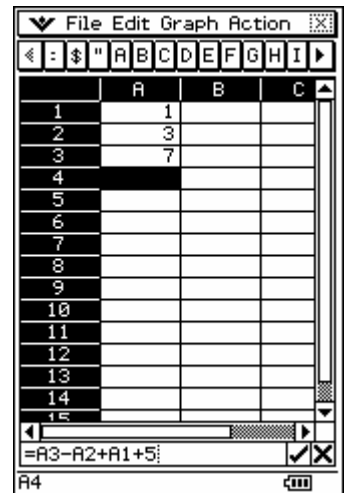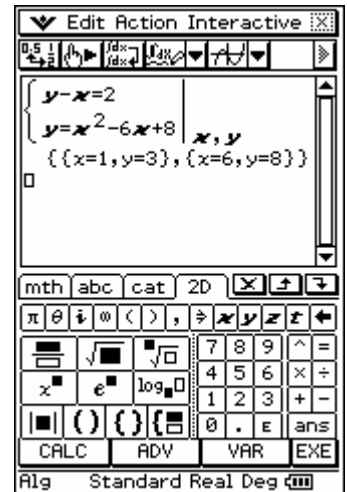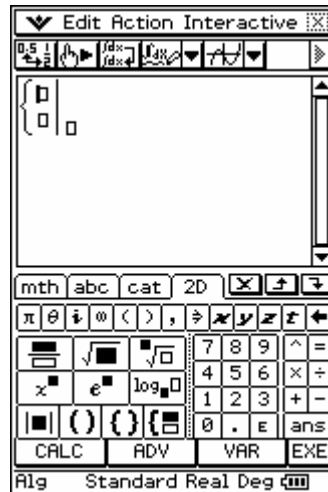$y = 3\ln(x+2)$ at the point
where $x = 4$.

3. [2D/3AMAT]

A recursive sequence is defined as

$T_{n+3} = T_{n+2} - T_{n+1} + T_n + 5$ with $T_1 = 1$, $T_2 = 3$, $T_3 = 7$

Find the next three terms of the sequence and T_{22}.

4. [**3AMAT**]

Solve the simultaneous equations
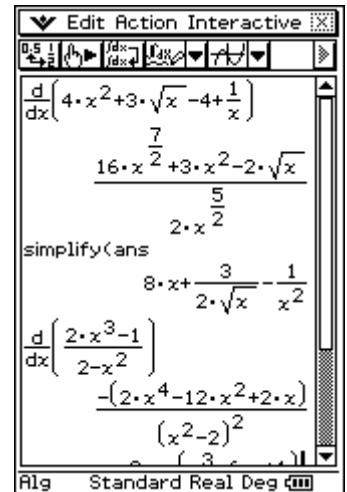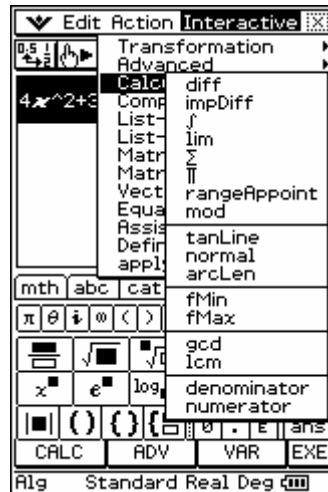$y - x = 2$ and $y = x^2 - 6x + 8$.

5. [**3B/3CMAT**]

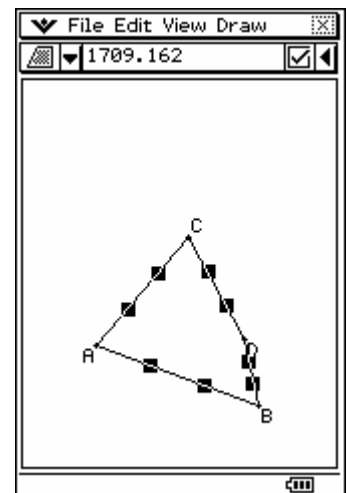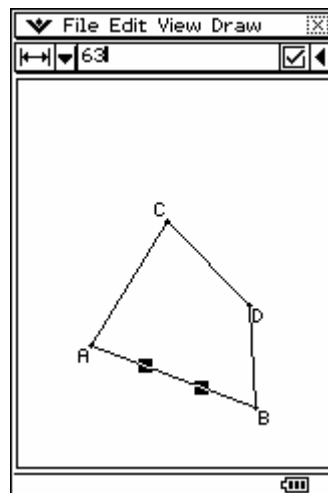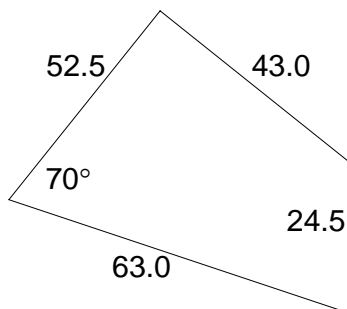Differentiate each of the following
with respect to *x*.

(a) $y = 4x^2 + 3\sqrt{x} - 4 + \dfrac{1}{x}$
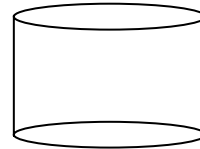
(b) $y = \dfrac{2x^3 - 1}{2 - x^2}$

6. [**2D/3AMAT**]

A sketch of a lot from a surveyor's notebook
is shown. All the lengths are in metres. Find
the area of the land.

52.5   43.0

70°

24.5

63.0

7. [3BMAT]

A cylindrical canister of radius *r* that is open at one end has a volume of 480cm^3. Find the minimum possible surface area of the cylindrical canister.

Screen 1

```
Edit Action Interactive
solve(480=π·r²·h,h)
                  {h=480/(r²·π)}
eliminate(A=π·r²+2·π·r·h,▸
                  A=r²·π+960/r
d/dr(r²·π+960/r)
                  (2·r³·π−960)/r²
solve((2·r³·π−960)/r²=0,r)
Alg    Standard Real Deg
```

Screen 2

```
Edit Action Interactive
                  {r=(2·60^(1/3))/(π^(1/3))}
A=r²·π+960/r | r=(2·60^(1/3))/(π^(1/3))
A=8·(450·π)^(1/3)+(480·π^(1/3))/(60^(1/3))
ans
                  A=269.3593387
Alg    Standard Real Deg
```

Screen 3

```
Edit Action Interactive
A=8·(450·π)^...+60^(1/3)
ans
                  A=269.3593387
h=480/(r²·π) | r=(2·60^(1/3))/(π^(1/3))
                  h=5.34601847
r=(2·60^(1/3))/(π^(1/3))
                  r=5.34601847
Alg    Standard Real Deg
```

8. [3CMAT/S]

Find the following indefinite integrals.

(a) $\int \left(3x^2 + \dfrac{5}{e^{2x}} \right) dx$ (b) $\int \dfrac{(x+2)^2}{x} dx$

```
Edit Action Interactive
∫ 3x^2+5/e^(2x) dx
                  (−5·e^(−2·x))/2 +x³
∫ (x+2)²/x dx
                  x²/2 +4·ln(|x|)+4·x
Alg    Standard Real Deg
```

9. [3CMAT]

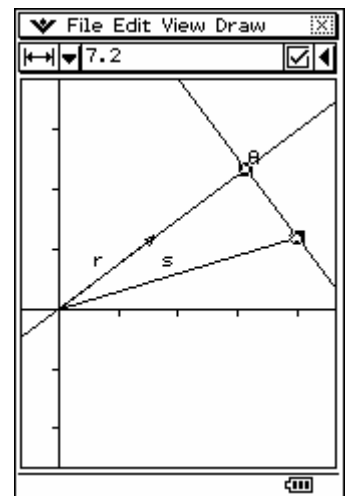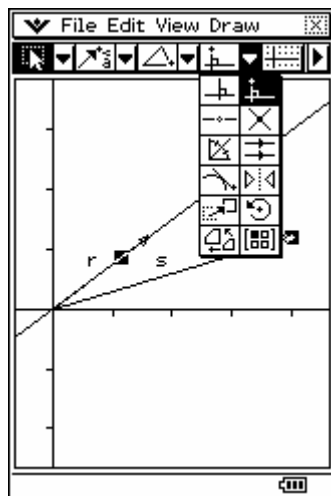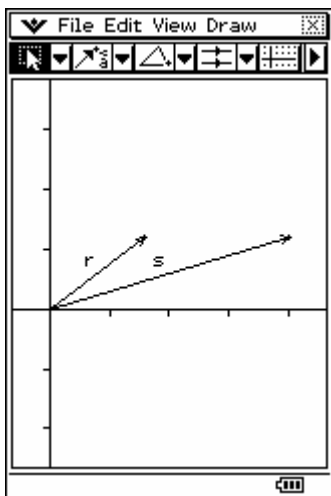Find the area trapped between the curves

$f(x) = 1 + x$ and $g(x) = x^2 - 5$.

```
Edit Zoom Analysis
solve(1+x=x²−5,x)
                  {x=−2,x=3}
∫[−2 to 3] |(1+x)−(x^2−5)|dx
                  125/6
Deg  Real
```

10. [**3BMAS**] A body A leaves the origin and travels with velocity 8**i** + 6**j**. How close does it come to point B which is stationary with position vector 20**i** + 6**j** ?
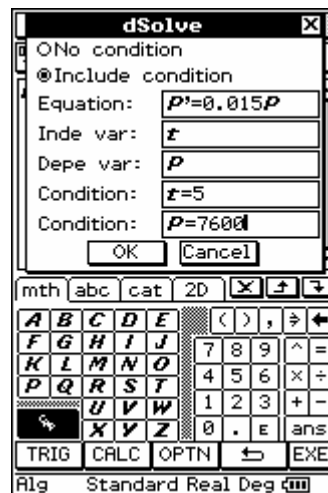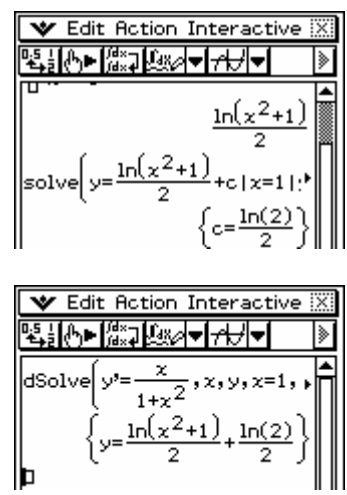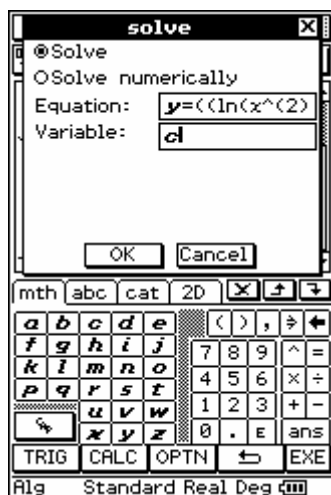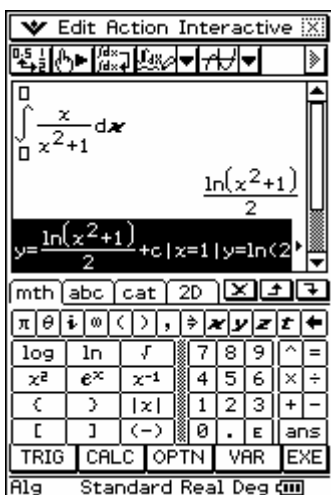
11. [**3DMAS**]

The population of a town 5 years ago was 7600 and has been increasing such that

$$\frac{dP}{dt} = 0.015P.$$

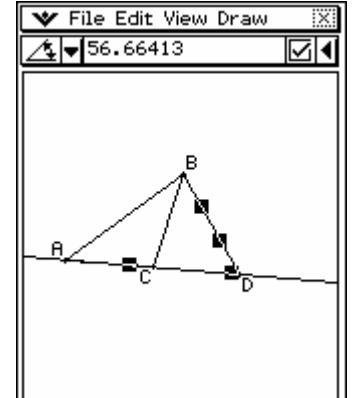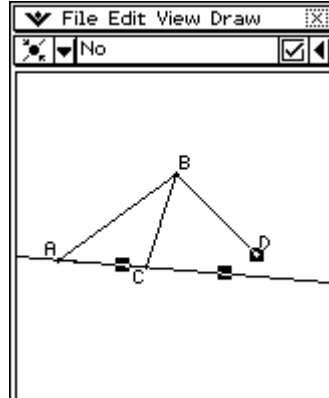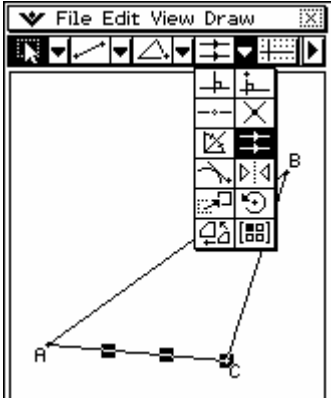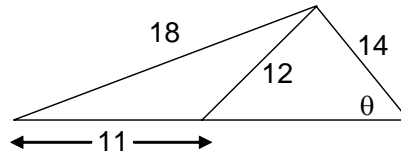Find the likely population of the town in 10 years time.
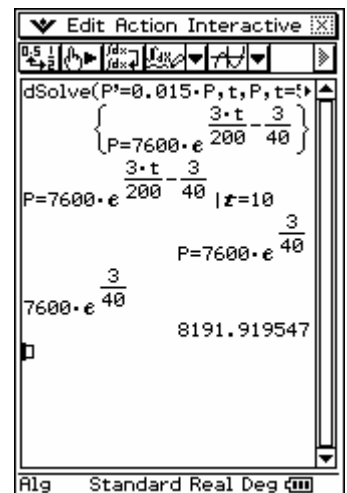
12. [**3CMAS**] Find the equation of the curve with gradient function $\dfrac{dy}{dx} = \dfrac{x}{1+x^2}$ given that the curve

passes through the point (1, ln(2)).

13. [2D/3AMAT]

Calculate the size of angle θ.

14. [3CMAS]

Find the maximum area of the rectangle with diagonal OA where O is the origin and A is a point on the curve $y = \sqrt{12 - x^2}$ in the first quadrant.