Answers: Factorization

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Summary

Answers to questions relating to the guide on factorization.

*These are the answers to* [*Questions: Factorization*](../questions/qs-factorization.qmd)*.*

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

## Q1

Note that you can rearrange the factorized brackets — the answer stays the same because the order of multiplication doesn’t matter.

1.1. $7x+35=7\left(x+5\right)$.

1.2. $3x−51=3\left(x−17\right)$.

1.3. $6m+3n=3\left(2m+n\right)$.

1.4. $5f+10+15k=5\left(f+2+3k\right)$.

1.5. $10x−2+3y^{2}+3y=2\left(5x−1\right)+y\left(3y+3\right)$.

1.6. $9xy−3x=3x\left(3y−1\right)$.

1.7. $a^{2}+ab=a\left(a+b\right)$.

1.8. $4m^{2}−8nm+12m=4m\left(m−2n+3\right)$.

1.9. $12wx^{2}+16wx=4wx\left(3x+4\right)$.

1.10. $a^{3}b+ab^{2}+ab^{3}=ab\left(a^{2}+b\left(1+b\right)\right)$.

1.11. $x\left(x−6\right)+3\left(6−x\right)=\left(x−6\right)\left(x−3\right)$.

1.12. $3w+3z+xw+xz=\left(w+z\right)\left(3+x\right)$.

1.13. $2ab+b^{2}−b−2a=\left(2a+b\right)\left(b−1\right)$.

1.14. $a^{2}b+3a^{2}+ab+3a−2b−6=\left(b+3\right)\left(a−1\right)\left(a+2\right)$.

## Q2

Note that you can rearrange the factorized brackets — the answer stays the same because the order of multiplication doesn’t matter.

2.1. $x^{2}+6x+5=\left(x+5\right)\left(x+1\right)$.

2.2. $x^{2}−3x−4=\left(x−4\right)\left(x+1\right)$.

2.3. $x^{2}−4x+3=\left(x−3\right)\left(x−1\right)$.

2.4. $2x^{2}−13x+21=\left(2x−7\right)\left(x−3\right)$.

2.5. $5x^{2}−10x+5=5\left(x−1\right)\left(x−1\right)$.

2.6. $x^{2}−xy−6y^{2}=\left(x−3y\right)\left(x+2y\right)$.

2.7. $12x^{2}y^{2}+8xy^{2}−4y^{2}=4y^{2}\left(3x−1\right)\left(x+1\right)$.

2.8. $x^{2}−4yx−x+4y=\left(x−4y\right)\left(x−1\right)$.

2.9. $x^{2}+y^{2}−2xy=\left(x−y\right)^{2}$ or $\left(y−x\right)^{2}$.

2.10. $x^{2}−y^{2}=\left(x−y\right)\left(x+y\right)$.

2.11. $9x^{2}+3x−2=\left(3x−1\right)\left(3x+2\right)$.

## Q3

3.1. You worked out in 1.1 that $7x+35=7\left(x+5\right)$. Solving for $x$ gives $x=−5$.

3.2. You worked out in 1.11 that $x\left(x−6\right)+3\left(6−x\right)=\left(x−6\right)\left(x−3\right)$. Solving for $x$ gives $x=3$ and $x=6$.

3.3. You worked out in 2.3 that $x^{2}−4x+3=\left(x−3\right)\left(x−1\right)$. Solving for $x$ gives $x=3$ and $x=1$.

3.4. You worked out in 2.7 that $12x^{2}y^{2}+8xy^{2}−4y^{2}=4y^{2}\left(3x−1\right)\left(x+1\right)$. Solving for $x$ gives $x=1/3$ and $x=−1$.

3.5. You worked out in 2.8 that $x^{2}−4yx−x+4y=\left(x−4y\right)\left(x−1\right)$. Solving for $x$ gives $x=4y$ and $x=1$.

## Version history and licensing

v1.0: initial version created 04/25 by Millie Pike, as part of a University of St Andrews VIP project.

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