

Abstract

This document is an demonstration of a L^AT_EX Template. Lorem ipsum dolor sit amet, consectetur adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris. Nam arcu libero, nonummy eget, consectetur id, vulputate a, magna. Donec vehicula augue eu neque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Mauris ut leo. Cras viverra metus rhoncus sem. Nulla et lectus vestibulum urna fringilla ultrices. Phasellus eu tellus sit amet tortor gravida placerat. Integer sapien est, iaculis in, pretium quis, viverra ac, nunc. Praesent eget sem vel leo ultrices bibendum. Aenean faucibus. Morbi dolor nulla, malesuada eu, pulvinar at, mollis ac, nulla. Curabitur auctor semper nulla. Donec varius orci eget risus. Duis nibh mi, congue eu, accumsan eleifend, sagittis quis, diam. Duis eget orci sit amet orci dignissim rutrum.

Contents

1	Section	1
1.1	Subsection	1
1.1.1	Subsubsection	4
1.1.2	Subsubsection	6
1.1.3	Subsubsection	9
1.2	Subsection	11
1.2.1	Subsubsection	14
1.2.2	Subsubsection	16
1.2.3	Subsubsection	19
1.3	Subsection	21
1.3.1	Subsubsection	24
1.3.2	Subsubsection	26
1.3.3	Subsubsection	29
2	Section	31
2.1	Subsection	31
2.1.1	Subsubsection	34
2.1.2	Subsubsection	37
2.1.3	Subsubsection	39
2.2	Subsection	41
2.2.1	Subsubsection	44
2.2.2	Subsubsection	47
2.2.3	Subsubsection	49
2.3	Subsection	51
2.3.1	Subsubsection	54
2.3.2	Subsubsection	57
2.3.3	Subsubsection	59
3	Section	61
3.1	Subsection	62
3.1.1	Subsubsection	65
3.1.2	Subsubsection	67
3.1.3	Subsubsection	69
3.2	Subsection	72
3.2.1	Subsubsection	75
3.2.2	Subsubsection	77

3.2.3	Subsubsection	79
3.3	Subsection	82
3.3.1	Subsubsection	85
3.3.2	Subsubsection	87
3.3.3	Subsubsection	89
A	Section Appendix	A-1
A.1	Subsection Appendix	A-1
A.1.1	Subsubsection Appendix	A-1
A.1.2	Subsubsection Appendix	A-2
A.2	Subsection Appendix	A-2
A.2.1	Subsubsection Appendix	A-2
A.2.2	Subsubsection Appendix	A-2
B	Section Appendix	A-3
B.1	Subsection Appendix	A-3
B.1.1	Subsubsection Appendix	A-4
B.1.2	Subsubsection Appendix	A-4
B.2	Subsection Appendix	A-4
B.2.1	Subsubsection Appendix	A-4
B.2.2	Subsubsection Appendix	A-5
C	List of Notations	A-5
D	List of Definitions	A-6
E	List of Examples	A-7
F	List of Lemmas	A-8
G	List of Theorems	A-9
H	List of Corollaries	A-10
	Index	A-11

1 Section

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1.1 Subsection

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Definition 1.1 (Defn Ipsum)

Lorem ipsum dolor sit amet, consectetur adipiscing elit. $\sum_{i=1}^n n = \frac{n(n+1)}{2}$ Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris.

$$e^{i\pi} + 1 = 0$$

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Notation 1.1

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$$\sum_{i=1}^n n = \frac{n(n+1)}{2}$$

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$$\int x dx = \frac{x^2}{2} + C$$

Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Mauris ut leo.

Definition 1.2

$$\sum_{i=1}^n n = \frac{n(n+1)}{2}$$

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Remark 1.1

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Example 1.1 (This is transcribed from Example 1.3 [here](#))

In calculus, $\int_a^b f(x) dx$ can be computed as

$$\int_a^b f(x) dx = F(b) - F(a),$$

where $F(x)$ is an arbitrary anti-derivative of $f(x)$ on $[a, b]$, *i.e.*, $F'(x) = f(x)$ for all x in $[a, b]$. This formula for $\int_a^b f(x) dx$ involves a choice of anti-derivative for $f(x)$, but the formula does *not* depend on the choice: every anti-derivative $G(x)$ of $f(x)$ on $[a, b]$ differs from $F(x)$ by a constant, say $G(x) = F(x) + C$ for all x in $[a, b]$, and changing the anti-derivative $G(x)$ does not change the difference of its values at the endpoints:

$$G(b) - G(a) = (F(b) + C) - (F(a) + C) = F(b) - F(a).$$

So the difference of the values of an anti-derivative of $f(x)$ at $x = a$ and $x = b$ is independent of the choice of anti-derivative of $f(x)$ on the interval $[a, b]$.²

In contrast, the “rule” $F(b) + F(a)$ depends on the choice of anti-derivative of $f(x)$, since

$$G(b) + G(a) = (F(b) + C) + (F(a) + C) = F(b) + F(a) + 2C,$$

which is a new value if $C \neq 0$. Taking differences in an anti-derivative cancels the effect of the undetermined additive constant, so the expression $F(b) - F(a)$ is a well-defined value based on the original input function $f(x)$ and the interval $[a, b]$.

Note 1.1

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Remark 1.2

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Lemma 1.1

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Theorem 1.2 (Thrm Ipsum)

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Corollary 1.2.1

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Exercise 1.1

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Solution

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1.1.1 Subsubsection

Definition 1.3 (Defn Ipsum)

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Notation 1.2

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$$\sum_{i=1}^n n = \frac{n(n+1)}{2}$$

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$$\int x dx = \frac{x^2}{2} + C$$

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Definition 1.4

$$\sum_{i=1}^n n = \frac{n(n+1)}{2}$$

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Remark 1.3

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Note 1.2

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Lemma 1.3

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²This is why in physics, potential energy has no intrinsic meaning (the zero level of potential energy can be anywhere), but *differences* in potential energy are physically meaningful.

Proof

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Theorem 1.4 (Thrm Ipsum)

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Corollary 1.4.1

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1.1.2 Subsubsection**Definition 1.5 (Defn Ipsum)**

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Notation 1.3

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$$\sum_{i=1}^n n = \frac{n(n+1)}{2}$$

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$$\int x \, dx = \frac{x^2}{2} + C$$

Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Mauris ut leo.

Definition 1.6

$$\sum_{i=1}^n n = \frac{n(n+1)}{2}$$

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Remark 1.5

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²This is why in physics, potential energy has no intrinsic meaning (the zero level of potential energy can be anywhere), but *differences* in potential energy are physically meaningful.

Note 1.3

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Remark 1.6

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Lemma 1.5

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Theorem 1.6 (Thrm Ipsum)

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Corollary 1.6.1

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vulputate a, magna.

1.1.3 Subsubsection

Definition 1.7 (Defn Ipsum)

Lorem ipsum dolor sit amet, consectetur adipiscing elit. $\sum_{i=1}^n n = \frac{n(n+1)}{2}$ Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris.

$$e^{i\pi} + 1 = 0$$

Nam arcu libero, nonummy eget, consectetur id, vulputate a, magna. $\int_a^b x^2 dx = \frac{x^3}{3} + C$ Donec vehicula augue eu neque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas.

Notation 1.4

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$$\sum_{i=1}^n n = \frac{n(n+1)}{2}$$

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$$\int x dx = \frac{x^2}{2} + C$$

Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Mauris ut leo.

Definition 1.8

$$\sum_{i=1}^n n = \frac{n(n+1)}{2}$$

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Remark 1.7

No environment should ever start with inline- or (especially not) display-mode math. Not only is that [bad writing practice](#) but, in the case of starting with display-mode math such as above, blank vertical space will be left before the display-mode math where text is expected to be.

If you don't know what to write, just state some context about the equation or expression with which you intended to start, e.g. 'Given any natural number n :'.

Example 1.4 (This is transcribed from Example 1.3 [here](#))

In calculus, $\int_a^b f(x) dx$ can be computed as

$$\int_a^b f(x) dx = F(b) - F(a),$$

where $F(x)$ is an arbitrary anti-derivative of $f(x)$ on $[a, b]$, i.e., $F'(x) = f(x)$ for all x in $[a, b]$. This formula for $\int_a^b f(x) dx$ involves a choice of anti-derivative for $f(x)$, but the formula does *not* depend on the choice: every anti-derivative $G(x)$ of $f(x)$ on $[a, b]$ differs from $F(x)$ by a constant, say $G(x) = F(x) + C$ for all x in $[a, b]$, and changing the anti-derivative $G(x)$ does not change the difference of its values at the endpoints:

$$G(b) - G(a) = (F(b) + C) - (F(a) + C) = F(b) - F(a).$$

So the difference of the values of an anti-derivative of $f(x)$ at $x = a$ and $x = b$ is independent of the choice of anti-derivative of $f(x)$ on the interval $[a, b]$.²

In contrast, the “rule” $F(b) - F(a)$ depends on the choice of anti-derivative of $f(x)$, since

$$G(b) + G(a) = (F(b) + C) + (F(a) + C) = F(b) + F(a) + 2C,$$

which is a new value if $C \neq 0$. Taking differences in an anti-derivative cancels the effect of the undetermined additive constant, so the expression $F(b) - F(a)$ is a well-defined value based on the original input function $f(x)$ and the interval $[a, b]$.

Note 1.4

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Remark 1.8

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Lemma 1.7

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Theorem 1.8 (Thrm Ipsum)

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Corollary 1.8.1

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1.2 Subsection

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Definition 1.9 (Defn Ipsum)

Lorem ipsum dolor sit amet, consectetur adipiscing elit. $\sum_{i=1}^n n = \frac{n(n+1)}{2}$ Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris.

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Notation 1.5

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$$\sum_{i=1}^n n = \frac{n(n+1)}{2}$$

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$$\int x dx = \frac{x^2}{2} + C$$

Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Mauris ut leo.

Definition 1.10

$$\sum_{i=1}^n n = \frac{n(n+1)}{2}$$

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Remark 1.9

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So the difference of the values of an anti-derivative of $f(x)$ at $x = a$ and $x = b$ is independent of the choice of anti-derivative of $f(x)$ on the interval $[a, b]$.²

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Note 1.5

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²This is why in physics, potential energy has no intrinsic meaning (the zero level of potential energy can be anywhere), but *differences* in potential energy are physically meaningful.

Remark 1.10

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Lemma 1.9

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Theorem 1.10 (Thrm Ipsum)

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Corollary 1.10.1

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Exercise 1.2

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Solution

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1.2.1 Subsubsection

Definition 1.11 (Defn Ipsum)

Lorem ipsum dolor sit amet, consectetur adipiscing elit. $\sum_{i=1}^n n = \frac{n(n+1)}{2}$ Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris.

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Notation 1.6

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris.

$$\sum_{i=1}^n n = \frac{n(n+1)}{2}$$

Nam arcu libero, nonummy eget, consectetur id, vulputate a, magna. Donec vehicula augue eu neque.

$$\int x dx = \frac{x^2}{2} + C$$

Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Mauris ut leo.

Definition 1.12

$$\sum_{i=1}^n n = \frac{n(n+1)}{2}$$

Curabitur dictum gravida mauris. Nam arcu libero, nonummy eget, consectetur id, vulputate a, magna. Donec vehicula augue eu neque.

Remark 1.11

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Note 1.6

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Remark 1.12

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Lemma 1.11

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²This is why in physics, potential energy has no intrinsic meaning (the zero level of potential energy can be anywhere), but *differences* in potential energy are physically meaningful.

Proof

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Theorem 1.12 (Thrm Ipsum)

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Corollary 1.12.1

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1.2.2 Subsubsection**Definition 1.13 (Defn Ipsum)**

Lorem ipsum dolor sit amet, consectetur adipiscing elit. $\sum_{i=1}^n n = \frac{n(n+1)}{2}$ Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris.

$$e^{i\pi} + 1 = 0$$

Nam arcu libero, nonummy eget, consectetur id, vulputate a, magna. $\int_a^b x^2 dx = \frac{x^3}{3} + C$ Donec vehicula augue eu neque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas.

Notation 1.7

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$$\sum_{i=1}^n n = \frac{n(n+1)}{2}$$

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$$\int x \, dx = \frac{x^2}{2} + C$$

Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Mauris ut leo.

Definition 1.14

$$\sum_{i=1}^n n = \frac{n(n+1)}{2}$$

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Remark 1.13

No environment should ever start with inline- or (especially not) display-mode math. Not only is that [bad writing practice](#) but, in the case of starting with display-mode math such as above, blank vertical space will be left before the display-mode math where text is expected to be.

If you don't know what to write, just state some context about the equation or expression with which you intended to start, e.g. 'Given any natural number n :'.

Example 1.7 (This is transcribed from Example 1.3 [here](#))

In calculus, $\int_a^b f(x) \, dx$ can be computed as

$$\int_a^b f(x) \, dx = F(b) - F(a),$$

where $F(x)$ is an arbitrary anti-derivative of $f(x)$ on $[a, b]$, *i.e.*, $F'(x) = f(x)$ for all x in $[a, b]$. This formula for $\int_a^b f(x) \, dx$ involves a choice of anti-derivative for $f(x)$, but the formula does *not* depend on the choice: every anti-derivative $G(x)$ of $f(x)$ on $[a, b]$ differs from $F(x)$ by a constant, say $G(x) = F(x) + C$ for all x in $[a, b]$, and changing the anti-derivative $G(x)$ does not change the difference of its values at the endpoints:

$$G(b) - G(a) = (F(b) + C) - (F(a) + C) = F(b) - F(a).$$

So the difference of the values of an anti-derivative of $f(x)$ at $x = a$ and $x = b$ is independent of the choice of anti-derivative of $f(x)$ on the interval $[a, b]$.²

In contrast, the “rule” $F(b) + F(a)$ depends on the choice of anti-derivative of $f(x)$, since

$$G(b) + G(a) = (F(b) + C) + (F(a) + C) = F(b) + F(a) + 2C,$$

which is a new value if $C \neq 0$. Taking differences in an anti-derivative cancels the effect of the undetermined additive constant, so the expression $F(b) - F(a)$ is a well-defined value based on the original input function $f(x)$ and the interval $[a, b]$.

²This is why in physics, potential energy has no intrinsic meaning (the zero level of potential energy can be anywhere), but *differences* in potential energy are physically meaningful.

Note 1.7

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Remark 1.14

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Lemma 1.13

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Theorem 1.14 (Thrm Ipsum)

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Corollary 1.14.1

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vulputate a, magna.

1.2.3 Subsubsection

Definition 1.15 (Defn Ipsum)

Lorem ipsum dolor sit amet, consectetur adipiscing elit. $\sum_{i=1}^n n = \frac{n(n+1)}{2}$ Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris.

$$e^{i\pi} + 1 = 0$$

Nam arcu libero, nonummy eget, consectetur id, vulputate a, magna. $\int_a^b x^2 dx = \frac{x^3}{3} + C$ Donec vehicula augue eu neque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas.

Notation 1.8

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$$\sum_{i=1}^n n = \frac{n(n+1)}{2}$$

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$$\int x dx = \frac{x^2}{2} + C$$

Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Mauris ut leo.

Definition 1.16

$$\sum_{i=1}^n n = \frac{n(n+1)}{2}$$

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Remark 1.15

No environment should ever start with inline- or (especially not) display-mode math. Not only is that [bad writing practice](#) but, in the case of starting with display-mode math such as above, blank vertical space will be left before the display-mode math where text is expected to be.

If you don't know what to write, just state some context about the equation or expression with which you intended to start, e.g. 'Given any natural number n :'.

Example 1.8 (This is transcribed from Example 1.3 [here](#))

In calculus, $\int_a^b f(x) dx$ can be computed as

$$\int_a^b f(x) dx = F(b) - F(a),$$

where $F(x)$ is an arbitrary anti-derivative of $f(x)$ on $[a, b]$, *i.e.*, $F'(x) = f(x)$ for all x in $[a, b]$. This formula for $\int_a^b f(x) dx$ involves a choice of anti-derivative for $f(x)$, but the formula does *not* depend on the choice: every anti-derivative $G(x)$ of $f(x)$ on $[a, b]$ differs from $F(x)$ by a constant, say $G(x) = F(x) + C$ for all x in $[a, b]$, and changing the anti-derivative $G(x)$ does not change the difference of its values at the endpoints:

$$G(b) - G(a) = (F(b) + C) - (F(a) + C) = F(b) - F(a).$$

So the difference of the values of an anti-derivative of $f(x)$ at $x = a$ and $x = b$ is independent of the choice of anti-derivative of $f(x)$ on the interval $[a, b]$.²

In contrast, the “rule” $F(b) - F(a)$ depends on the choice of anti-derivative of $f(x)$, since

$$G(b) + G(a) = (F(b) + C) + (F(a) + C) = F(b) + F(a) + 2C,$$

which is a new value if $C \neq 0$. Taking differences in an anti-derivative cancels the effect of the undetermined additive constant, so the expression $F(b) - F(a)$ is a well-defined value based on the original input function $f(x)$ and the interval $[a, b]$.

Note 1.8

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Remark 1.16

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Lemma 1.15

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²This is why in physics, potential energy has no intrinsic meaning (the zero level of potential energy can be anywhere), but *differences* in potential energy are physically meaningful.

Theorem 1.16 (Thrm Ipsum)

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Corollary 1.16.1

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1.3 Subsection

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Definition 1.17 (Defn Ipsum)

Lorem ipsum dolor sit amet, consectetur adipiscing elit. $\sum_{i=1}^n n = \frac{n(n+1)}{2}$ Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris.

$$e^{i\pi} + 1 = 0$$

Nam arcu libero, nonummy eget, consectetur id, vulputate a, magna. $\int_a^b x^2 dx = \frac{x^3}{3} + C$ Donec vehicula augue eu neque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas.

Notation 1.9

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$$\sum_{i=1}^n n = \frac{n(n+1)}{2}$$

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$$\int x dx = \frac{x^2}{2} + C$$

Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Mauris ut leo.

Definition 1.18

$$\sum_{i=1}^n n = \frac{n(n+1)}{2}$$

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Remark 1.17

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Example 1.9 (This is transcribed from Example 1.3 [here](#))

In calculus, $\int_a^b f(x) dx$ can be computed as

$$\int_a^b f(x) dx = F(b) - F(a),$$

where $F(x)$ is an arbitrary anti-derivative of $f(x)$ on $[a, b]$, *i.e.*, $F'(x) = f(x)$ for all x in $[a, b]$. This formula for $\int_a^b f(x) dx$ involves a choice of anti-derivative for $f(x)$, but the formula does *not* depend on the choice: every anti-derivative $G(x)$ of $f(x)$ on $[a, b]$ differs from $F(x)$ by a constant, say $G(x) = F(x) + C$ for all x in $[a, b]$, and changing the anti-derivative $G(x)$ does not change the difference of its values at the endpoints:

$$G(b) - G(a) = (F(b) + C) - (F(a) + C) = F(b) - F(a).$$

So the difference of the values of an anti-derivative of $f(x)$ at $x = a$ and $x = b$ is independent of the choice of anti-derivative of $f(x)$ on the interval $[a, b]$.²

In contrast, the “rule” $F(b) + F(a)$ depends on the choice of anti-derivative of $f(x)$, since

$$G(b) + G(a) = (F(b) + C) + (F(a) + C) = F(b) + F(a) + 2C,$$

which is a new value if $C \neq 0$. Taking differences in an anti-derivative cancels the effect of the undetermined additive constant, so the expression $F(b) - F(a)$ is a well-defined value based on the original input function $f(x)$ and the interval $[a, b]$.

Note 1.9

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²This is why in physics, potential energy has no intrinsic meaning (the zero level of potential energy can be anywhere), but *differences* in potential energy are physically meaningful.

Remark 1.18

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Lemma 1.17

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Theorem 1.18 (Thrm Ipsum)

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Corollary 1.18.1

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Exercise 1.3

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Solution

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1.3.1 Subsubsection

Definition 1.19 (Defn Ipsum)

Lorem ipsum dolor sit amet, consectetur adipiscing elit. $\sum_{i=1}^n n = \frac{n(n+1)}{2}$ Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris.

$$e^{i\pi} + 1 = 0$$

Nam arcu libero, nonummy eget, consectetur id, vulputate a, magna. $\int_a^b x^2 dx = \frac{x^3}{3} + C$ Donec vehicula augue eu neque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas.

Notation 1.10

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$$\sum_{i=1}^n n = \frac{n(n+1)}{2}$$

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$$\int x dx = \frac{x^2}{2} + C$$

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Definition 1.20

$$\sum_{i=1}^n n = \frac{n(n+1)}{2}$$

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Remark 1.19

No environment should ever start with inline- or (especially not) display-mode math. Not only is that [bad writing practice](#) but, in the case of starting with display-mode math such as above, blank vertical space will be left before the display-mode math where text is expected to be.

If you don't know what to write, just state some context about the equation or expression with which you intended to start, e.g. 'Given any natural number n :'.

Example 1.10 (This is transcribed from Example 1.3 [here](#))

In calculus, $\int_a^b f(x) dx$ can be computed as

$$\int_a^b f(x) dx = F(b) - F(a),$$

where $F(x)$ is an arbitrary anti-derivative of $f(x)$ on $[a, b]$, *i.e.*, $F'(x) = f(x)$ for all x in $[a, b]$. This formula for $\int_a^b f(x) dx$ involves a choice of anti-derivative for $f(x)$, but the formula does *not* depend on the choice: every anti-derivative $G(x)$ of $f(x)$ on $[a, b]$ differs from $F(x)$ by a constant, say $G(x) = F(x) + C$ for all x in $[a, b]$, and changing the anti-derivative $G(x)$ does not change the difference of its values at the endpoints:

$$G(b) - G(a) = (F(b) + C) - (F(a) + C) = F(b) - F(a).$$

So the difference of the values of an anti-derivative of $f(x)$ at $x = a$ and $x = b$ is independent of the choice of anti-derivative of $f(x)$ on the interval $[a, b]$.²

In contrast, the "rule" $F(b) + F(a)$ depends on the choice of anti-derivative of $f(x)$, since

$$G(b) + G(a) = (F(b) + C) + (F(a) + C) = F(b) + F(a) + 2C,$$

which is a new value if $C \neq 0$. Taking differences in an anti-derivative cancels the effect of the undetermined additive constant, so the expression $F(b) - F(a)$ is a well-defined value based on the original input function $f(x)$ and the interval $[a, b]$.

Note 1.10

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Remark 1.20

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Lemma 1.19

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²This is why in physics, potential energy has no intrinsic meaning (the zero level of potential energy can be anywhere), but *differences* in potential energy are physically meaningful.

Proof

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Theorem 1.20 (Thrm Ipsum)

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Corollary 1.20.1

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1.3.2 Subsubsection**Definition 1.21 (Defn Ipsum)**

Lorem ipsum dolor sit amet, consectetur adipiscing elit. $\sum_{i=1}^n n = \frac{n(n+1)}{2}$ Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris.

$$e^{i\pi} + 1 = 0$$

Nam arcu libero, nonummy eget, consectetur id, vulputate a, magna. $\int_a^b x^2 dx = \frac{x^3}{3} + C$ Donec vehicula augue eu neque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas.

Notation 1.11

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$$\sum_{i=1}^n n = \frac{n(n+1)}{2}$$

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$$\int x \, dx = \frac{x^2}{2} + C$$

Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Mauris ut leo.

Definition 1.22

$$\sum_{i=1}^n n = \frac{n(n+1)}{2}$$

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Remark 1.21

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Example 1.11 (This is transcribed from Example 1.3 [here](#))

In calculus, $\int_a^b f(x) \, dx$ can be computed as

$$\int_a^b f(x) \, dx = F(b) - F(a),$$

where $F(x)$ is an arbitrary anti-derivative of $f(x)$ on $[a, b]$, *i.e.*, $F'(x) = f(x)$ for all x in $[a, b]$. This formula for $\int_a^b f(x) \, dx$ involves a choice of anti-derivative for $f(x)$, but the formula does *not* depend on the choice: every anti-derivative $G(x)$ of $f(x)$ on $[a, b]$ differs from $F(x)$ by a constant, say $G(x) = F(x) + C$ for all x in $[a, b]$, and changing the anti-derivative $G(x)$ does not change the difference of its values at the endpoints:

$$G(b) - G(a) = (F(b) + C) - (F(a) + C) = F(b) - F(a).$$

So the difference of the values of an anti-derivative of $f(x)$ at $x = a$ and $x = b$ is independent of the choice of anti-derivative of $f(x)$ on the interval $[a, b]$.²

In contrast, the “rule” $F(b) + F(a)$ depends on the choice of anti-derivative of $f(x)$, since

$$G(b) + G(a) = (F(b) + C) + (F(a) + C) = F(b) + F(a) + 2C,$$

which is a new value if $C \neq 0$. Taking differences in an anti-derivative cancels the effect of the undetermined additive constant, so the expression $F(b) - F(a)$ is a well-defined value based on the original input function $f(x)$ and the interval $[a, b]$.

²This is why in physics, potential energy has no intrinsic meaning (the zero level of potential energy can be anywhere), but *differences* in potential energy are physically meaningful.

Note 1.11

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Remark 1.22

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Lemma 1.21

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Theorem 1.22 (Thrm Ipsum)

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Corollary 1.22.1

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1.3.3 Subsubsection

Definition 1.23 (Defn Ipsum)

Lorem ipsum dolor sit amet, consectetur adipiscing elit. $\sum_{i=1}^n n = \frac{n(n+1)}{2}$ Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris.

$$e^{i\pi} + 1 = 0$$

Nam arcu libero, nonummy eget, consectetur id, vulputate a, magna. $\int_a^b x^2 dx = \frac{x^3}{3} + C$ Donec vehicula augue eu neque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas.

Notation 1.12

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$$\sum_{i=1}^n n = \frac{n(n+1)}{2}$$

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$$\int x dx = \frac{x^2}{2} + C$$

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Definition 1.24

$$\sum_{i=1}^n n = \frac{n(n+1)}{2}$$

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Remark 1.23

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Example 1.12 (This is transcribed from Example 1.3 [here](#))

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$$\int_a^b f(x) dx = F(b) - F(a),$$

where $F(x)$ is an arbitrary anti-derivative of $f(x)$ on $[a, b]$, i.e., $F'(x) = f(x)$ for all x in $[a, b]$. This formula for $\int_a^b f(x) dx$ involves a choice of anti-derivative for $f(x)$, but the formula does *not* depend on the choice: every anti-derivative $G(x)$ of $f(x)$ on $[a, b]$ differs from $F(x)$ by a constant, say $G(x) = F(x) + C$ for all x in $[a, b]$, and changing the anti-derivative $G(x)$ does not change the difference of its values at the endpoints:

$$G(b) - G(a) = (F(b) + C) - (F(a) + C) = F(b) - F(a).$$

So the difference of the values of an anti-derivative of $f(x)$ at $x = a$ and $x = b$ is independent of the choice of anti-derivative of $f(x)$ on the interval $[a, b]$.²

In contrast, the “rule” $F(b) + F(a)$ depends on the choice of anti-derivative of $f(x)$, since

$$G(b) + G(a) = (F(b) + C) + (F(a) + C) = F(b) + F(a) + 2C,$$

which is a new value if $C \neq 0$. Taking differences in an anti-derivative cancels the effect of the undetermined additive constant, so the expression $F(b) - F(a)$ is a well-defined value based on the original input function $f(x)$ and the interval $[a, b]$.

Note 1.12

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Remark 1.24

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Lemma 1.23

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²This is why in physics, potential energy has no intrinsic meaning (the zero level of potential energy can be anywhere), but *differences* in potential energy are physically meaningful.

Theorem 1.24 (Thrm Ipsum)

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Corollary 1.24.1

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2 Section

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2.1 Subsection

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Definition 2.1 (Defn Ipsum)

Lorem ipsum dolor sit amet, consectetur adipiscing elit. $\sum_{i=1}^n n = \frac{n(n+1)}{2}$ Ut purus elit, vestibulum ut,

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Notation 2.1

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$$\int x dx = \frac{x^2}{2} + C$$

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Definition 2.2

$$\sum_{i=1}^n n = \frac{n(n+1)}{2}$$

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Note 2.1

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Remark 2.2

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Lemma 2.1

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Theorem 2.2 (Thrm Ipsum)

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²This is why in physics, potential energy has no intrinsic meaning (the zero level of potential energy can be anywhere), but *differences* in potential energy are physically meaningful.

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Corollary 2.2.1

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Exercise 2.1

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Solution

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2.1.1 Subsubsection

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Notation 2.2

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adipiscing vitae, felis. Curabitur dictum gravida mauris.

$$\sum_{i=1}^n n = \frac{n(n+1)}{2}$$

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$$\int x \, dx = \frac{x^2}{2} + C$$

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Definition 2.4

$$\sum_{i=1}^n n = \frac{n(n+1)}{2}$$

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Remark 2.4

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Lemma 2.3

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Theorem 2.4 (Thrm Ipsum)

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Corollary 2.4.1

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2.1.2 Subsubsection

Definition 2.5 (Defn Ipsum)

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$$\int x dx = \frac{x^2}{2} + C$$

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Definition 2.6

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Lemma 2.5

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Theorem 2.6 (Thrm Ipsum)

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Corollary 2.6.1

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2.1.3 Subsubsection**Definition 2.7 (Defn Ipsum)**

Lorem ipsum dolor sit amet, consectetur adipiscing elit. $\sum_{i=1}^n n = \frac{n(n+1)}{2}$ Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris.

$$e^{i\pi} + 1 = 0$$

Nam arcu libero, nonummy eget, consectetur id, vulputate a, magna. $\int_a^b x^2 dx = \frac{x^3}{3} + C$ Donec vehicula augue eu neque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas.

Notation 2.4

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$$\sum_{i=1}^n n = \frac{n(n+1)}{2}$$

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$$\int x dx = \frac{x^2}{2} + C$$

Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Mauris ut leo.

Definition 2.8

$$\sum_{i=1}^n n = \frac{n(n+1)}{2}$$

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Remark 2.7

No environment should ever start with inline- or (especially not) display-mode math. Not only is that [bad writing practice](#) but, in the case of starting with display-mode math such as above, blank vertical space will be left before the display-mode math where text is expected to be.

If you don't know what to write, just state some context about the equation or expression with which you intended to start, e.g. 'Given any natural number n :'.

Example 2.4 (This is transcribed from Example 1.3 [here](#))

In calculus, $\int_a^b f(x) dx$ can be computed as

$$\int_a^b f(x) dx = F(b) - F(a),$$

where $F(x)$ is an arbitrary anti-derivative of $f(x)$ on $[a, b]$, i.e., $F'(x) = f(x)$ for all x in $[a, b]$. This formula for $\int_a^b f(x) dx$ involves a choice of anti-derivative for $f(x)$, but the formula does *not* depend on the choice: every anti-derivative $G(x)$ of $f(x)$ on $[a, b]$ differs from $F(x)$ by a constant, say $G(x) = F(x) + C$ for all x in $[a, b]$, and changing the anti-derivative $G(x)$ does not change the difference of its values at the endpoints:

$$G(b) - G(a) = (F(b) + C) - (F(a) + C) = F(b) - F(a).$$

So the difference of the values of an anti-derivative of $f(x)$ at $x = a$ and $x = b$ is independent of the choice of anti-derivative of $f(x)$ on the interval $[a, b]$.²

In contrast, the “rule” $F(b) + F(a)$ depends on the choice of anti-derivative of $f(x)$, since

$$G(b) + G(a) = (F(b) + C) + (F(a) + C) = F(b) + F(a) + 2C,$$

which is a new value if $C \neq 0$. Taking differences in an anti-derivative cancels the effect of the undetermined additive constant, so the expression $F(b) - F(a)$ is a well-defined value based on the original input function $f(x)$ and the interval $[a, b]$.

Note 2.4

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Remark 2.8

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²This is why in physics, potential energy has no intrinsic meaning (the zero level of potential energy can be anywhere), but *differences* in potential energy are physically meaningful.

Lemma 2.7

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Theorem 2.8 (Thrm Ipsum)

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Corollary 2.8.1

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2.2 Subsection

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Definition 2.9 (Defn Ipsum)

Lorem ipsum dolor sit amet, consectetur adipiscing elit. $\sum_{i=1}^n n = \frac{n(n+1)}{2}$ Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris.

$$e^{i\pi} + 1 = 0$$

Nam arcu libero, nonummy eget, consectetur id, vulputate a, magna. $\int_a^b x^2 dx = \frac{x^3}{3} + C$ Donec vehicula augue eu neque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas.

Notation 2.5

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$$\sum_{i=1}^n n = \frac{n(n+1)}{2}$$

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$$\int x dx = \frac{x^2}{2} + C$$

Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Mauris ut leo.

Definition 2.10

$$\sum_{i=1}^n n = \frac{n(n+1)}{2}$$

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Remark 2.9

No environment should ever start with inline- or (especially not) display-mode math. Not only is that [bad writing practice](#) but, in the case of starting with display-mode math such as above, blank vertical space will be left before the display-mode math where text is expected to be.

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Example 2.5 (This is transcribed from Example 1.3 [here](#))

In calculus, $\int_a^b f(x) dx$ can be computed as

$$\int_a^b f(x) dx = F(b) - F(a),$$

where $F(x)$ is an arbitrary anti-derivative of $f(x)$ on $[a, b]$, *i.e.*, $F'(x) = f(x)$ for all x in $[a, b]$. This formula for $\int_a^b f(x) dx$ involves a choice of anti-derivative for $f(x)$, but the formula does *not* depend on the choice: every anti-derivative $G(x)$ of $f(x)$ on $[a, b]$ differs from $F(x)$ by a constant, say $G(x) = F(x) + C$ for all x in $[a, b]$, and changing the anti-derivative $G(x)$ does not change the difference of its values at the endpoints:

$$G(b) - G(a) = (F(b) + C) - (F(a) + C) = F(b) - F(a).$$

So the difference of the values of an anti-derivative of $f(x)$ at $x = a$ and $x = b$ is independent of the choice of anti-derivative of $f(x)$ on the interval $[a, b]$.²

²This is why in physics, potential energy has no intrinsic meaning (the zero level of potential energy can be anywhere), but *differences* in potential energy are physically meaningful.

In contrast, the “rule” $F(b) + F(a)$ depends on the choice of anti-derivative of $f(x)$, since

$$G(b) + G(a) = (F(b) + C) + (F(a) + C) = F(b) + F(a) + 2C,$$

which is a new value if $C \neq 0$. Taking differences in an anti-derivative cancels the effect of the undetermined additive constant, so the expression $F(b) - F(a)$ is a well-defined value based on the original input function $f(x)$ and the interval $[a, b]$.

Note 2.5

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Remark 2.10

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Lemma 2.9

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Theorem 2.10 (Thrm Ipsum)

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Corollary 2.10.1

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Exercise 2.2

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Solution

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2.2.1 Subsubsection

Definition 2.11 (Defn Ipsum)

Lorem ipsum dolor sit amet, consectetur adipiscing elit. $\sum_{i=1}^n n = \frac{n(n+1)}{2}$ Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris.

$$e^{i\pi} + 1 = 0$$

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Notation 2.6

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris.

$$\sum_{i=1}^n n = \frac{n(n+1)}{2}$$

Nam arcu libero, nonummy eget, consectetur id, vulputate a, magna. Donec vehicula augue eu neque.

$$\int x \, dx = \frac{x^2}{2} + C$$

Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Mauris ut leo.

Definition 2.12

$$\sum_{i=1}^n n = \frac{n(n+1)}{2}$$

Curabitur dictum gravida mauris. Nam arcu libero, nonummy eget, consectetur id, vulputate a, magna. Donec vehicula augue eu neque.

Remark 2.11

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where $F(x)$ is an arbitrary anti-derivative of $f(x)$ on $[a, b]$, *i.e.*, $F'(x) = f(x)$ for all x in $[a, b]$. This formula for $\int_a^b f(x) \, dx$ involves a choice of anti-derivative for $f(x)$, but the formula does *not* depend on the choice: every anti-derivative $G(x)$ of $f(x)$ on $[a, b]$ differs from $F(x)$ by a constant, say $G(x) = F(x) + C$ for all x in $[a, b]$, and changing the anti-derivative $G(x)$ does not change the difference of its values at the endpoints:

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So the difference of the values of an anti-derivative of $f(x)$ at $x = a$ and $x = b$ is independent of the choice of anti-derivative of $f(x)$ on the interval $[a, b]$.²

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which is a new value if $C \neq 0$. Taking differences in an anti-derivative cancels the effect of the undetermined additive constant, so the expression $F(b) - F(a)$ is a well-defined value based on the original input function $f(x)$ and the interval $[a, b]$.

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Note 2.6

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Remark 2.12

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Lemma 2.11

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Theorem 2.12 (Thrm Ipsum)

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Corollary 2.12.1

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vulputate a, magna.

2.2.2 Subsubsection

Definition 2.13 (Defn Ipsum)

Lorem ipsum dolor sit amet, consectetur adipiscing elit. $\sum_{i=1}^n n = \frac{n(n+1)}{2}$ Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris.

$$e^{i\pi} + 1 = 0$$

Nam arcu libero, nonummy eget, consectetur id, vulputate a, magna. $\int_a^b x^2 dx = \frac{x^3}{3} + C$ Donec vehicula augue eu neque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas.

Notation 2.7

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris.

$$\sum_{i=1}^n n = \frac{n(n+1)}{2}$$

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$$\int x dx = \frac{x^2}{2} + C$$

Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Mauris ut leo.

Definition 2.14

$$\sum_{i=1}^n n = \frac{n(n+1)}{2}$$

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Remark 2.13

No environment should ever start with inline- or (especially not) display-mode math. Not only is that [bad writing practice](#) but, in the case of starting with display-mode math such as above, blank vertical space will be left before the display-mode math where text is expected to be.

If you don't know what to write, just state some context about the equation or expression with which you intended to start, e.g. 'Given any natural number n :'.

Example 2.7 (This is transcribed from Example 1.3 [here](#))

In calculus, $\int_a^b f(x) dx$ can be computed as

$$\int_a^b f(x) dx = F(b) - F(a),$$

where $F(x)$ is an arbitrary anti-derivative of $f(x)$ on $[a, b]$, i.e., $F'(x) = f(x)$ for all x in $[a, b]$. This formula for $\int_a^b f(x) dx$ involves a choice of anti-derivative for $f(x)$, but the formula does *not* depend on the choice: every anti-derivative $G(x)$ of $f(x)$ on $[a, b]$ differs from $F(x)$ by a constant, say $G(x) = F(x) + C$ for all x in $[a, b]$, and changing the anti-derivative $G(x)$ does not change the difference of its values at the endpoints:

$$G(b) - G(a) = (F(b) + C) - (F(a) + C) = F(b) - F(a).$$

So the difference of the values of an anti-derivative of $f(x)$ at $x = a$ and $x = b$ is independent of the choice of anti-derivative of $f(x)$ on the interval $[a, b]$.²

In contrast, the “rule” $F(b) - F(a)$ depends on the choice of anti-derivative of $f(x)$, since

$$G(b) + G(a) = (F(b) + C) + (F(a) + C) = F(b) + F(a) + 2C,$$

which is a new value if $C \neq 0$. Taking differences in an anti-derivative cancels the effect of the undetermined additive constant, so the expression $F(b) - F(a)$ is a well-defined value based on the original input function $f(x)$ and the interval $[a, b]$.

Note 2.7

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Remark 2.14

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Lemma 2.13

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²This is why in physics, potential energy has no intrinsic meaning (the zero level of potential energy can be anywhere), but *differences* in potential energy are physically meaningful.

Theorem 2.14 (Thrm Ipsum)

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Corollary 2.14.1

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2.2.3 Subsubsection**Definition 2.15 (Defn Ipsum)**

Lorem ipsum dolor sit amet, consectetur adipiscing elit. $\sum_{i=1}^n n = \frac{n(n+1)}{2}$ Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris.

$$e^{i\pi} + 1 = 0$$

Nam arcu libero, nonummy eget, consectetur id, vulputate a, magna. $\int_a^b x^2 dx = \frac{x^3}{3} + C$ Donec vehicula augue eu neque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas.

Notation 2.8

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris.

$$\sum_{i=1}^n n = \frac{n(n+1)}{2}$$

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$$\int x dx = \frac{x^2}{2} + C$$

Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Mauris ut leo.

Definition 2.16

$$\sum_{i=1}^n n = \frac{n(n+1)}{2}$$

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Remark 2.15

No environment should ever start with inline- or (especially not) display-mode math. Not only is that [bad writing practice](#) but, in the case of starting with display-mode math such as above, blank vertical space will be left before the display-mode math where text is expected to be.

If you don't know what to write, just state some context about the equation or expression with which you intended to start, e.g. 'Given any natural number n :'.

Example 2.8 (This is transcribed from Example 1.3 [here](#))

In calculus, $\int_a^b f(x) dx$ can be computed as

$$\int_a^b f(x) dx = F(b) - F(a),$$

where $F(x)$ is an arbitrary anti-derivative of $f(x)$ on $[a, b]$, i.e., $F'(x) = f(x)$ for all x in $[a, b]$. This formula for $\int_a^b f(x) dx$ involves a choice of anti-derivative for $f(x)$, but the formula does *not* depend on the choice: every anti-derivative $G(x)$ of $f(x)$ on $[a, b]$ differs from $F(x)$ by a constant, say $G(x) = F(x) + C$ for all x in $[a, b]$, and changing the anti-derivative $G(x)$ does not change the difference of its values at the endpoints:

$$G(b) - G(a) = (F(b) + C) - (F(a) + C) = F(b) - F(a).$$

So the difference of the values of an anti-derivative of $f(x)$ at $x = a$ and $x = b$ is independent of the choice of anti-derivative of $f(x)$ on the interval $[a, b]$.²

In contrast, the “rule” $F(b) + F(a)$ depends on the choice of anti-derivative of $f(x)$, since

$$G(b) + G(a) = (F(b) + C) + (F(a) + C) = F(b) + F(a) + 2C,$$

which is a new value if $C \neq 0$. Taking differences in an anti-derivative cancels the effect of the undetermined additive constant, so the expression $F(b) - F(a)$ is a well-defined value based on the original input function $f(x)$ and the interval $[a, b]$.

Note 2.8

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Remark 2.16

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²This is why in physics, potential energy has no intrinsic meaning (the zero level of potential energy can be anywhere), but *differences* in potential energy are physically meaningful.

Lemma 2.15

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Theorem 2.16 (Thrm Ipsum)

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Corollary 2.16.1

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2.3 Subsection

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Definition 2.17 (Defn Ipsum)

Lorem ipsum dolor sit amet, consectetur adipiscing elit. $\sum_{i=1}^n n = \frac{n(n+1)}{2}$ Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris.

$$e^{i\pi} + 1 = 0$$

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Notation 2.9

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$$\sum_{i=1}^n n = \frac{n(n+1)}{2}$$

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$$\int x dx = \frac{x^2}{2} + C$$

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Definition 2.18

$$\sum_{i=1}^n n = \frac{n(n+1)}{2}$$

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Remark 2.17

No environment should ever start with inline- or (especially not) display-mode math. Not only is that [bad writing practice](#) but, in the case of starting with display-mode math such as above, blank vertical space will be left before the display-mode math where text is expected to be.

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Example 2.9 (This is transcribed from Example 1.3 [here](#))

In calculus, $\int_a^b f(x) dx$ can be computed as

$$\int_a^b f(x) dx = F(b) - F(a),$$

where $F(x)$ is an arbitrary anti-derivative of $f(x)$ on $[a, b]$, *i.e.*, $F'(x) = f(x)$ for all x in $[a, b]$. This formula for $\int_a^b f(x) dx$ involves a choice of anti-derivative for $f(x)$, but the formula does *not* depend on the choice: every anti-derivative $G(x)$ of $f(x)$ on $[a, b]$ differs from $F(x)$ by a constant, say $G(x) = F(x) + C$ for all x in $[a, b]$, and changing the anti-derivative $G(x)$ does not change the difference of its values at the endpoints:

$$G(b) - G(a) = (F(b) + C) - (F(a) + C) = F(b) - F(a).$$

So the difference of the values of an anti-derivative of $f(x)$ at $x = a$ and $x = b$ is independent of the choice of anti-derivative of $f(x)$ on the interval $[a, b]$.²

²This is why in physics, potential energy has no intrinsic meaning (the zero level of potential energy can be anywhere), but *differences* in potential energy are physically meaningful.

In contrast, the “rule” $F(b) + F(a)$ depends on the choice of anti-derivative of $f(x)$, since

$$G(b) + G(a) = (F(b) + C) + (F(a) + C) = F(b) + F(a) + 2C,$$

which is a new value if $C \neq 0$. Taking differences in an anti-derivative cancels the effect of the undetermined additive constant, so the expression $F(b) - F(a)$ is a well-defined value based on the original input function $f(x)$ and the interval $[a, b]$.

Note 2.9

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Remark 2.18

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Lemma 2.17

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Theorem 2.18 (Thrm Ipsum)

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Corollary 2.18.1

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Exercise 2.3

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Solution

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2.3.1 Subsubsection

Definition 2.19 (Defn Ipsum)

Lorem ipsum dolor sit amet, consectetur adipiscing elit. $\sum_{i=1}^n n = \frac{n(n+1)}{2}$ Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris.

$$e^{i\pi} + 1 = 0$$

Nam arcu libero, nonummy eget, consectetur id, vulputate a, magna. $\int_a^b x^2 dx = \frac{x^3}{3} + C$ Donec vehicula augue eu neque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas.

Notation 2.10

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$$\sum_{i=1}^n n = \frac{n(n+1)}{2}$$

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$$\int x \, dx = \frac{x^2}{2} + C$$

Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Mauris ut leo.

Definition 2.20

$$\sum_{i=1}^n n = \frac{n(n+1)}{2}$$

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Remark 2.19

No environment should ever start with inline- or (especially not) display-mode math. Not only is that [bad writing practice](#) but, in the case of starting with display-mode math such as above, blank vertical space will be left before the display-mode math where text is expected to be.

If you don't know what to write, just state some context about the equation or expression with which you intended to start, e.g. 'Given any natural number n :'.

Example 2.10 (This is transcribed from Example 1.3 [here](#))

In calculus, $\int_a^b f(x) \, dx$ can be computed as

$$\int_a^b f(x) \, dx = F(b) - F(a),$$

where $F(x)$ is an arbitrary anti-derivative of $f(x)$ on $[a, b]$, *i.e.*, $F'(x) = f(x)$ for all x in $[a, b]$. This formula for $\int_a^b f(x) \, dx$ involves a choice of anti-derivative for $f(x)$, but the formula does *not* depend on the choice: every anti-derivative $G(x)$ of $f(x)$ on $[a, b]$ differs from $F(x)$ by a constant, say $G(x) = F(x) + C$ for all x in $[a, b]$, and changing the anti-derivative $G(x)$ does not change the difference of its values at the endpoints:

$$G(b) - G(a) = (F(b) + C) - (F(a) + C) = F(b) - F(a).$$

So the difference of the values of an anti-derivative of $f(x)$ at $x = a$ and $x = b$ is independent of the choice of anti-derivative of $f(x)$ on the interval $[a, b]$.²

In contrast, the “rule” $F(b) + F(a)$ depends on the choice of anti-derivative of $f(x)$, since

$$G(b) + G(a) = (F(b) + C) + (F(a) + C) = F(b) + F(a) + 2C,$$

which is a new value if $C \neq 0$. Taking differences in an anti-derivative cancels the effect of the undetermined additive constant, so the expression $F(b) - F(a)$ is a well-defined value based on the original input function $f(x)$ and the interval $[a, b]$.

²This is why in physics, potential energy has no intrinsic meaning (the zero level of potential energy can be anywhere), but *differences* in potential energy are physically meaningful.

Note 2.10

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Remark 2.20

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Lemma 2.19

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Theorem 2.20 (Thrm Ipsum)

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Corollary 2.20.1

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vulputate a, magna.

2.3.2 Subsubsection

Definition 2.21 (Defn Ipsum)

Lorem ipsum dolor sit amet, consectetur adipiscing elit. $\sum_{i=1}^n n = \frac{n(n+1)}{2}$ Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris.

$$e^{i\pi} + 1 = 0$$

Nam arcu libero, nonummy eget, consectetur id, vulputate a, magna. $\int_a^b x^2 dx = \frac{x^3}{3} + C$ Donec vehicula augue eu neque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas.

Notation 2.11

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$$\sum_{i=1}^n n = \frac{n(n+1)}{2}$$

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$$\int x dx = \frac{x^2}{2} + C$$

Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Mauris ut leo.

Definition 2.22

$$\sum_{i=1}^n n = \frac{n(n+1)}{2}$$

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Remark 2.21

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If you don't know what to write, just state some context about the equation or expression with which you intended to start, e.g. 'Given any natural number n :'.

Example 2.11 (This is transcribed from Example 1.3 [here](#))

In calculus, $\int_a^b f(x) dx$ can be computed as

$$\int_a^b f(x) dx = F(b) - F(a),$$

where $F(x)$ is an arbitrary anti-derivative of $f(x)$ on $[a, b]$, i.e., $F'(x) = f(x)$ for all x in $[a, b]$. This formula for $\int_a^b f(x) dx$ involves a choice of anti-derivative for $f(x)$, but the formula does *not* depend on the choice: every anti-derivative $G(x)$ of $f(x)$ on $[a, b]$ differs from $F(x)$ by a constant, say $G(x) = F(x) + C$ for all x in $[a, b]$, and changing the anti-derivative $G(x)$ does not change the difference of its values at the endpoints:

$$G(b) - G(a) = (F(b) + C) - (F(a) + C) = F(b) - F(a).$$

So the difference of the values of an anti-derivative of $f(x)$ at $x = a$ and $x = b$ is independent of the choice of anti-derivative of $f(x)$ on the interval $[a, b]$.²

In contrast, the “rule” $F(b) - F(a)$ depends on the choice of anti-derivative of $f(x)$, since

$$G(b) + G(a) = (F(b) + C) + (F(a) + C) = F(b) + F(a) + 2C,$$

which is a new value if $C \neq 0$. Taking differences in an anti-derivative cancels the effect of the undetermined additive constant, so the expression $F(b) - F(a)$ is a well-defined value based on the original input function $f(x)$ and the interval $[a, b]$.

Note 2.11

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Remark 2.22

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Lemma 2.21

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²This is why in physics, potential energy has no intrinsic meaning (the zero level of potential energy can be anywhere), but *differences* in potential energy are physically meaningful.

Theorem 2.22 (Thrm Ipsum)

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Corollary 2.22.1

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2.3.3 Subsubsection**Definition 2.23 (Defn Ipsum)**

Lorem ipsum dolor sit amet, consectetur adipiscing elit. $\sum_{i=1}^n n = \frac{n(n+1)}{2}$ Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris.

$$e^{i\pi} + 1 = 0$$

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Notation 2.12

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$$\sum_{i=1}^n n = \frac{n(n+1)}{2}$$

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$$\int x dx = \frac{x^2}{2} + C$$

Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Mauris ut leo.

Definition 2.24

$$\sum_{i=1}^n n = \frac{n(n+1)}{2}$$

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Remark 2.23

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where $F(x)$ is an arbitrary anti-derivative of $f(x)$ on $[a, b]$, i.e., $F'(x) = f(x)$ for all x in $[a, b]$. This formula for $\int_a^b f(x) dx$ involves a choice of anti-derivative for $f(x)$, but the formula does *not* depend on the choice: every anti-derivative $G(x)$ of $f(x)$ on $[a, b]$ differs from $F(x)$ by a constant, say $G(x) = F(x) + C$ for all x in $[a, b]$, and changing the anti-derivative $G(x)$ does not change the difference of its values at the endpoints:

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So the difference of the values of an anti-derivative of $f(x)$ at $x = a$ and $x = b$ is independent of the choice of anti-derivative of $f(x)$ on the interval $[a, b]$.²

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which is a new value if $C \neq 0$. Taking differences in an anti-derivative cancels the effect of the undetermined additive constant, so the expression $F(b) - F(a)$ is a well-defined value based on the original input function $f(x)$ and the interval $[a, b]$.

Note 2.12

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Remark 2.24

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²This is why in physics, potential energy has no intrinsic meaning (the zero level of potential energy can be anywhere), but *differences* in potential energy are physically meaningful.

Lemma 2.23

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Theorem 2.24 (Thrm Ipsum)

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Corollary 2.24.1

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3 Section

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3.1 Subsection

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Definition 3.1 (Defn Ipsum)

Lorem ipsum dolor sit amet, consectetur adipiscing elit. $\sum_{i=1}^n n = \frac{n(n+1)}{2}$ Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris.

$$e^{i\pi} + 1 = 0$$

Nam arcu libero, nonummy eget, consectetur id, vulputate a, magna. $\int_a^b x^2 dx = \frac{x^3}{3} + C$ Donec vehicula augue eu neque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas.

Notation 3.1

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris.

$$\sum_{i=1}^n n = \frac{n(n+1)}{2}$$

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$$\int x dx = \frac{x^2}{2} + C$$

Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Mauris ut leo.

Definition 3.2

$$\sum_{i=1}^n n = \frac{n(n+1)}{2}$$

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Remark 3.1

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$$G(b) - G(a) = (F(b) + C) - (F(a) + C) = F(b) - F(a).$$

So the difference of the values of an anti-derivative of $f(x)$ at $x = a$ and $x = b$ is independent of the choice of anti-derivative of $f(x)$ on the interval $[a, b]$.²

In contrast, the “rule” $F(b) + F(a)$ depends on the choice of anti-derivative of $f(x)$, since

$$G(b) + G(a) = (F(b) + C) + (F(a) + C) = F(b) + F(a) + 2C,$$

which is a new value if $C \neq 0$. Taking differences in an anti-derivative cancels the effect of the undetermined additive constant, so the expression $F(b) - F(a)$ is a well-defined value based on the original input function $f(x)$ and the interval $[a, b]$.

Note 3.1

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Remark 3.2

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Lemma 3.1

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²This is why in physics, potential energy has no intrinsic meaning (the zero level of potential energy can be anywhere), but *differences* in potential energy are physically meaningful.

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Theorem 3.2 (Thrm Ipsum)

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Corollary 3.2.1

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Exercise 3.1

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Solution

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3.1.1 Subsubsection**Definition 3.3 (Defn Ipsum)**

Lorem ipsum dolor sit amet, consectetur adipiscing elit. $\sum_{i=1}^n n = \frac{n(n+1)}{2}$ Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris.

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Notation 3.2

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$$\sum_{i=1}^n n = \frac{n(n+1)}{2}$$

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$$\int x dx = \frac{x^2}{2} + C$$

Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Mauris ut leo.

Definition 3.4

$$\sum_{i=1}^n n = \frac{n(n+1)}{2}$$

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Remark 3.3

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where $F(x)$ is an arbitrary anti-derivative of $f(x)$ on $[a, b]$, *i.e.*, $F'(x) = f(x)$ for all x in $[a, b]$. This formula for $\int_a^b f(x) dx$ involves a choice of anti-derivative for $f(x)$, but the formula does *not* depend on the

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So the difference of the values of an anti-derivative of $f(x)$ at $x = a$ and $x = b$ is independent of the choice of anti-derivative of $f(x)$ on the interval $[a, b]$.²

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Note 3.2

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Remark 3.4

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Lemma 3.3

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Theorem 3.4 (Thrm Ipsum)

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²This is why in physics, potential energy has no intrinsic meaning (the zero level of potential energy can be anywhere), but *differences* in potential energy are physically meaningful.

Proof

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Corollary 3.4.1

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3.1.2 Subsubsection**Definition 3.5 (Defn Ipsum)**

Lorem ipsum dolor sit amet, consectetur adipiscing elit. $\sum_{i=1}^n n = \frac{n(n+1)}{2}$ Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris.

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Notation 3.3

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$$\sum_{i=1}^n n = \frac{n(n+1)}{2}$$

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$$\int x dx = \frac{x^2}{2} + C$$

Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Mauris ut leo.

Definition 3.6

$$\sum_{i=1}^n n = \frac{n(n+1)}{2}$$

Curabitur dictum gravida mauris. Nam arcu libero, nonummy eget, consectetur id, vulputate a, magna. Donec vehicula augue eu neque.

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Note 3.3

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Remark 3.6

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Lemma 3.5

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Proof

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Theorem 3.6 (Thrm Ipsum)

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Corollary 3.6.1

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3.1.3 Subsubsection**Definition 3.7 (Defn Ipsum)**

Lorem ipsum dolor sit amet, consectetur adipiscing elit. $\sum_{i=1}^n n = \frac{n(n+1)}{2}$ Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris.

$$e^{i\pi} + 1 = 0$$

Nam arcu libero, nonummy eget, consectetur id, vulputate a, magna. $\int_a^b x^2 dx = \frac{x^3}{3} + C$ Donec vehicula augue eu neque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas.

Notation 3.4

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$$\sum_{i=1}^n n = \frac{n(n+1)}{2}$$

Nam arcu libero, nonummy eget, consectetur id, vulputate a, magna. Donec vehicula augue eu neque.

$$\int x \, dx = \frac{x^2}{2} + C$$

Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Mauris ut leo.

Definition 3.8

$$\sum_{i=1}^n n = \frac{n(n+1)}{2}$$

Curabitur dictum gravida mauris. Nam arcu libero, nonummy eget, consectetur id, vulputate a, magna. Donec vehicula augue eu neque.

Remark 3.7

No environment should ever start with inline- or (especially not) display-mode math. Not only is that [bad writing practice](#) but, in the case of starting with display-mode math such as above, blank vertical space will be left before the display-mode math where text is expected to be.

If you don't know what to write, just state some context about the equation or expression with which you intended to start, e.g. 'Given any natural number n :'.

Example 3.4 (This is transcribed from Example 1.3 [here](#))

In calculus, $\int_a^b f(x) \, dx$ can be computed as

$$\int_a^b f(x) \, dx = F(b) - F(a),$$

where $F(x)$ is an arbitrary anti-derivative of $f(x)$ on $[a, b]$, *i.e.*, $F'(x) = f(x)$ for all x in $[a, b]$. This formula for $\int_a^b f(x) \, dx$ involves a choice of anti-derivative for $f(x)$, but the formula does *not* depend on the choice: every anti-derivative $G(x)$ of $f(x)$ on $[a, b]$ differs from $F(x)$ by a constant, say $G(x) = F(x) + C$ for all x in $[a, b]$, and changing the anti-derivative $G(x)$ does not change the difference of its values at the endpoints:

$$G(b) - G(a) = (F(b) + C) - (F(a) + C) = F(b) - F(a).$$

So the difference of the values of an anti-derivative of $f(x)$ at $x = a$ and $x = b$ is independent of the choice of anti-derivative of $f(x)$ on the interval $[a, b]$.²

In contrast, the “rule” $F(b) + F(a)$ depends on the choice of anti-derivative of $f(x)$, since

$$G(b) + G(a) = (F(b) + C) + (F(a) + C) = F(b) + F(a) + 2C,$$

which is a new value if $C \neq 0$. Taking differences in an anti-derivative cancels the effect of the undetermined additive constant, so the expression $F(b) - F(a)$ is a well-defined value based on the original input function $f(x)$ and the interval $[a, b]$.

²This is why in physics, potential energy has no intrinsic meaning (the zero level of potential energy can be anywhere), but *differences* in potential energy are physically meaningful.

Note 3.4

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Remark 3.8

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Lemma 3.7

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Theorem 3.8 (Thrm Ipsum)

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Corollary 3.8.1

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vulputate a, magna.

3.2 Subsection

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Definition 3.9 (Defn Ipsum)

Lorem ipsum dolor sit amet, consectetur adipiscing elit. $\sum_{i=1}^n n = \frac{n(n+1)}{2}$ Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris.

$$e^{i\pi} + 1 = 0$$

Nam arcu libero, nonummy eget, consectetur id, vulputate a, magna. $\int_a^b x^2 dx = \frac{x^3}{3} + C$ Donec vehicula augue eu neque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas.

Notation 3.5

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$$\sum_{i=1}^n n = \frac{n(n+1)}{2}$$

Nam arcu libero, nonummy eget, consectetur id, vulputate a, magna. Donec vehicula augue eu neque.

$$\int x dx = \frac{x^2}{2} + C$$

Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Mauris ut leo.

Definition 3.10

$$\sum_{i=1}^n n = \frac{n(n+1)}{2}$$

Curabitur dictum gravida mauris. Nam arcu libero, nonummy eget, consectetur id, vulputate a, magna. Donec vehicula augue eu neque.

Remark 3.9

No environment should ever start with inline- or (especially not) display-mode math. Not only is that [bad writing practice](#) but, in the case of starting with display-mode math such as above, blank vertical space will be left before the display-mode math where text is expected to be.

If you don't know what to write, just state some context about the equation or expression with which you intended to start, e.g. 'Given any natural number n :'.

Example 3.5 (This is transcribed from Example 1.3 [here](#))

In calculus, $\int_a^b f(x) dx$ can be computed as

$$\int_a^b f(x) dx = F(b) - F(a),$$

where $F(x)$ is an arbitrary anti-derivative of $f(x)$ on $[a, b]$, i.e., $F'(x) = f(x)$ for all x in $[a, b]$. This formula for $\int_a^b f(x) dx$ involves a choice of anti-derivative for $f(x)$, but the formula does *not* depend on the choice: every anti-derivative $G(x)$ of $f(x)$ on $[a, b]$ differs from $F(x)$ by a constant, say $G(x) = F(x) + C$ for all x in $[a, b]$, and changing the anti-derivative $G(x)$ does not change the difference of its values at the endpoints:

$$G(b) - G(a) = (F(b) + C) - (F(a) + C) = F(b) - F(a).$$

So the difference of the values of an anti-derivative of $f(x)$ at $x = a$ and $x = b$ is independent of the choice of anti-derivative of $f(x)$ on the interval $[a, b]$.²

In contrast, the “rule” $F(b) + F(a)$ depends on the choice of anti-derivative of $f(x)$, since

$$G(b) + G(a) = (F(b) + C) + (F(a) + C) = F(b) + F(a) + 2C,$$

which is a new value if $C \neq 0$. Taking differences in an anti-derivative cancels the effect of the undetermined additive constant, so the expression $F(b) - F(a)$ is a well-defined value based on the original input function $f(x)$ and the interval $[a, b]$.

Note 3.5

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Remark 3.10

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Lemma 3.9

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²This is why in physics, potential energy has no intrinsic meaning (the zero level of potential energy can be anywhere), but *differences* in potential energy are physically meaningful.

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Theorem 3.10 (Thrm Ipsum)

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Corollary 3.10.1

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Exercise 3.2

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Solution

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3.2.1 Subsubsection**Definition 3.11 (Defn Ipsum)**

Lorem ipsum dolor sit amet, consectetur adipiscing elit. $\sum_{i=1}^n n = \frac{n(n+1)}{2}$ Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris.

$$e^{i\pi} + 1 = 0$$

Nam arcu libero, nonummy eget, consectetur id, vulputate a, magna. $\int_a^b x^2 dx = \frac{x^3}{3} + C$ Donec vehicula augue eu neque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas.

Notation 3.6

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris.

$$\sum_{i=1}^n n = \frac{n(n+1)}{2}$$

Nam arcu libero, nonummy eget, consectetur id, vulputate a, magna. Donec vehicula augue eu neque.

$$\int x dx = \frac{x^2}{2} + C$$

Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Mauris ut leo.

Definition 3.12

$$\sum_{i=1}^n n = \frac{n(n+1)}{2}$$

Curabitur dictum gravida mauris. Nam arcu libero, nonummy eget, consectetur id, vulputate a, magna. Donec vehicula augue eu neque.

Remark 3.11

No environment should ever start with inline- or (especially not) display-mode math. Not only is that [bad writing practice](#) but, in the case of starting with display-mode math such as above, blank vertical space will be left before the display-mode math where text is expected to be.

If you don't know what to write, just state some context about the equation or expression with which you intended to start, e.g. 'Given any natural number n :'.

Example 3.6 (This is transcribed from Example 1.3 [here](#))

In calculus, $\int_a^b f(x) dx$ can be computed as

$$\int_a^b f(x) dx = F(b) - F(a),$$

where $F(x)$ is an arbitrary anti-derivative of $f(x)$ on $[a, b]$, *i.e.*, $F'(x) = f(x)$ for all x in $[a, b]$. This formula for $\int_a^b f(x) dx$ involves a choice of anti-derivative for $f(x)$, but the formula does *not* depend on the

choice: every anti-derivative $G(x)$ of $f(x)$ on $[a, b]$ differs from $F(x)$ by a constant, say $G(x) = F(x) + C$ for all x in $[a, b]$, and changing the anti-derivative $G(x)$ does not change the difference of its values at the endpoints:

$$G(b) - G(a) = (F(b) + C) - (F(a) + C) = F(b) - F(a).$$

So the difference of the values of an anti-derivative of $f(x)$ at $x = a$ and $x = b$ is independent of the choice of anti-derivative of $f(x)$ on the interval $[a, b]$.²

In contrast, the “rule” $F(b) - F(a)$ depends on the choice of anti-derivative of $f(x)$, since

$$G(b) + G(a) = (F(b) + C) + (F(a) + C) = F(b) + F(a) + 2C,$$

which is a new value if $C \neq 0$. Taking differences in an anti-derivative cancels the effect of the undetermined additive constant, so the expression $F(b) - F(a)$ is a well-defined value based on the original input function $f(x)$ and the interval $[a, b]$.

Note 3.6

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Remark 3.12

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Lemma 3.11

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Theorem 3.12 (Thrm Ipsum)

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²This is why in physics, potential energy has no intrinsic meaning (the zero level of potential energy can be anywhere), but *differences* in potential energy are physically meaningful.

Proof

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris. Nam arcu libero, nonummy eget, consectetur id, vulputate a, magna. Donec vehicula augue eu neque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Mauris ut leo. Cras viverra metus rhoncus sem. Nulla et lectus vestibulum urna fringilla ultrices. Phasellus eu tellus sit amet tortor gravida placerat. Integer sapien est, iaculis in, pretium quis, viverra ac, nunc. Praesent eget sem vel leo ultrices bibendum. Aenean faucibus. Morbi dolor nulla, malesuada eu, pulvinar at, mollis ac, nulla. Curabitur auctor semper nulla. Donec varius orci eget risus. Duis nibh mi, congue eu, accumsan eleifend, sagittis quis, diam. Duis eget orci sit amet orci dignissim rutrum. \square

Corollary 3.12.1

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3.2.2 Subsubsection**Definition 3.13 (Defn Ipsum)**

Lorem ipsum dolor sit amet, consectetur adipiscing elit. $\sum_{i=1}^n n = \frac{n(n+1)}{2}$ Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris.

$$e^{i\pi} + 1 = 0$$

Nam arcu libero, nonummy eget, consectetur id, vulputate a, magna. $\int_a^b x^2 dx = \frac{x^3}{3} + C$ Donec vehicula augue eu neque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas.

Notation 3.7

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris.

$$\sum_{i=1}^n n = \frac{n(n+1)}{2}$$

Nam arcu libero, nonummy eget, consectetur id, vulputate a, magna. Donec vehicula augue eu neque.

$$\int x dx = \frac{x^2}{2} + C$$

Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Mauris ut leo.

Definition 3.14

$$\sum_{i=1}^n n = \frac{n(n+1)}{2}$$

Curabitur dictum gravida mauris. Nam arcu libero, nonummy eget, consectetur id, vulputate a, magna. Donec vehicula augue eu neque.

Remark 3.13

No environment should ever start with inline- or (especially not) display-mode math. Not only is that [bad writing practice](#) but, in the case of starting with display-mode math such as above, blank vertical space will be left before the display-mode math where text is expected to be.

If you don't know what to write, just state some context about the equation or expression with which you intended to start, e.g. 'Given any natural number n :'.

Example 3.7 (This is transcribed from Example 1.3 [here](#))

In calculus, $\int_a^b f(x) dx$ can be computed as

$$\int_a^b f(x) dx = F(b) - F(a),$$

where $F(x)$ is an arbitrary anti-derivative of $f(x)$ on $[a, b]$, *i.e.*, $F'(x) = f(x)$ for all x in $[a, b]$. This formula for $\int_a^b f(x) dx$ involves a choice of anti-derivative for $f(x)$, but the formula does *not* depend on the choice: every anti-derivative $G(x)$ of $f(x)$ on $[a, b]$ differs from $F(x)$ by a constant, say $G(x) = F(x) + C$ for all x in $[a, b]$, and changing the anti-derivative $G(x)$ does not change the difference of its values at the endpoints:

$$G(b) - G(a) = (F(b) + C) - (F(a) + C) = F(b) - F(a).$$

So the difference of the values of an anti-derivative of $f(x)$ at $x = a$ and $x = b$ is independent of the choice of anti-derivative of $f(x)$ on the interval $[a, b]$.²

In contrast, the "rule" $F(b) + F(a)$ depends on the choice of anti-derivative of $f(x)$, since

$$G(b) + G(a) = (F(b) + C) + (F(a) + C) = F(b) + F(a) + 2C,$$

which is a new value if $C \neq 0$. Taking differences in an anti-derivative cancels the effect of the undetermined additive constant, so the expression $F(b) - F(a)$ is a well-defined value based on the original input function $f(x)$ and the interval $[a, b]$.

Note 3.7

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Remark 3.14

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Lemma 3.13

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²This is why in physics, potential energy has no intrinsic meaning (the zero level of potential energy can be anywhere), but *differences* in potential energy are physically meaningful.

Proof

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Theorem 3.14 (Thrm Ipsum)

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Proof

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Corollary 3.14.1

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3.2.3 Subsubsection**Definition 3.15 (Defn Ipsum)**

Lorem ipsum dolor sit amet, consectetur adipiscing elit. $\sum_{i=1}^n n = \frac{n(n+1)}{2}$ Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris.

$$e^{i\pi} + 1 = 0$$

Nam arcu libero, nonummy eget, consectetur id, vulputate a, magna. $\int_a^b x^2 dx = \frac{x^3}{3} + C$ Donec vehicula augue eu neque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas.

Notation 3.8

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris.

$$\sum_{i=1}^n n = \frac{n(n+1)}{2}$$

Nam arcu libero, nonummy eget, consectetur id, vulputate a, magna. Donec vehicula augue eu neque.

$$\int x \, dx = \frac{x^2}{2} + C$$

Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Mauris ut leo.

Definition 3.16

$$\sum_{i=1}^n n = \frac{n(n+1)}{2}$$

Curabitur dictum gravida mauris. Nam arcu libero, nonummy eget, consectetur id, vulputate a, magna. Donec vehicula augue eu neque.

Remark 3.15

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Example 3.8 (This is transcribed from Example 1.3 [here](#))

In calculus, $\int_a^b f(x) \, dx$ can be computed as

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where $F(x)$ is an arbitrary anti-derivative of $f(x)$ on $[a, b]$, *i.e.*, $F'(x) = f(x)$ for all x in $[a, b]$. This formula for $\int_a^b f(x) \, dx$ involves a choice of anti-derivative for $f(x)$, but the formula does *not* depend on the choice: every anti-derivative $G(x)$ of $f(x)$ on $[a, b]$ differs from $F(x)$ by a constant, say $G(x) = F(x) + C$ for all x in $[a, b]$, and changing the anti-derivative $G(x)$ does not change the difference of its values at the endpoints:

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So the difference of the values of an anti-derivative of $f(x)$ at $x = a$ and $x = b$ is independent of the choice of anti-derivative of $f(x)$ on the interval $[a, b]$.²

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which is a new value if $C \neq 0$. Taking differences in an anti-derivative cancels the effect of the undetermined additive constant, so the expression $F(b) - F(a)$ is a well-defined value based on the original input function $f(x)$ and the interval $[a, b]$.

²This is why in physics, potential energy has no intrinsic meaning (the zero level of potential energy can be anywhere), but *differences* in potential energy are physically meaningful.

Note 3.8

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Remark 3.16

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Lemma 3.15

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Proof

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Theorem 3.16 (Thrm Ipsum)

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Corollary 3.16.1

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vulputate a, magna.

3.3 Subsection

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Definition 3.17 (Defn Ipsum)

Lorem ipsum dolor sit amet, consectetur adipiscing elit. $\sum_{i=1}^n n = \frac{n(n+1)}{2}$ Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris.

$$e^{i\pi} + 1 = 0$$

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Notation 3.9

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$$\sum_{i=1}^n n = \frac{n(n+1)}{2}$$

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$$\int x dx = \frac{x^2}{2} + C$$

Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Mauris ut leo.

Definition 3.18

$$\sum_{i=1}^n n = \frac{n(n+1)}{2}$$

Curabitur dictum gravida mauris. Nam arcu libero, nonummy eget, consectetur id, vulputate a, magna. Donec vehicula augue eu neque.

Remark 3.17

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Example 3.9 (This is transcribed from Example 1.3 [here](#))

In calculus, $\int_a^b f(x) dx$ can be computed as

$$\int_a^b f(x) dx = F(b) - F(a),$$

where $F(x)$ is an arbitrary anti-derivative of $f(x)$ on $[a, b]$, i.e., $F'(x) = f(x)$ for all x in $[a, b]$. This formula for $\int_a^b f(x) dx$ involves a choice of anti-derivative for $f(x)$, but the formula does *not* depend on the choice: every anti-derivative $G(x)$ of $f(x)$ on $[a, b]$ differs from $F(x)$ by a constant, say $G(x) = F(x) + C$ for all x in $[a, b]$, and changing the anti-derivative $G(x)$ does not change the difference of its values at the endpoints:

$$G(b) - G(a) = (F(b) + C) - (F(a) + C) = F(b) - F(a).$$

So the difference of the values of an anti-derivative of $f(x)$ at $x = a$ and $x = b$ is independent of the choice of anti-derivative of $f(x)$ on the interval $[a, b]$.²

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Note 3.9

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Remark 3.18

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Lemma 3.17

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²This is why in physics, potential energy has no intrinsic meaning (the zero level of potential energy can be anywhere), but *differences* in potential energy are physically meaningful.

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Theorem 3.18 (Thrm Ipsum)

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Corollary 3.18.1

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Exercise 3.3

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Solution

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3.3.1 Subsubsection**Definition 3.19 (Defn Ipsum)**

Lorem ipsum dolor sit amet, consectetur adipiscing elit. $\sum_{i=1}^n n = \frac{n(n+1)}{2}$ Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris.

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Notation 3.10

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris.

$$\sum_{i=1}^n n = \frac{n(n+1)}{2}$$

Nam arcu libero, nonummy eget, consectetur id, vulputate a, magna. Donec vehicula augue eu neque.

$$\int x dx = \frac{x^2}{2} + C$$

Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Mauris ut leo.

Definition 3.20

$$\sum_{i=1}^n n = \frac{n(n+1)}{2}$$

Curabitur dictum gravida mauris. Nam arcu libero, nonummy eget, consectetur id, vulputate a, magna. Donec vehicula augue eu neque.

Remark 3.19

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$$\int_a^b f(x) dx = F(b) - F(a),$$

where $F(x)$ is an arbitrary anti-derivative of $f(x)$ on $[a, b]$, *i.e.*, $F'(x) = f(x)$ for all x in $[a, b]$. This formula for $\int_a^b f(x) dx$ involves a choice of anti-derivative for $f(x)$, but the formula does *not* depend on the

choice: every anti-derivative $G(x)$ of $f(x)$ on $[a, b]$ differs from $F(x)$ by a constant, say $G(x) = F(x) + C$ for all x in $[a, b]$, and changing the anti-derivative $G(x)$ does not change the difference of its values at the endpoints:

$$G(b) - G(a) = (F(b) + C) - (F(a) + C) = F(b) - F(a).$$

So the difference of the values of an anti-derivative of $f(x)$ at $x = a$ and $x = b$ is independent of the choice of anti-derivative of $f(x)$ on the interval $[a, b]$.²

In contrast, the “rule” $F(b) - F(a)$ depends on the choice of anti-derivative of $f(x)$, since

$$G(b) + G(a) = (F(b) + C) + (F(a) + C) = F(b) + F(a) + 2C,$$

which is a new value if $C \neq 0$. Taking differences in an anti-derivative cancels the effect of the undetermined additive constant, so the expression $F(b) - F(a)$ is a well-defined value based on the original input function $f(x)$ and the interval $[a, b]$.

Note 3.10

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Remark 3.20

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Lemma 3.19

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Theorem 3.20 (Thrm Ipsum)

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²This is why in physics, potential energy has no intrinsic meaning (the zero level of potential energy can be anywhere), but *differences* in potential energy are physically meaningful.

Proof

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Corollary 3.20.1

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3.3.2 Subsubsection**Definition 3.21 (Defn Ipsum)**

Lorem ipsum dolor sit amet, consectetur adipiscing elit. $\sum_{i=1}^n n = \frac{n(n+1)}{2}$ Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris.

$$e^{i\pi} + 1 = 0$$

Nam arcu libero, nonummy eget, consectetur id, vulputate a, magna. $\int_a^b x^2 dx = \frac{x^3}{3} + C$ Donec vehicula augue eu neque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas.

Notation 3.11

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$$\sum_{i=1}^n n = \frac{n(n+1)}{2}$$

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$$\int x dx = \frac{x^2}{2} + C$$

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Definition 3.22

$$\sum_{i=1}^n n = \frac{n(n+1)}{2}$$

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Remark 3.21

No environment should ever start with inline- or (especially not) display-mode math. Not only is that [bad writing practice](#) but, in the case of starting with display-mode math such as above, blank vertical space will be left before the display-mode math where text is expected to be.

If you don't know what to write, just state some context about the equation or expression with which you intended to start, e.g. 'Given any natural number n :'.

Example 3.11 (This is transcribed from Example 1.3 [here](#))

In calculus, $\int_a^b f(x) dx$ can be computed as

$$\int_a^b f(x) dx = F(b) - F(a),$$

where $F(x)$ is an arbitrary anti-derivative of $f(x)$ on $[a, b]$, *i.e.*, $F'(x) = f(x)$ for all x in $[a, b]$. This formula for $\int_a^b f(x) dx$ involves a choice of anti-derivative for $f(x)$, but the formula does *not* depend on the choice: every anti-derivative $G(x)$ of $f(x)$ on $[a, b]$ differs from $F(x)$ by a constant, say $G(x) = F(x) + C$ for all x in $[a, b]$, and changing the anti-derivative $G(x)$ does not change the difference of its values at the endpoints:

$$G(b) - G(a) = (F(b) + C) - (F(a) + C) = F(b) - F(a).$$

So the difference of the values of an anti-derivative of $f(x)$ at $x = a$ and $x = b$ is independent of the choice of anti-derivative of $f(x)$ on the interval $[a, b]$.²

In contrast, the "rule" $F(b) + F(a)$ depends on the choice of anti-derivative of $f(x)$, since

$$G(b) + G(a) = (F(b) + C) + (F(a) + C) = F(b) + F(a) + 2C,$$

which is a new value if $C \neq 0$. Taking differences in an anti-derivative cancels the effect of the undetermined additive constant, so the expression $F(b) - F(a)$ is a well-defined value based on the original input function $f(x)$ and the interval $[a, b]$.

Note 3.11

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Remark 3.22

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Lemma 3.21

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²This is why in physics, potential energy has no intrinsic meaning (the zero level of potential energy can be anywhere), but *differences* in potential energy are physically meaningful.

Proof

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Theorem 3.22 (Thrm Ipsum)

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Corollary 3.22.1

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3.3.3 Subsubsection**Definition 3.23 (Defn Ipsum)**

Lorem ipsum dolor sit amet, consectetur adipiscing elit. $\sum_{i=1}^n n = \frac{n(n+1)}{2}$ Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris.

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Notation 3.12

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$$\sum_{i=1}^n n = \frac{n(n+1)}{2}$$

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$$\int x \, dx = \frac{x^2}{2} + C$$

Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Mauris ut leo.

Definition 3.24

$$\sum_{i=1}^n n = \frac{n(n+1)}{2}$$

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Remark 3.23

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Example 3.12 (This is transcribed from Example 1.3 [here](#))

In calculus, $\int_a^b f(x) \, dx$ can be computed as

$$\int_a^b f(x) \, dx = F(b) - F(a),$$

where $F(x)$ is an arbitrary anti-derivative of $f(x)$ on $[a, b]$, *i.e.*, $F'(x) = f(x)$ for all x in $[a, b]$. This formula for $\int_a^b f(x) \, dx$ involves a choice of anti-derivative for $f(x)$, but the formula does *not* depend on the choice: every anti-derivative $G(x)$ of $f(x)$ on $[a, b]$ differs from $F(x)$ by a constant, say $G(x) = F(x) + C$ for all x in $[a, b]$, and changing the anti-derivative $G(x)$ does not change the difference of its values at the endpoints:

$$G(b) - G(a) = (F(b) + C) - (F(a) + C) = F(b) - F(a).$$

So the difference of the values of an anti-derivative of $f(x)$ at $x = a$ and $x = b$ is independent of the choice of anti-derivative of $f(x)$ on the interval $[a, b]$.²

In contrast, the “rule” $F(b) + F(a)$ depends on the choice of anti-derivative of $f(x)$, since

$$G(b) + G(a) = (F(b) + C) + (F(a) + C) = F(b) + F(a) + 2C,$$

which is a new value if $C \neq 0$. Taking differences in an anti-derivative cancels the effect of the undetermined additive constant, so the expression $F(b) - F(a)$ is a well-defined value based on the original input function $f(x)$ and the interval $[a, b]$.

²This is why in physics, potential energy has no intrinsic meaning (the zero level of potential energy can be anywhere), but *differences* in potential energy are physically meaningful.

Note 3.12

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Remark 3.24

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Lemma 3.23

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Theorem 3.24 (Thrm Ipsum)

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Corollary 3.24.1

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A Section Appendix

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A.1 Subsection Appendix

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A.1.1 Subsubsection Appendix

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A.1.2 Subsubsection Appendix

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B Section Appendix

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B.1 Subsection Appendix

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B.1.1 Subsubsection Appendix

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B.1.2 Subsubsection Appendix

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C List of Notations

Notation 1.1	1
Notation 1.2	4
Notation 1.3	6
Notation 1.4	9
Notation 1.5	11
Notation 1.6	14
Notation 1.7	16
Notation 1.8	19
Notation 1.9	21
Notation 1.10	24
Notation 1.11	26
Notation 1.12	29
Notation 2.1	32
Notation 2.2	34
Notation 2.3	37
Notation 2.4	39
Notation 2.5	42
Notation 2.6	44
Notation 2.7	47
Notation 2.8	49
Notation 2.9	52
Notation 2.10	54
Notation 2.11	57
Notation 2.12	59
Notation 3.1	62
Notation 3.2	65
Notation 3.3	67
Notation 3.4	69
Notation 3.5	72
Notation 3.6	75
Notation 3.7	77
Notation 3.8	79
Notation 3.9	82
Notation 3.10	85
Notation 3.11	87

Notation 3.12	89
---------------	----

D List of Definitions

Definition 1.1	Defn Ipsum	1
Definition 1.2		2
Definition 1.3	Defn Ipsum	4
Definition 1.4		4
Definition 1.5	Defn Ipsum	6
Definition 1.6		7
Definition 1.7	Defn Ipsum	9
Definition 1.8		9
Definition 1.9	Defn Ipsum	11
Definition 1.10		12
Definition 1.11	Defn Ipsum	14
Definition 1.12		14
Definition 1.13	Defn Ipsum	16
Definition 1.14		17
Definition 1.15	Defn Ipsum	19
Definition 1.16		19
Definition 1.17	Defn Ipsum	21
Definition 1.18		22
Definition 1.19	Defn Ipsum	24
Definition 1.20		24
Definition 1.21	Defn Ipsum	26
Definition 1.22		27
Definition 1.23	Defn Ipsum	29
Definition 1.24		29
Definition 2.1	Defn Ipsum	31
Definition 2.2		32
Definition 2.3	Defn Ipsum	34
Definition 2.4		35
Definition 2.5	Defn Ipsum	37
Definition 2.6		37
Definition 2.7	Defn Ipsum	39
Definition 2.8		39
Definition 2.9	Defn Ipsum	41
Definition 2.10		42
Definition 2.11	Defn Ipsum	44
Definition 2.12		45
Definition 2.13	Defn Ipsum	47
Definition 2.14		47
Definition 2.15	Defn Ipsum	49
Definition 2.16		49
Definition 2.17	Defn Ipsum	51
Definition 2.18		52
Definition 2.19	Defn Ipsum	54
Definition 2.20		55

Definition 2.21	Defn Ipsum	57
Definition 2.22	57
Definition 2.23	Defn Ipsum	59
Definition 2.24	59
Definition 3.1	Defn Ipsum	62
Definition 3.2	62
Definition 3.3	Defn Ipsum	65
Definition 3.4	65
Definition 3.5	Defn Ipsum	67
Definition 3.6	67
Definition 3.7	Defn Ipsum	69
Definition 3.8	70
Definition 3.9	Defn Ipsum	72
Definition 3.10	72
Definition 3.11	Defn Ipsum	75
Definition 3.12	75
Definition 3.13	Defn Ipsum	77
Definition 3.14	77
Definition 3.15	Defn Ipsum	79
Definition 3.16	80
Definition 3.17	Defn Ipsum	82
Definition 3.18	82
Definition 3.19	Defn Ipsum	85
Definition 3.20	85
Definition 3.21	Defn Ipsum	87
Definition 3.22	87
Definition 3.23	Defn Ipsum	89
Definition 3.24	90

E List of Examples

Example 1.1	This is transcribed from Example 1.3 here	2
Example 1.2	This is transcribed from Example 1.3 here	5
Example 1.3	This is transcribed from Example 1.3 here	7
Example 1.4	This is transcribed from Example 1.3 here	9
Example 1.5	This is transcribed from Example 1.3 here	12
Example 1.6	This is transcribed from Example 1.3 here	15
Example 1.7	This is transcribed from Example 1.3 here	17
Example 1.8	This is transcribed from Example 1.3 here	19
Example 1.9	This is transcribed from Example 1.3 here	22
Example 1.10	This is transcribed from Example 1.3 here	25
Example 1.11	This is transcribed from Example 1.3 here	27
Example 1.12	This is transcribed from Example 1.3 here	29
Example 2.1	This is transcribed from Example 1.3 here	32
Example 2.2	This is transcribed from Example 1.3 here	35
Example 2.3	This is transcribed from Example 1.3 here	37
Example 2.4	This is transcribed from Example 1.3 here	40
Example 2.5	This is transcribed from Example 1.3 here	42

Example 2.6	This is transcribed from Example 1.3 here	45
Example 2.7	This is transcribed from Example 1.3 here	47
Example 2.8	This is transcribed from Example 1.3 here	50
Example 2.9	This is transcribed from Example 1.3 here	52
Example 2.10	This is transcribed from Example 1.3 here	55
Example 2.11	This is transcribed from Example 1.3 here	57
Example 2.12	This is transcribed from Example 1.3 here	60
Example 3.1	This is transcribed from Example 1.3 here	63
Example 3.2	This is transcribed from Example 1.3 here	65
Example 3.3	This is transcribed from Example 1.3 here	68
Example 3.4	This is transcribed from Example 1.3 here	70
Example 3.5	This is transcribed from Example 1.3 here	73
Example 3.6	This is transcribed from Example 1.3 here	75
Example 3.7	This is transcribed from Example 1.3 here	78
Example 3.8	This is transcribed from Example 1.3 here	80
Example 3.9	This is transcribed from Example 1.3 here	83
Example 3.10	This is transcribed from Example 1.3 here	85
Example 3.11	This is transcribed from Example 1.3 here	88
Example 3.12	This is transcribed from Example 1.3 here	90

F List of Lemmas

Lemma 1.1	3
Lemma 1.3	5
Lemma 1.5	8
Lemma 1.7	10
Lemma 1.9	13
Lemma 1.11	15
Lemma 1.13	18
Lemma 1.15	20
Lemma 1.17	23
Lemma 1.19	25
Lemma 1.21	28
Lemma 1.23	30
Lemma 2.1	33
Lemma 2.3	36
Lemma 2.5	38
Lemma 2.7	40
Lemma 2.9	43
Lemma 2.11	46
Lemma 2.13	48
Lemma 2.15	50
Lemma 2.17	53
Lemma 2.19	56
Lemma 2.21	58
Lemma 2.23	60
Lemma 3.1	63
Lemma 3.3	66

Lemma 3.5	68
Lemma 3.7	71
Lemma 3.9	73
Lemma 3.11	76
Lemma 3.13	78
Lemma 3.15	81
Lemma 3.17	83
Lemma 3.19	86
Lemma 3.21	88
Lemma 3.23	91

G List of Theorems

Theorem 1.2	Thrm Ipsum	3
Theorem 1.4	Thrm Ipsum	6
Theorem 1.6	Thrm Ipsum	8
Theorem 1.8	Thrm Ipsum	10
Theorem 1.10	Thrm Ipsum	13
Theorem 1.12	Thrm Ipsum	16
Theorem 1.14	Thrm Ipsum	18
Theorem 1.16	Thrm Ipsum	20
Theorem 1.18	Thrm Ipsum	23
Theorem 1.20	Thrm Ipsum	26
Theorem 1.22	Thrm Ipsum	28
Theorem 1.24	Thrm Ipsum	30
Theorem 2.2	Thrm Ipsum	33
Theorem 2.4	Thrm Ipsum	36
Theorem 2.6	Thrm Ipsum	38
Theorem 2.8	Thrm Ipsum	41
Theorem 2.10	Thrm Ipsum	43
Theorem 2.12	Thrm Ipsum	46
Theorem 2.14	Thrm Ipsum	48
Theorem 2.16	Thrm Ipsum	51
Theorem 2.18	Thrm Ipsum	53
Theorem 2.20	Thrm Ipsum	56
Theorem 2.22	Thrm Ipsum	58
Theorem 2.24	Thrm Ipsum	61
Theorem 3.2	Thrm Ipsum	64
Theorem 3.4	Thrm Ipsum	66
Theorem 3.6	Thrm Ipsum	69
Theorem 3.8	Thrm Ipsum	71
Theorem 3.10	Thrm Ipsum	74
Theorem 3.12	Thrm Ipsum	76
Theorem 3.14	Thrm Ipsum	79
Theorem 3.16	Thrm Ipsum	81
Theorem 3.18	Thrm Ipsum	84
Theorem 3.20	Thrm Ipsum	86
Theorem 3.22	Thrm Ipsum	89

Theorem 3.24 Thrm Ipsum	91
-----------------------------------	----

H List of Corollaries

Corollary 1.2.1	3
Corollary 1.4.1	6
Corollary 1.6.1	8
Corollary 1.8.1	11
Corollary 1.10.1	13
Corollary 1.12.1	16
Corollary 1.14.1	18
Corollary 1.16.1	21
Corollary 1.18.1	23
Corollary 1.20.1	26
Corollary 1.22.1	28
Corollary 1.24.1	31
Corollary 2.2.1	34
Corollary 2.4.1	36
Corollary 2.6.1	39
Corollary 2.8.1	41
Corollary 2.10.1	44
Corollary 2.12.1	46
Corollary 2.14.1	49
Corollary 2.16.1	51
Corollary 2.18.1	54
Corollary 2.20.1	56
Corollary 2.22.1	59
Corollary 2.24.1	61
Corollary 3.2.1	64
Corollary 3.4.1	67
Corollary 3.6.1	69
Corollary 3.8.1	71
Corollary 3.10.1	74
Corollary 3.12.1	77
Corollary 3.14.1	79
Corollary 3.16.1	81
Corollary 3.18.1	84
Corollary 3.20.1	87
Corollary 3.22.1	89
Corollary 3.24.1	91

Index

Defn Ipsum, 1, 4, 6, 9, 11, 14, 16, 19, 21, 24, 26,
29, 31, 34, 37, 39, 41, 44, 47, 49, 51, 54,
57, 59, 62, 65, 67, 69, 72, 75, 77, 79, 82,
85, 87, 89, A-6, A-7

Thrm Ipsum, 3, 6, 8, 11, 13, 16, 18, 21, 23, 26, 28,
31, 33, 36, 39, 41, 43, 46, 49, 51, 53, 56,
59, 61, 64, 66, 69, 71, 74, 76, 79, 81, 84,
86, 89, 91, A-9, A-10