# Percentage of my earnings

Students discover, using an online commission calculator, how commission is calculated. The students then calculate commission using both tiered and non-tiered commissions, with and without retainers.

## Visible learning

### Learning intentions

* To know how people earn money from commission.
* To be able to perform commission calculations.

### Success criteria

* I can find a percentage of an amount.
* I can calculate a flat rate commission.
* I can calculate commission using tiered rates.
* I can explain the advantages and disadvantages of earning money through commission.

### Syllabus outcomes

A student:

* develops understanding and fluency in mathematics through exploring and connecting mathematical concepts, choosing and applying mathematical techniques to solve problems, and communicating their thinking and reasoning coherently and clearly **MAO-WM-01**
* solves financial problems involving simple interest, earning money and spending money **MA5-FIN-C-01**

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## Activity structure

Please use the associated PowerPoint *Percentage of my earnings* to display images in this lesson.

One device per person or pair is needed during this lesson.

### Launch

1. Display slide 3 of the *Percentage of my earnings* PowerPoint, which displays 2 scenarios: Would you rather…
2. Get paid $1000 every week, or
3. Get paid 10% of the profits you make for your company?
4. Students play a game of ‘Would you rather’, where they are given scenarios and need to decide which they would prefer ([www.wouldyourathermath.com](http://www.wouldyourathermath.com)).
5. To do this, have all students stand in the centre of the room.
6. Students choosing the first option move to the left of the room, and students choosing the second move to the right.

An alternative to having students move around the room would be to get them to put their hands up (left or right) depending on their preference or all stand at desks and hands on head or hands on tails depending on preferred option.

1. Students can talk to a partner on their side of the room to explain their reasoning of why they chose that scenario.
2. Using a questioning technique such as Pause-Pose-Pounce-Bounce ([bit.ly/pausepouncebounce](https://bit.ly/pausepouncebounce)) ask a few students to justify which scenario they chose.

There are no incorrect answers. This activity is aimed at preparing the students to justify their choice and consider other variables that may need to be considered.

### Explore

#### Discovering commission

1. Display slide 5 of the *Percentage of my earnings* PowerPoint which lists jobs where people get paid by commission.
2. Ask students to consider what they notice and what they wonder ([bit.ly/noticewonderstrategy](https://bit.ly/noticewonderstrategy)) about these jobs.

The aim here is for students to recognise that all the jobs involve sales.

1. Conduct a class discussion to see if students know how these types of jobs are paid. Some prompting questions to consider:
2. Does anyone know someone who works in one of these professions?
3. Do each of these professions get paid a fixed amount?
4. Could their pay depend on something to do with their job?
5. If students haven’t already brought it up, explicitly define commission as earnings that depend on the amount of product a person sells.
6. Ask students to Think-Pair-Share ([bit.ly/thinkpairsharestrategy](https://bit.ly/thinkpairsharestrategy)) which they would prefer, a salary or commission. They should provide reasons to justify their choice.
7. Before asking for students to share their thinking, show students the video ‘Salary job or Commission’ (c 0:58) ([bit.ly/salaryorcommissionvideo](https://bit.ly/salaryorcommissionvideo)).
8. After watching the clip, ask students to re-consider which method they prefer, salary or commission. Ask them to think of reasons that weren’t mentioned in the clip that they believe are important to consider.

#### Commission with an online calculator

1. Students will need one device per pair to use the online commission calculator ([bit.ly/onlinecommissioncalculator](https://bit.ly/onlinecommissioncalculator)). Explain to students that they will be using this online calculator to compare different amounts of commission.
2. Use slide 6 of the *Percentage of my earnings* PowerPoint to explain the definition of commission and retainers.
3. Issue each student a copy of Appendix A ‘Commission using an online calculator’, where they will enter different information into the online calculator to find the total earnings.
4. Demonstrate to students how to use the online calculator by working through the first question in Appendix A together.

The first calculator uses the sales price and commission rate only to calculate the commission earnt. The second calculator includes a retainer and has the option to select tiered commissions.

Tiered commissions will be addressed in the Apply section of this lesson, although students can be exposed to it here if they are ready by selecting ‘Commission varies with price’.

1. This worksheet uses variation theory ([variationtheory.com/introduction/](https://variationtheory.com/introduction/)) where the students need to consider which variable has been changed and how this might affect the final amount.

This calculator is used to help students understand how to calculate commission with and without a retainer. The online calculator allows students to learn these skills independently of percentage calculations. If students don’t have access to devices, showing students the calculator on a projector could be an alternative.

### Summarise

#### Explicit teaching and consolidation

1. Use slides 8-15 from the *Percentage of my earnings* PowerPoint for explicit teaching of calculating commission.

The explicit teaching technique used in the PowerPoint is ‘Your turn’. The first slide is a worked example which should be displayed for the students before using the following steps.

1. Reveal the question to students and its solution.
2. Students read in silence.
3. Students individually explain to themselves what is happening in each step.
4. Students hold a thumbs up to the teacher when they have finished reading and have some sort of understanding.
5. Think-Pair-Share. Students explain the solution to their partner.
6. In pairs, students then answer the self-explanation questions.
7. Finally, randomly select students to share their answers with the whole class.
8. Distribute Appendix B ‘Calculating Commission’ to each student. Students should individually complete the faded worked examples on calculating commission.
9. Ask students to consider all of the methods of earning money they have explored so far:

* salary
* wages
* piecework
* royalties
* commission.

1. Using a Think-Pair-Share, ask students to discuss which payment option they believe is best.
2. Allow students time to create a Venn diagram displaying the similarities and differences between each and a table outlining the pros and cons of each.

#### Comparing different ways to earn money

1. Put students in randomly selected groups of 3. Each member of the group will choose the way of earning money that they think will earn them the most money.
2. The aim of the activity is for students to persuade the other group members that their form of earning is the best. Students may need a few minutes preparation time and are encouraged to link their choice to their own strengths. For example, a student who plays in a rock band may argue that royalties would earn them the most money.
3. After students have shared their thoughts with their group, have the group choose the most convincing argument to present to the class.

### Apply

1. Distribute Appendix C ‘Calculating tiered commission’ to students and instruct them to return to the online commission calculator ([bit.ly/onlinecommissioncalculator](https://bit.ly/onlinecommissioncalculator)).

The tiered commission calculator and working is below the initial calculator on the page. You may need to instruct students to scroll down the page.

1. Allow students time to explore the tiered commission function of the online commission calculator using the questions from Appendix C. They should not record any calculations at this point. Students should just be noticing the different commission calculations for the different amounts.
2. Use slides 17-20 from the *Percentage of my earnings* PowerPoint for explicit teaching of calculating tiered commission.
3. Students can now complete Appendix C by hand, filling in the appropriate cells of the table. They can check their answers using the online calculator.

## Assessment and differentiation

### Suggested opportunities for differentiation

**Launch**

* Students may need to revise or have a brief explanation of percentages to determine which option they would prefer in the ‘Would you rather…?’. That is, explain the meaning of ‘10% of the profits you make for your company’.

**Explore**

* The online commission calculator has been used to support students in their understanding of commission, independently of percentage calculations.
* Students could be extended into tiered commission using the online calculator here, although it will be covered in the apply section.

**Summarise**

* Students may need to revise the different payment methods and the advantages and disadvantages of these.
* Students could use the online calculator to check their answer to Appendix B.
* Some students may need to be assigned a payment method rather than choosing one on their own.

**Apply**

* Some students will struggle with the concept of tiered commission and could just explore it using the online calculator rather than calculating it by hand.
* Encourage students to discuss the advantages and disadvantages of tiered commission.
* Students could be encouraged to use the online calculator to check their answers to Appendix C.
* Students can complete an exit ticket consisting of a tiered commission question such as the one below.
* A real estate agent’s commission for selling houses is 2% for the first $800 000 of the sale price and 1.5% for any amount over $800 000. Calculate the commission earned in selling a house for $1 500 000.

### Suggested opportunities for assessment

**Explore**

* Monitor student conversations to check for understanding and address any misconceptions.

**Summarise**

* Collect Appendix B from students to check for understanding.

**Apply**

* The table or Venn diagrams constructed to compare the different types of earnings could be collected and form part of the formative assessment for this unit.
* Appendix C could be collected from the students and form part of the formative assessment for this unit.

## **Appendix A**

### Commission with an online calculator

Use the online commission calculator ([bit.ly/onlinecommissioncalculator](https://bit.ly/onlinecommissioncalculator)) to find the amount everyone earns, considering their retainer, commission rate and total sales.

As you progress through the questions, consider what has changed compared to the previous question and make a prediction of how this affects the total earnings.

Table 1 – commission with an online calculator

|  |  |  |  |
| --- | --- | --- | --- |
| Retainer, commission rate and total sales | What has changed? | Make a prediction | Total earnings |
| No retainer.  1.5% commission on sales.  Total sales of $1 300 000. |  |  |  |
| Retainer of $1500 per month.  1.5% commission on sales.  Total monthly sales of  $1 300 000. |  |  |  |
| Retainer of $1500 per week.  1.5% commission on sales. Total weekly sales of  $1 300 000. |  |  |  |
| Retainer of $1500.  1.5% commission on sales.  Total sales of $800 000. |  |  |  |
| Retainer of $1500.  2% commission on sales.  Total sales of $800 000. |  |  |  |

## Appendix B

### Calculating commission

Table 2 – calculating commission

|  |  |  |  |
| --- | --- | --- | --- |
| Example 1 | Example 2 | Example 3 | Example 4 |
| An employee receives a $350 weekly retainer, plus 3% of all their sales.  How much will they receive if they sold a total of  $15 600 in the week? | An employee receives a fortnightly retainer of $900, plus 2.5% of all their sales.  How much will they receive in the fortnight if they sold a total of  $20 500 each week? | An employee receives a $1200 weekly retainer, plus 3.5% of all their sales.  How much will they receive in a year if they sold a total of  $12 000 in the year? | An employee receives a $1300 weekly retainer, plus 4.1% of all their sales.  How much will they receive a month if they sold a total of  $180 000 that month? |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |

## Appendix C

### Calculating tiered commission

A used car salesperson received a tiered commission for selling used cars, based on this sliding scale:

* $0 – $2000: 5%
* $2000 – $7000: 3%
* Above $7000: 2%

Table 3 – calculating tiered commission

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Sales | 5% | 3% | 2% | Total |
| a) $1600 | =0.05 x 1600  = |  |  | = |
| b) $1850 | =0.05 x  = |  |  | = |
| c) $3500 | =0.05 x 2000  =$100 | =0.03 x 1500  = |  | =$100 +  = |
| d) $5750 | =  =$100 | =0.03 x  = |  | = +  = |
| e) $6600 | =  = | =  = |  | =  = |
| f) $8500 | =  = | =0.03 x 5000  = | =0.02 x 1500  = | = + +  = |
| g) $12 500 | =  = | =0.03 x  = | =0.02 x  = | = + +  = |
| h) $15 750 |  |  |  |  |

## Sample solutions

### Appendix A – commission with an online calculator

Table 4 – sample solution for Table 1

|  |  |  |  |
| --- | --- | --- | --- |
| Retainer, commission rate and total sales | What has changed? | Make a prediction | Total earnings |
| No retainer.  1.5% commission on sales.  Total sales of $1 300 000. |  |  | $19 500 |
| Retainer of $1500 per month.  1.5% commission on sales.  Total monthly sales of  $1 300 000. | A retainer has been added. | The total earnings would increase to include the retainer. | $21 000 per month |
| Retainer of $1500 per week.  1.5% commission on sales. Total weekly sales of  $1 300 000. | It has changed from monthly to weekly. | The amount won’t change although the frequency of this payment has. | $21 000 per week |
| Retainer of $1500.  1.5% commission on sales.  Total sales of $800 000. | The total sales have decreased. | The overall amount will decrease. | $13 500 |
| Retainer of $1500.  2% commission on sales.  Total sales of $800 000. | The commission rate has increased. | The overall amount will increase. | $17 500 |

### Appendix B – calculating commission

Table 5 – sample solution for Table 2

|  |  |  |  |
| --- | --- | --- | --- |
| Example 1 | Example 2 | Example 3 | Example 4 |
| An employee receives a $350 weekly retainer, plus 3% of all their sales.  How much will they receive if they sold a total of  $15 600 in the week? | An employee receives a fortnightly retainer of $900, plus 2.5% of all their sales.  How much will they receive in the fortnight if they sold a total of  $20 500 each week? | An employee receives a $1200 weekly retainer, plus 3.5% of all their sales.  How much will they receive in a year if they sold a total of  $12 000 in the year? | An employee receives a $1300 weekly retainer, plus 4.1% of all their sales.  How much will they receive a month if they sold a total of  $180 000 that month? |
|  | **900** |  |  |
|  | **1025** |  |  |
|  |  |  |  |

### Appendix C – calculating tiered commission

Table 6 – sample solution for Table 3

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | 5% | 3% | 2% | Total |
| a) $1600 | =0.05 x 1600  =$80 |  |  | =$80 |
| b) $1850 | =0.05 x 1850  =$92.50 |  |  | =$92.50 |
| c) $3500 | =0.05 x 2000  =$100 | =0.03 x 1500  =$45 |  | =100+45  =$145 |
| d) $5750 | =0.05 x 2000  =$100 | =0.03 x 3750  =$112.50 |  | =100+112.50  =$212.50 |
| e) $6600 | =0.05 x 2000  =$100 | =0.03 x 4600  =$138 |  | =100+138  =$238 |
| f) $8500 | =0.05 x 2000  =$100 | =0.03 x 5000  =$150 | =0.02 x 1500  =$30 | =100+150+30  =$280 |
| g) $12 500 | =0.05 x 2000  =$100 | =0.03 x 5000  =$150 | =0.02 x 5500  =$110 | =100+150+110  =$360 |
| h) $15 750 | =0.05 x 2000  =$100 | =0.03 x 5000  =$150 | =0.02 x 8750  =$175 | =100+150+175  =$425 |

## References

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