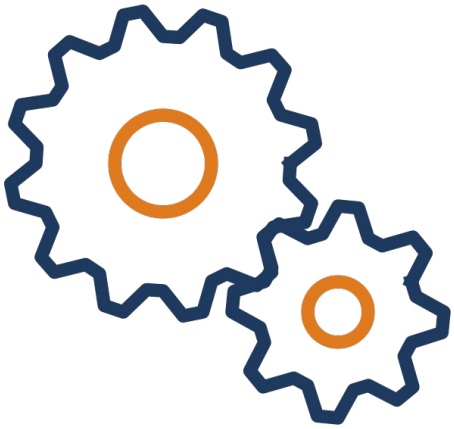
Lesson D2 Review Questions

Simple Gear Trains and Idler Gears



Answer every question in your jotter. Show your working. Tap a question below to go to it. Tap **Show answer** under a question to mark it.

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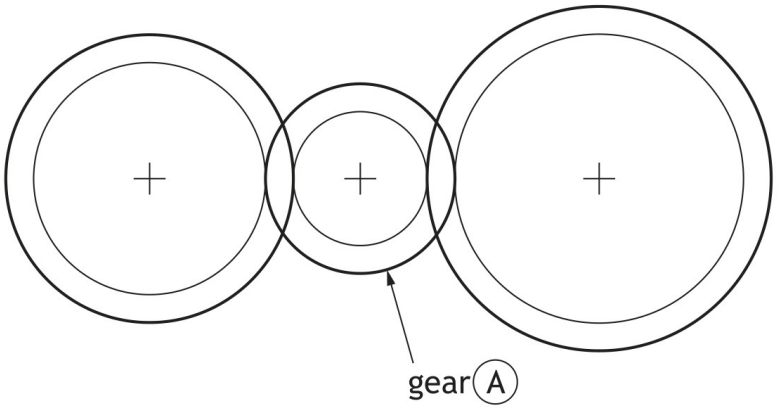
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Questions

2022 Section 1 Question 1

1. A gear train is shown below.



(a) State the type of **gear train** shown. **1**

_____

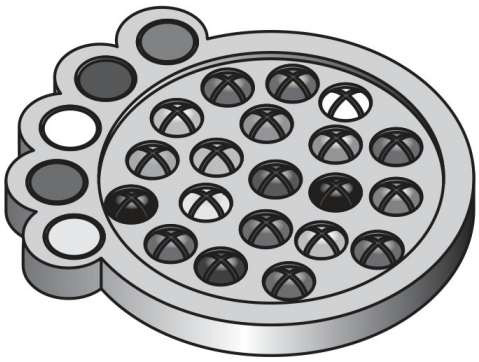
(b) State the name of gear (A). **1**

_____

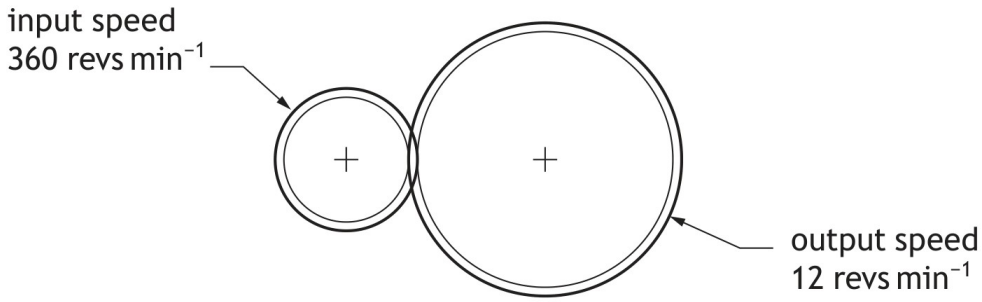
Show answer ›

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2. A child's game is shown.



A diagram of the simple gear train inside the game is shown below.

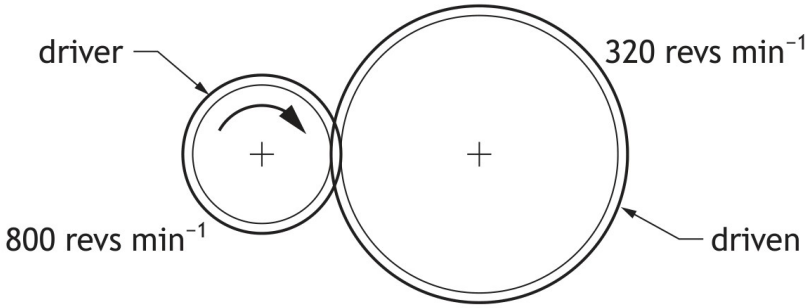


Calculate the velocity ratio of this simple gear train.

Show answer ›

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3. A simple gear train is shown below.



(a) Calculate the velocity ratio of this simple gear train. **2**

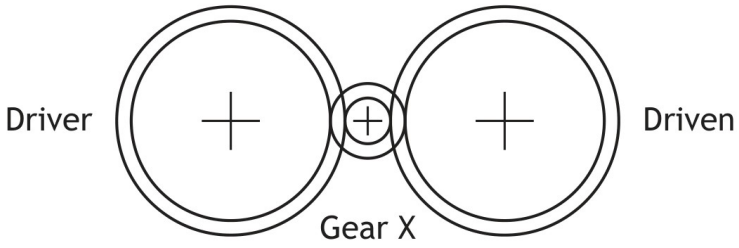
The driver gear in the diagram above rotates clockwise.

(b) State the direction of rotation of the **driven** gear. **1**

Show answer ›

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4. The diagram below represents a simple gear train.



(a) State the name of Gear X. **1**

_____

(b) Describe the purpose of Gear X in this simple gear train. **1**

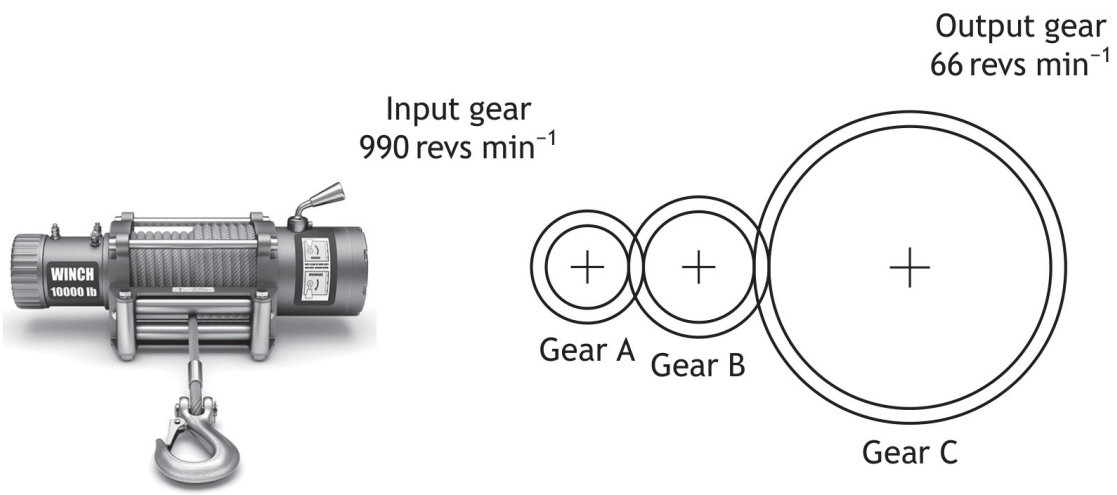
_____

_____

Show answer ›

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5. A simple gear train used in a winch system is shown below.



(a) (i) State the name of gear B.

_____

(ii) State the effect of gear B on the output speed.

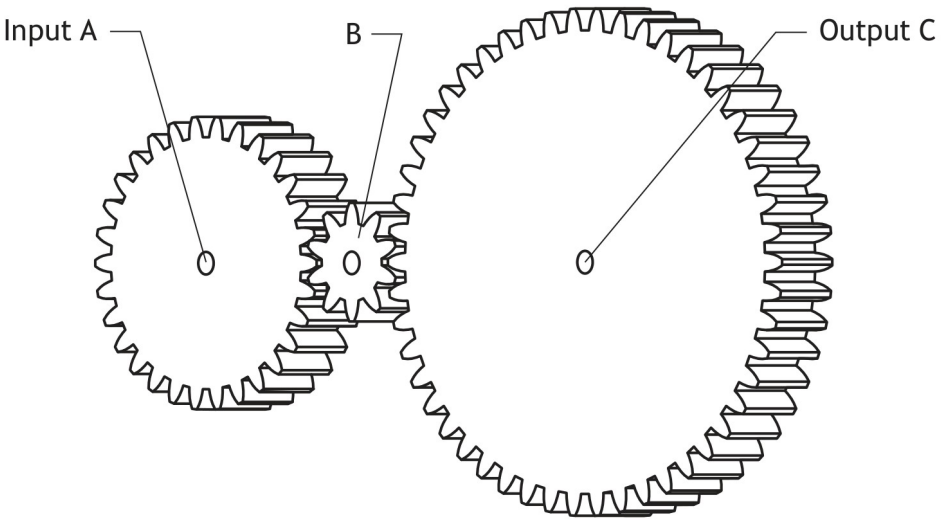
_____

(b) Calculate the velocity ratio of the gear train.

Show answer ›

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6. A diagram of part of a gear mechanism for an electric food mixer is shown below.



(a) (i) State the name of gear B. **1**

(ii) Describe the function of gear B. **1**

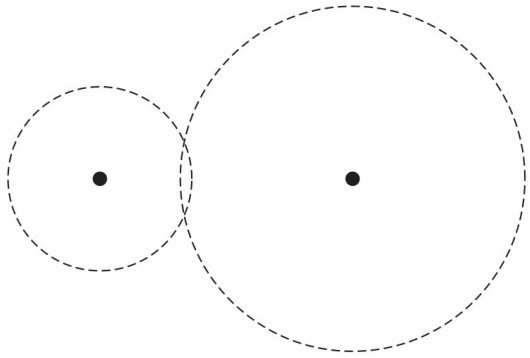
(b) Calculate the velocity ratio when Input A rotates at 1200 revs min^{-1} and Output C has a speed of 720 revs min^{-1}. **2**

Show all working.

Show answer ›

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7. The simple gear train, shown below, has been drawn using incorrect conventions.



Describe two errors that were made when drawing this simple gear train. **2**

Error 1 _____

_____

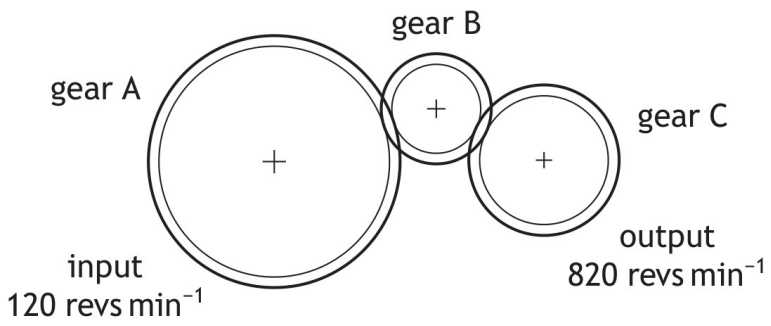
Error 2 _____

_____

Show answer ›

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8. A diagram of a simple gear train is shown below.



(a) Calculate the velocity ratio of this simple gear train. **2**

(b) State the effect on the output velocity if the number of teeth on gear B is **reduced**. **1**

Show answer ›

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Answers

Check your understanding (booklet)

1 The driver gear.

2 Anticlockwise.

3 It makes the driver and the driven gear turn in the same direction.

4 VR = speed of input ÷ speed of output = 600 ÷ 200 = 3 : 1

5 Any two: solid lines; two circles (a double outline); a cross at the centre.

Answer to question 1

2022 Section 1 Question 1

Marking instructions

Question			Expected response	Max mark	Additional guidance
1.	(a)		Simple	1	
	(b)		Idler	1	

‹ Back to question 1

Answer to question 2

2023 Section 1 Question 2

Marking instructions

Question			Expected response	Max mark	Additional guidance
2.			$\text{Velocity Ratio} = \frac{\text{Speed of Input}}{\text{Speed of Output}}$ $\text{Velocity Ratio} = \frac{360}{12}$ VR = **30 : 1**	2	1 mark for substitution. 1 mark for correct answer from given working. Ignore any units. Ratio must be simplified. Accept 30.

‹ Back to question 2

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Answer to question 3

2019 Section 1 Question 4

Marking instructions

Question			Expected response	Max mark	Additional guidance
4.	(a)		$\text{Velocity Ratio} = \frac{\text{Speed of Input}}{\text{Speed of Output}}$ $\text{Velocity Ratio} = \frac{800}{320}$ Velocity Ratio = **5 : 2**	**2**	1 mark for substitution. 1 mark for correct answer from given working. Accept 2·5 : 1 or 2·5 Ignore any units.
	(b)		Anti-clockwise.	**1**	Do not accept other way or opposite way. Accept indication of direction on diagram.

‹ Back to question 3

Answer to question 4

2017 Specimen Section 1 Question 4

Marking instructions

Question			Expected response	Max mark	Additional guidance
4	a		Idler gear	1	
4	b		It makes the driver and driven turn the same way.	1	Do not accept: that it has no effect on the speed of the gears.

‹ Back to question 4

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Answer to question 5

2017 Section 1 Question 7

Marking instructions

Question			Expected answer(s)	Max mark	Additional guidance
7.	(a)	(i)	Idler	**1**	
		(ii)	No effect	**1**	
	(b)		Velocity Ratio = $\frac{\text{speed of input}}{\text{speed of output}}$ Velocity Ratio = $\frac{990}{66}$ Velocity Ratio = **15 : 1**	**2**	1 mark for substitution 1 mark for correct answer from given working Allow follow through error Ignore any units Accept just 15

‹ Back to question 5

Answer to question 6

2016 Section 1 Question 6

Marking instructions

Question			Expected Answer(s)	Max Mark	Additional Guidance
6.	(a)	(i)	Idler	**1**	
		(ii)	It makes gear A and gear C turn in the same direction (without affecting the output speed).	**1**	Descriptive response Accept change the (output) direction Not keep the direction the same on its own
	(b)		VR = speed of input/speed of output VR = 1200/720 VR = 5:3 (5/3) 1·7:1 (1·67)	**2**	1 Mark for using the correct substitution. 1 Mark for the correct answer from working (ignore any units) Do not accept 1·6•

‹ Back to question 6

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Answer to question 7

2018 Section 1 Question 8

Marking instructions

Question			Expected response	Max mark	Additional guidance
8.			Incorrect line type used / not solid lines Should be crosses in the centres / not dots Double outlines missing	2	Must be descriptive response Do not accept overlapping Do not accept lines incorrect

‹ Back to question 7

Answer to question 8

2024 Section 1 Question 4

Marking instructions

Question			Expected response	Max mark	Additional guidance
4.	(a)		$\text{velocity ratio} = \frac{\text{speed of input}}{\text{speed of output}}$ $\text{velocity ratio} = \frac{120}{820}$ $\text{velocity ratio} = \frac{6}{41}$ **VR = 6 : 41 (2 sf)**	2	1 mark for substitution. 1 mark for correct answer from given working. Ignore any unit. Accept 1 : 6.8 Accept 0.15 : 1 Accept 0.146 (3 sf) Ratio must be simplified.
	(b)		No effect. The velocity of gear C will not change.	1	

‹ Back to question 8

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