Abstract

This document is an demonstration of a LaTeX Template. Lorem ipsum dolor sit amet, consectetuer adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris. Nam arcu libero, nonummy eget, consectetuer 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

$\boxed{1}$ Section

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$\boxed{1.1}$ Subsection

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Definition 1.1 (Defn Ipsum)

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

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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

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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:

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

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

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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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Definition 1.4

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

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Lemma 1.3

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

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Definition 1.6

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Remark 1.6

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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, consectetuer 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, consectetuer 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
Lorem ipsum dolor sit amet, consectetuer 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 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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[2] This 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 1.8 (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, consectetuer 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, consectetuer 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 1.5

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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

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 1.5 (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 1.5

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[2] This 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, consectetuer 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 1.6

Lorem ipsum dolor sit amet, consectetuer 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 1.12

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

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

Remark 1.11

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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 $[a, b]$.

Note 1.6

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Remark 1.12

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Lemma 1.11

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[2] This 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, consectetuer 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, consectetuer 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 $[a, b]$.

[2]This 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, consectetuer 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, consectetuer 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
Lorem ipsum dolor sit amet, consectetuer 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 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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[2] This 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, consectetuer 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 1.9

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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 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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[2] This 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, consectetuer 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, consectetuer 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

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

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

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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[2] This 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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Proof

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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, consectetuer 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 1.11

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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 1.22

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

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Remark 1.21

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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 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 $[a, b]$.

[2] This 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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Proof

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Theorem 1.22 (Thrm Ipsum)

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Corollary 1.22.1

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vulputate a, magna.

1.3.3 Subsubsection

Definition 1.23 (Defn Ipsum)
Lorem ipsum dolor sit amet, consectetuer 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, consectetuer 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
Lorem ipsum dolor sit amet, consectetuer 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 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)
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 1.12

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Remark 1.24

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Lemma 1.23

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[2] This 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)

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Notation 2.1

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

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

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Definition 2.2

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

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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:

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

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

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Lemma 2.1

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Theorem 2.2 (Thrm Ipsum)

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[2] This 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

Definition 2.3 (Defn Ipsum)

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Notation 2.2

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Definition 2.4

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

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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

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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, consectetuer 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, consectetuer 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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[2] This 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, consectetuer 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 2.5

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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

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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]

[2] This 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, consectetuer 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, consectetuer 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, consectetuer 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, consectetuer id, vulputate a, magna. Donec vehicula augue eu neque.

Remark 2.11

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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, consectetuer 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, consectetuer 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, consectetuer 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, consectetuer 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 2.14

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

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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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[2]This 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, consectetuer 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, consectetuer 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

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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 2.16

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

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Remark 2.15

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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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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, consectetuer 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 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

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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:

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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]

[2]This 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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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, consectetuer 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, consectetuer 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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$$\int x \, dx = \frac{x^2}{2} + C$$

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Definition 2.20

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

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Remark 2.19

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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 2.10 (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 $[a, b]$.

[2] This 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, consectetuer 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, consectetuer 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
Lorem ipsum dolor sit amet, consectetuer 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 2.22

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

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Remark 2.21
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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]

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

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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[2] This 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, consectetuer 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 2.12

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

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

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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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Note 2.12

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Remark 2.24

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[2] This 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, consectetuer 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 3.1

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

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

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Definition 3.2

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

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Remark 3.1

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Remark 3.2

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Lemma 3.1

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[2]This 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, consectetuer 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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$$\int x \; dx = \frac{x^2}{2} + C$$

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Definition 3.4

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

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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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[2] This 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 3.4.1

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3.1.2 Subsubsection

Definition 3.5 (Defn Ipsum)

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Notation 3.3

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

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Definition 3.6

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

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

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Definition 3.8

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

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Remark 3.7

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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 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 $[a, b]$.

[2]This 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, consectetuer 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 3.5

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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 3.10

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

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Remark 3.9

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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:

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

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

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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[2] This 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)
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Notation 3.6
Lorem ipsum dolor sit amet, consectetuer 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, consectetuer 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, consectetuer id, vulputate a, magna. Donec vehicula augue eu neque.

Remark 3.11
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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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[2] This 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 3.12.1

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3.2.2 Subsubsection

Definition 3.13 (Defn Ipsum)

Lorem ipsum dolor sit amet, consectetuer 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, consectetuer 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, consectetuer 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 3.14

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

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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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[2] This 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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Corollary 3.14.1

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3.2.3 Subsubsection

Definition 3.15 (Defn Ipsum)

Lorem ipsum dolor sit amet, consectetuer 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, consectetuer 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

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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 3.16

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

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Remark 3.15
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.

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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

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

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 $[a, b]$.

[2]This 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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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, consectetuer 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

Lorem ipsum dolor sit amet, consectetuer 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 3.18

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

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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:

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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 3.9

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Remark 3.18

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Lemma 3.17

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[2] This 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, consectetuer 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, consectetuer 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 3.10
Lorem ipsum dolor sit amet, consectetuer 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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$$\int x \ dx = \frac{x^2}{2} + C$$

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Definition 3.20

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

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Remark 3.19
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 3.10 (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 3.10

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Remark 3.20

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Lemma 3.19

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Proof

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Theorem 3.20 (Thrm Ipsum)

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[2] This 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, consectetuer 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, consectetuer 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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$$\sum_{i=1}^{n} n = \frac{n(n+1)}{2}$$

Nam arcu libero, nonummy eget, consectetuer 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 3.22

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

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Remark 3.21

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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 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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[2] This 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, consectetuer 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 3.12

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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 3.24

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

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Remark 3.23
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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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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 $[a,b]$.

[2] This 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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vulputate a, magna.

A Section Appendix

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