Answers: The scalar product

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Answers to questions relating to the guide on the scalar product.

*These are the answers to* [*Questions: The scalar product*](../questions/qs-scalarproduct.qmd)*.*

**Please attempt the questions before reading these answers!**

## Q1

1.1. For and , the scalar product is .

1.2. For and , the scalar product is .

1.3. For and , the scalar product is .

1.4. For and , the scalar product is .

1.5. For and , the scalar product is .

1.6. For and , the scalar product is .

1.7. For and , the scalar product is .

1.8. For and , the scalar product is .

As the scalar product of and is , they are perpendicular to each other. This is true for any combination of any *distinct* pair of , , and . However, since any vector is parallel to itself, it follows that ; similar results hold for and .

## Q2

2.1. For and , the angle is .

2.2. For and , the angle is .

2.3. For and , the angle is .

2.4. For and , the angle is .

2.5. For and , the angle is .

2.6. For and , the angle is .

2.7. For and , the angle is .

2.8. For and , the angle is .

## Q3

3.1. For and to be perpendicular, then .

3.2. For and to be perpendicular, then .

3.3. For and to be perpendicular, then .

3.4. For and to be perpendicular, then or .

3.5. For and to be perpendicular, then or .

3.6. For and to be perpendicular, then or .

3.7. For and to be perpendicular, then or .

3.8. For and to be perpendicular, then or .

## Version history and licensing

v1.0: initial version created 08/23 by Ritwik Anand as part of a University of St Andrews STEP project.

* v1.1: edited 05/24 by tdhc.

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