Questions: Introduction to differentiation and the derivative

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Summary

A selection of questions for the study guide on introduction to differentiation and the derivative.

*Before attempting these questions, it is highly recommended that you read* [*Guide: Introduction to differentiation and the derivative*](../studyguides/introtodifferentiation.qmd)*.*

In this guide, the following definitions are used:

$$cosh\left(x\right)=\frac{e^{x}+e^{−x}}{2}  and  sinh\left(x\right)=\frac{e^{x}−e^{−x}}{2}$$

These are **hyperbolic trigonometric functions**; for more about these, see [Guide: Introduction to hyperbolic functions].

Using the differentiation rules seen in [Guide: Introduction to differentiation and the derivative](../studyguides/introtodifferentiation.qmd), differentiate the following functions:

1.1. $ x^{3}+5x−3$

1.2. $ 5x$

1.3. $ −5\sqrt{x}$

1.4. $ −sin\left(x\right)$

1.5. $ cos\left(x\right)+5$

1.6. $ 2\sqrt{x}$

1.7. $ 2ln\left(2x\right)+x^{5}$

1.8. $ ln\left(5x\right)$

1.9. $ e^{−x}$

1.10. $ 23x+5$

1.11. $ 4x+100$

1.12. $ sinh\left(5x\right)$

1.13 $ cos\left(3x\right)−sin\left(2x\right)$

1.14 $ ln\left(x\right)+cos\left(x\right)+3x$

1.15. $ \frac{2}{5}sinh\left(x\right)+\frac{2}{13}cosh\left(x\right)$

1.16. $ e^{5x}+x^{2}+3$

1.17. $ ln\left(x\right)+x^{2}$

1.18. $ ln\left(5x\right)−ln\left(x\right)$

1.19. $ cosh\left(x\right)−5x^{7}$

1.20. $ \sqrt{3x^{2}}$

1.21. $ x^{3}+3x−\sqrt{2x}$

[After attempting the questions above, please click this link to find the answers.](../answers/as-introtodifferentiation.qmd)

## Version history and licensing

v1.0: initial version created 03/25 by Sara Delgado Garcia as part of a University of St Andrews VIP project.

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