2022Call6.

(1) **Q1**

CLOZE | 0.10 penalty

If not specified otherwise, fill in the blanks with **integers (possibly** 0 **or negative)**. A fraction should be **reduced** (for example, $\frac{1}{2}$ is accepted but not $\frac{2}{4}$), and if it is negative and the answer boxes (such as $\frac{\boxed{a}}{\boxed{b}}$) have ambiguity, the negative sign should be put on the numerator (for example $\frac{-1}{2}$ is accepted but $\frac{1}{-2}$ is not). $\log x = \log_e x$, not $\log_{10} x$.

Complete the formulae.

$$(x+1)^{\frac{1}{2}} = \boxed{a} + \frac{\boxed{b}}{\boxed{c}}x + \frac{\boxed{d}}{\boxed{e}}x^2 + \frac{\boxed{f}}{\boxed{g}}x^3 \text{ as } x \to 0.$$

$\boxed{a}$:

NUMERICAL | 1 point

1 ✓	

$\boxed{b}$:

NUMERICAL | 1 point

1 ✓	

$\boxed{c}$:

NUMERICAL | 1 point

2 ✓	

$\boxed{d}$:

NUMERICAL | 1 point

-1 ✓	

$\boxed{e}$:

NUMERICAL | 1 point

8 ✓	

$\boxed{f}$:

NUMERICAL | 1 point

1 ✓	

$\boxed{g}$:

NUMERICAL | 2 points

16 ✓	

$$(x-1)\exp x = \boxed{\text{h}} + \boxed{\text{i}}x + \frac{\boxed{\text{j}}}{\boxed{\text{k}}}x^2 + \frac{\boxed{\text{l}}}{\boxed{\text{m}}}x^3 + o(x^3) \text{ as } x \to 0.$$

$\boxed{\text{h}}$:

NUMERICAL | 1 point

-1 ✓	

$\boxed{\text{i}}$:

NUMERICAL | 1 point

0 ✓	

$\boxed{\text{j}}$:

NUMERICAL | 1 point

1 ✓	

$\boxed{\text{k}}$:

NUMERICAL | 2 points

2 ✓	

$\boxed{\text{l}}$:

NUMERICAL | 1 point

1 ✓	

$\boxed{\text{m}}$:

NUMERICAL | 2 points

3 ✓	

$$\sin(2x^2)\cdot x = \boxed{\text{o}} + \boxed{\text{p}}x + \boxed{\text{q}}x^2 + \boxed{\text{r}}x^3 + o(x^3) \text{ as } x \to 0.$$

$\boxed{\text{o}}$:

NUMERICAL | 3 points

0 ✓	

$\boxed{\text{p}}$:

NUMERICAL | 1 point

0 ✓	

$\boxed{\text{q}}$:

NUMERICAL | 1 point

0 ✓	

$\boxed{\text{r}}$:

NUMERICAL | 3 points

2 ✓	

For various $\alpha, \beta \in \mathbb{R}$, study the limit:

$$\lim_{x \to 0} \frac{(x+1)^{\frac{1}{2}} + (x-1)\exp x + \alpha x + \beta x^2}{\sin(2x^2) \cdot x}.$$

This limit converges for $\alpha = \frac{\boxed{s}}{\boxed{t}}, \beta = \frac{\boxed{u}}{\boxed{v}}$.

$\boxed{s}$:

NUMERICAL | 4 points

-1 ✓	

$\boxed{t}$:

NUMERICAL | 4 points

2 ✓	

$\boxed{u}$:

NUMERICAL | 4 points

-3 ✓	

$\boxed{v}$:

NUMERICAL | 4 points

8 ✓	

In that case, the limit is $\frac{\boxed{w}}{\boxed{x}}$.

$\boxed{w}$:

NUMERICAL | 4 points

19 ✓	

$\boxed{x}$:

NUMERICAL | 4 points

96 ✓	

(2) **Q1**

CLOZE | 0.10 penalty

If not specified otherwise, fill in the blanks with **integers (possibly** 0 **or negative)**. A fraction should be **reduced** (for example, $\frac{1}{2}$ is accepted but not $\frac{2}{4}$), and if it is negative and the answer boxes (such as $\frac{\boxed{a}}{\boxed{b}}$) have ambiguity, the negative sign should be put on the numerator (for example $\frac{-1}{2}$ is accepted but $\frac{1}{-2}$ is not). $\log x = \log_e x$, not $\log_{10} x$.

Complete the formulae.

$$(3x+1)^{\frac{1}{2}} = \boxed{a} + \frac{\boxed{b}}{\boxed{c}}x + \frac{\boxed{d}}{\boxed{e}}x^2 + \frac{\boxed{f}}{\boxed{g}}x^3 \text{ as } x \to 0.$$

a:

NUMERICAL 1 point

1 ✓	

b:

NUMERICAL 1 point

3 ✓	

c:

NUMERICAL 1 point

2 ✓	

d:

NUMERICAL 1 point

-9 ✓	

e:

NUMERICAL 1 point

8 ✓	

f:

NUMERICAL 1 point

27 ✓	

g:

NUMERICAL 2 points

16 ✓	

$$(x-1)\exp x = \boxed{\text{h}} + \boxed{\text{i}}x + \frac{\boxed{\text{j}}}{\boxed{\text{k}}}x^2 + \frac{\boxed{\text{l}}}{\boxed{\text{m}}}x^3 + o(x^3) \text{ as } x \to 0.$$

h:

NUMERICAL 1 point

-1 ✓	

i:

NUMERICAL 1 point

0 ✓	

j:

NUMERICAL 1 point

1 ✓	

k:

NUMERICAL 2 points

2 ✓	

l:

NUMERICAL | 1 point

1 ✓	

m:

NUMERICAL | 2 points

3 ✓	

$\sin(x^2) \cdot x = \boxed{\text{o}} + \boxed{\text{p}}x + \boxed{\text{q}}x^2 + \boxed{\text{r}}x^3 + o(x^3)$ as $x \to 0$.

o:

NUMERICAL | 3 points

0 ✓	

p:

NUMERICAL | 1 point

0 ✓	

q:

NUMERICAL | 1 point

0 ✓	

r:

NUMERICAL | 3 points

1 ✓	

For various $\alpha, \beta \in \mathbb{R}$, study the limit:

$$\lim_{x \to 0} \frac{(3x+1)^{\frac{1}{2}} + (x-1)\exp x + \alpha x + \beta x^2}{\sin(x^2) \cdot x}.$$

This limit converges for $\alpha = \frac{\boxed{\text{s}}}{\boxed{\text{t}}}, \beta = \frac{\boxed{\text{u}}}{\boxed{\text{v}}}$.

s:

NUMERICAL | 4 points

-3 ✓	

t:

NUMERICAL | 4 points

2 ✓	

u:

NUMERICAL | 4 points

5 ✓	

v:

NUMERICAL | 4 points

8 ✓	

In that case, the limit is $\frac{\boxed{\text{w}}}{\boxed{\text{x}}}$.

w:

NUMERICAL | 4 points

97 ✓	

x:

NUMERICAL | 4 points

48 ✓	

(3) **Q2**

CLOZE | 0.10 penalty

If not specified otherwise, fill in the blanks with **integers (possibly 0 or negative)**. A fraction should be **reduced** (for example, $\frac{1}{2}$ is accepted but not $\frac{2}{4}$), and if it is negative and the answer boxes (such as $\frac{\boxed{\text{a}}}{\boxed{\text{b}}}$) have ambiguity, the negative sign should be put on the numerator (for example $\frac{-1}{2}$ is accepted but $\frac{1}{-2}$ is not). $\log x = \log_e x$, not $\log_{10} x$.

Let us study the following series $\sum_{n=0}^{\infty} \frac{4^n-1}{n^2+3}(x+1)^{2n}$, with various x.

This series makes sense also for $x \in \mathbb{C}$. For $x = i$, calculate the partial sum $\sum_{n=0}^{2} \frac{4^n-1}{n^2+3}(x+1)^{2n} = \frac{\boxed{\text{a}}}{\boxed{\text{b}}} + \frac{\boxed{\text{c}}}{\boxed{\text{d}}} i$.

a:

NUMERICAL | 1 point

-60 ✓	

b:

NUMERICAL | 1 point

7 ✓	

c:

NUMERICAL | 1 point

3 ✓	

d:

NUMERICAL | 1 point

2 ✓	

In order to use the ratio test for $x \in \mathbb{R}$, we put $a_n = \frac{4^n-1}{n^2+3}(x+1)^{2n}$. Complete the formula.

$$\lim_{n\to\infty} \frac{a_{n+1}}{a_n} = \boxed{\text{e}}|x+\boxed{\text{g}}|^{\boxed{\text{h}}}$$

e:

NUMERICAL | 2 points

4 ✓	

f:

NUMERICAL | 1 point

1 ✓	

g:

NUMERICAL | 1 point

2 ✓	

Therefore, by the ratio test, the series converges absolutely for

MULTI | 8 points | Single

- all x.
- $-3 < x < -1$.
- $-3 < x < 1$.
- $-2 < x < 2$.
- $\frac{1}{2} < x < \frac{3}{2}$.
- $-\frac{3}{2} < x < -\frac{1}{2}$. ✓
- $-1 < x < 1$.
- $-1 < x < 3$.
- $-\frac{1}{2} < x < \frac{1}{2}$.
- $x = 0$.
- $1 < x < 3$.

For the case $x = -\frac{3}{2}$, the series

MULTI | 4 points | Single | Shuffle

- converges absolutely. ✓
- converges but not absolutely.
- diverges.

For the case $x = 1$, the series

MULTI | 4 points | Single | Shuffle

- converges absolutely.
- converges but not absolutely.
- diverges. ✓

(4) **Q2**

CLOZE | 0.10 penalty

If not specified otherwise, fill in the blanks with **integers (possibly 0 or negative)**. A fraction should be **reduced** (for example, $\frac{1}{2}$ is accepted but not $\frac{2}{4}$), and if it is negative and the answer boxes (such as $\frac{\boxed{a}}{\boxed{b}}$) have ambiguity, the negative sign should be put on the numerator (for example $\frac{-1}{2}$ is accepted but $\frac{1}{-2}$ is not). $\log x = \log_e x$, not $\log_{10} x$.

Let us study the following series $\sum_{n=0}^{\infty} \frac{4^n-1}{n^2+3}(x-1)^{2n}$, with various x.

This series makes sense also for $x \in \mathbb{C}$. For $x = i$, calculate the partial sum $\sum_{n=0}^{2} \frac{4^n-1}{n^2+3}(x-1)^{2n} = \frac{\boxed{a}}{\boxed{b}} + \frac{\boxed{c}}{\boxed{d}} i$.

$\boxed{a}$:

NUMERICAL | 1 point

-60 ✓	

$\boxed{b}$:

NUMERICAL | 1 point

7 ✓	

$\boxed{c}$:

NUMERICAL | 1 point

-3 ✓	

$\boxed{d}$:

NUMERICAL | 1 point

2 ✓	

In order to use the ratio test for $x \in \mathbb{R}$, we put $a_n = \frac{4^n-1}{n^2+3}(x-1)^{2n}$. Complete the formula.

$$\lim_{n\to\infty} \frac{a_{n+1}}{a_n} = \boxed{e}|x + \boxed{g}|^{\boxed{h}}$$

$\boxed{e}$:

NUMERICAL | 2 points

4 ✓	

$\boxed{f}$:

NUMERICAL | 1 point

-1 ✓	

$\boxed{g}$:

NUMERICAL | 1 point

2 ✓	

Therefore, by the ratio test, the series converges absolutely for

MULTI | 8 points | Single

- all x.
- $-3 < x < -1$.
- $-3 < x < 1$.
- $-2 < x < 2$.
- $\frac{1}{2} < x < \frac{3}{2}$. ✓
- $-\frac{3}{2} < x < -\frac{1}{2}$.
- $-1 < x < 1$.
- $-1 < x < 3$.
- $-\frac{1}{2} < x < \frac{1}{2}$.
- $x = 0$.
- $1 < x < 3$.

For the case $x = -\frac{3}{2}$, the series

MULTI | 4 points | Single | Shuffle

- converges absolutely.
- converges but not absolutely.
- diverges. ✓

For the case $x = 1$, the series

MULTI | 4 points | Single | Shuffle

- converges absolutely. ✓
- converges but not absolutely.
- diverges.

(5) **Q3**

CLOZE | 0.10 penalty

If not specified otherwise, fill in the blanks with **integers (possibly** 0 **or negative)**. A fraction should be **reduced** (for example, $\frac{1}{2}$ is accepted but not $\frac{2}{4}$), and if it is negative and the answer boxes (such as $\frac{\boxed{\text{a}}}{\boxed{\text{b}}}$) have ambiguity, the negative sign should be put on the numerator (for example $\frac{-1}{2}$ is accepted but $\frac{1}{-2}$ is not). $\log x = \log_e x$, not $\log_{10} x$.

Let us consider the following function

$$f(x) = \log\left(\frac{x}{x^2+1}\right).$$

The function $f(x)$ is not defined on the whole real line $\mathbb{R}$. Choose all the points that are **not** in the natural domain of $f(x)$.

MULTI | 4 points | Single

- -2 ✓
- -1 ✓
- $-\frac{1}{2}$ ✓
- 0 ✓
- $\frac{1}{2}$ (-100%)
- 1 (-100%)
- 2 (-100%)

Choose all asymptotes of $f(x)$.

MULTI | 4 points | Single

- $y = -1$ (-100%)
- $y = -\frac{1}{2}$ (-100%)
- $y = 0$ (-100%)
- $y = \frac{1}{2}$ (-100%)
- $y = 2$ (-100%)
- $x = -2$ (-100%)
- $x = -1$ (-100%)
- $x = -\frac{1}{2}$ (-100%)
- $x = 0$ ✓
- $x = \frac{1}{2}$ (-100%)
- $x = 1$ (-100%)
- $x = 2$ (-100%)
- $y = -x$ (-100%)
- $y = x$ (-100%)

One has

$$f'(2) = \frac{\boxed{\text{a}}}{\boxed{\text{b}}}.$$

$\boxed{\text{a}}$:

NUMERICAL | 4 points

-3 ✓	

$\boxed{\text{b}}$:

NUMERICAL | 4 points

10 ✓	

The function $f(x)$ has $\boxed{\text{c}}$ stationary point(s) in the domain

$\boxed{\text{c}}$:

NUMERICAL | 4 points

1 ✓	

Choose the behaviour of $f(x)$ in the interval $(0, 2)$.

MULTI | 4 points | Single

- monotonically decreasing
- monotonically increasing

- neither decreasing nor increasing ✓

(6) **Q3**

CLOZE | 0.10 penalty

If not specified otherwise, fill in the blanks with **integers (possibly 0 or negative)**. A fraction should be **reduced** (for example, $\frac{1}{2}$ is accepted but not $\frac{2}{4}$), and if it is negative and the answer boxes (such as $\frac{\boxed{a}}{\boxed{b}}$) have ambiguity, the negative sign should be put on the numerator (for example $\frac{-1}{2}$ is accepted but $\frac{1}{-2}$ is not). $\log x = \log_e x$, not $\log_{10} x$.

Let us consider the following function

$$f(x) = \log\left(\frac{-x}{x^2+1}\right).$$

The function $f(x)$ is not defined on the whole real line $\mathbb{R}$. Choose all the points that are **not** in the natural domain of $f(x)$.

MULTI | 4 points | Single

- -2 (-100%)
- -1 (-100%)
- $-\frac{1}{2}$ (-100%)
- 0 ✓
- $\frac{1}{2}$ ✓
- 1 ✓
- 2 ✓

Choose all asymptotes of $f(x)$.

MULTI | 4 points | Single

- $y = -1$ (-100%)
- $y = -\frac{1}{2}$ (-100%)
- $y = 0$ (-100%)
- $y = \frac{1}{2}$ (-100%)
- $y = 2$ (-100%)
- $x = -2$ (-100%)
- $x = -1$ (-100%)
- $x = -\frac{1}{2}$ (-100%)
- $x = 0$ ✓
- $x = \frac{1}{2}$ (-100%)
- $x = 1$ (-100%)
- $x = 2$ (-100%)
- $y = -x$ (-100%)
- $y = x$ (-100%)

One has

$$f'(-3) = \frac{\boxed{\text{a}}}{\boxed{\text{b}}}.$$

$\boxed{\text{a}}$:

NUMERICAL | 4 points

4 ✓	

$\boxed{\text{b}}$:

NUMERICAL | 4 points

15 ✓	

The function $f(x)$ has $\boxed{\text{c}}$ stationary point(s) in the domain

$\boxed{\text{c}}$:

NUMERICAL | 4 points

1 ✓	

Choose the behaviour of $f(x)$ in the interval $(-4, -2)$.

MULTI | 4 points | Single

- monotonically decreasing
- monotonically increasing ✓
- neither decreasing nor increasing

(7) **Q4**

CLOZE | 0.10 penalty

If not specified otherwise, fill in the blanks with **integers (possibly** 0 **or negative)**. A fraction should be **reduced** (for example, $\frac{1}{2}$ is accepted but not $\frac{2}{4}$), and if it is negative and the answer boxes (such as $\frac{\boxed{\text{a}}}{\boxed{\text{b}}}$) have ambiguity, the negative sign should be put on the numerator (for example $\frac{-1}{2}$ is accepted but $\frac{1}{-2}$ is not). $\log x = \log_e x$, not $\log_{10} x$.

Let us calculate the following integral.

$$\int_0^\pi x^2 \sin x dx.$$

By noting that we can find easily a primitive of $\sin(x)$, we can apply integration by parts. Fill in the blanks.

$$\int_0^\pi x^2 \sin x dx. = [\boxed{\text{a}}]_0^\pi - \int_0^\pi \boxed{\text{b}} dx.$$

Choose correct functions.

$\boxed{\text{a}}$:

MULTI | 3 points | Single

- $x \sin(x)$

- $-x\cos(x)$
- $x^3\cos(x)$
- $-x^2\cos(x)$ ✓
- $-2x\cos(x)$
- $\sin(x)$
- $x\cos(x^2)$
- $2x\sin(x)$

b:

MULTI | 3 points | Single

- $x\sin(x)$
- $-x\cos(x)$
- $x^3\cos(x)$
- $-x^2\cos(x)$
- $-2x\cos(x)$ ✓
- $\sin(x)$
- $x\cos(x^2)$
- $2x\sin(x)$

By continuing the calculation, we obtain

$$\int_0^\pi x^2 \sin x dx. = \boxed{d} + \boxed{e}\pi + \boxed{f}\pi^2.$$

d:

NUMERICAL | 4 points

-4 ✓	

e:

NUMERICAL | 4 points

0 ✓	

f:

NUMERICAL | 4 points

1 ✓	

(8) **Q4**

CLOZE | 0.10 penalty

If not specified otherwise, fill in the blanks with **integers (possibly 0 or negative)**. A fraction should be **reduced** (for example, $\frac{1}{2}$ is accepted but not $\frac{2}{4}$), and if it is negative and the answer boxes (such as $\frac{\boxed{a}}{\boxed{b}}$) have ambiguity, the negative sign should be put on the numerator (for example $\frac{-1}{2}$ is accepted but $\frac{1}{-2}$ is not). $\log x = \log_e x$, not $\log_{10} x$.

Let us calculate the following integral.

$$\int_0^{\frac{\pi}{2}} x^2 \sin x dx.$$

By noting that we can find easily a primitive of $\sin(x)$, we can apply integration by parts. Fill in the blanks.

$$\int_0^{\frac{\pi}{2}} x^2 \sin x dx. = [\boxed{a}]_0^{\frac{\pi}{2}} - \int_0^{\frac{\pi}{2}} \boxed{b} dx.$$

Choose correct functions.

$\boxed{a}$:

MULTI | 6 points | Single

- $x \sin(x)$
- $-x \cos(x)$
- $x^3 \cos(x)$
- $-x^2 \cos(x)$ ✓
- $-2x \cos(x)$
- $\sin(x)$
- $x \cos(x^2)$
- $2x \sin(x)$

$\boxed{b}$:

MULTI | 6 points | Single

- $x \sin(x)$
- $-x \cos(x)$
- $x^3 \cos(x)$
- $-x^2 \cos(x)$
- $-2x \cos(x)$ ✓
- $\sin(x)$
- $x \cos(x^2)$
- $2x \sin(x)$

By continuing the calculation, we obtain

$$\int_0^{\frac{\pi}{2}} x^2 \sin x dx. = \boxed{d} + \boxed{e}\pi + \boxed{f}\pi^2.$$

$\boxed{d}$:

NUMERICAL | 4 points

-2 ✓	

$\boxed{e}$:

NUMERICAL | 4 points

1 ✓	

$\boxed{f}$:

NUMERICAL | 4 points

0 ✓	

(9) **Q5**

CLOZE | 0.10 penalty

If not specified otherwise, fill in the blanks with **integers (possibly 0 or negative)**. A fraction should be **reduced** (for example, $\frac{1}{2}$ is accepted but not $\frac{2}{4}$), and if it is negative and the answer boxes (such as $\frac{\boxed{a}}{\boxed{b}}$) have ambiguity, the negative sign should be put on the numerator (for example $\frac{-1}{2}$ is accepted but $\frac{1}{-2}$ is not). $\log x = \log_e x$, not $\log_{10} x$.

Choose the general solution of the following differential equation.

$$y'(x) = 2\exp(y(x))\sin(x^2)x.$$

MULTI | 2 points | Single

- $y(x) = \exp(\cos(x^2)) + C$
- $y(x) = \log(\cos(x^2)) + C$
- $y(x) = \exp(-\cos(x^2) + C)$
- $y(x) = -\log(\cos(x^2) + C)$ ✓
- $y(x) = \exp(-\cos(x^2)) + C$
- $y(x) = -\log(\sin(x^2)) + C$
- $y(x) = -\log(\sin(x^2) + C)$
- $y(x) = \exp(-\sin(x^2)) + C$
- $y(x) = -\log(\sin(x^2)) + C$

Determine $C = \boxed{a}$ with the initial condition $y(0) = 0$

$\boxed{a}$:

NUMERICAL | 2 points

0 ✓	

Choose the general solution of the following differential equation.

$$y''(x) + 5y'(x) + 4y(x) = 0.$$

MULTI | 2 points | Single

- $y(x) = C_1\exp(2x) + C_2\exp(-2x)$
- $y(x) = C_1\exp(-x) + C_2\exp(4x)$
- $y(x) = C_1\exp(x) + C_2\exp(-4x)$
- $y(x) = C_1\exp(-x) + C_2\exp(-4x)$ ✓
- $y(x) = C_1\sin(-4x) + C_2\cos(x)$
- $y(x) = C_1\sin(-2x) + C_2\cos(2x)$
- $y(x) = C_1\sin(2x) + C_2\cos(-2x)$
- $y(x) = C_1\sin(x) + C_2\cos(4x)$

Find a solution $y(x)$ such that $y(0) = 3$ and $y'(0) = 0$. $C_1 =$ [b], $C_2 =$ [c].

[b]:

NUMERICAL | 2 points

4 ✓	

[c]:

NUMERICAL | 2 points

-1 ✓	

For these values of C_1, C_2, find a value $A =$ [d] such that $\lim_{x\to\infty} y(x)/\exp(Ax) = 4$.

[d]:

NUMERICAL | 2 points

-1 ✓	

(10) **Q5**

CLOZE | 0.10 penalty

If not specified otherwise, fill in the blanks with **integers (possibly** 0 **or negative)**. A fraction should be **reduced** (for example, $\frac{1}{2}$ is accepted but not $\frac{2}{4}$), and if it is negative and the answer boxes (such as $\frac{\boxed{a}}{\boxed{b}}$) have ambiguity, the negative sign should be put on the numerator (for example $\frac{-1}{2}$ is accepted but $\frac{1}{-2}$ is not). $\log x = \log_e x$, not $\log_{10} x$.

Choose the general solution of the following differential equation.

$$y'(x) = 2\exp(y(x))\sin(x^2)x.$$

MULTI | 2 points | Single

- $y(x) = \exp(\cos(x^2)) + C$
- $y(x) = \log(\cos(x^2)) + C$
- $y(x) = \exp(-\cos(x^2) + C)$
- $y(x) = -\log(\cos(x^2) + C)$ ✓
- $y(x) = \exp(-\cos(x^2)) + C$
- $y(x) = -\log(\sin(x^2)) + C$
- $y(x) = -\log(\sin(x^2) + C)$
- $y(x) = \exp(-\sin(x^2)) + C$
- $y(x) = -\log(\sin(x^2)) + C$

Determine $C =$ [a] with the initial condition $y(\sqrt{\frac{\pi}{2}}) = 0$

[a]:

NUMERICAL | 2 points

1 ✓	

Choose the general solution of the following differential equation.

$$y''(x) - 5y'(x) + 4y(x) = 0.$$

MULTI | 2 points | Single

- $y(x) = C_1 \exp(2x) + C_2 \exp(-2x)$
- $y(x) = C_1 \exp(-x) + C_2 \exp(4x)$
- $y(x) = C_1 \exp(x) + C_2 \exp(4x)$ ✓
- $y(x) = C_1 \exp(-x) + C_2 \exp(-4x)$
- $y(x) = C_1 \sin(-4x) + C_2 \cos(x)$
- $y(x) = C_1 \sin(-2x) + C_2 \cos(2x)$
- $y(x) = C_1 \sin(2x) + C_2 \cos(-2x)$
- $y(x) = C_1 \sin(x) + C_2 \cos(4x)$

Find a solution $y(x)$ such that $y(0) = 6$ and $y'(0) = 0$. $C_1 =$ [b], $C_2 =$ [c].

[b]:

NUMERICAL | 2 points

8 ✓	

[c]:

NUMERICAL | 2 points

-2 ✓	

For these values of C_1, C_2, find a value $A =$ [d] such that $\lim_{x\to\infty} y(x)/\exp(Ax) = -2$.

[d]:

NUMERICAL | 2 points

4 ✓	

Total of marks: 258