A+ National

PRE-APPRENTICESHIP

Maths & Literacy for Building & Carpentry

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MATHEMATICS

Unit 4: General Mathematics

Short-answer questions

Specific instructions to students

- This unit will help you to improve your general mathematical skills.
- Read the questions below and answer all of them in the spaces provided.
- No calculators.
- You will need to show all working.

QUESTION 1

What unit of measurement would you use to measure:

a the length of the top of an oak table?

Answer:

b the temperature of radiator coolant in a van?

Answer:

c the amount of glue in a hot glue gun?

Answer:

d the weight of a roof rafter?

Answer:

e the speed of a vehicle?

Answer:

f the amount of epoxy resin in a container?

Answer:

g the cost of a hammer drill?

Answer:

QUESTION 2

Give examples of how the following might be used in the building industry.

a percentages

Answer:

b decimals

Answer:

c fractions

Answer:

d mixed numbers

Answer:

e ratios

Answer:

f angles

Answer:

Sample Chapter

QUESTION 6

Timber is delivered to a building site. Two lengths need to be cut from a 6 m length. The two lengths measure 2250 mm and 2870 mm respectively. How much is left from the original 6 m length?

Answer:

QUESTION 7

If two 1550 mm lengths of pine are cut from a 4 m length, how much pine is left?

Answer:

QUESTION 8

A length of timber measures 1250 mm. If a length of 900 mm is cut from it, how much timber remains?

Answer:

QUESTION 9

A builder has a 5 m length of pine. It is used for three different jobs: 1850 mm for job 1; 1650 mm for job 2; and 950 mm for job 3. How much pine is left?

Answer:

QUESTION 10

A cabinet maker has a 2 m length of Australian oak. If 350 mm is used on one job and then 765 mm and 445 mm are used on two other jobs, how much oak is left?

Answer:

Section C: Multiplication

Short-answer questions

Specific instructions to students

- This section will help you to improve your multiplication skills when working with decimals.
- Read the following questions and answer all of them in the spaces provided.
- No calculators.
- You will need to show all working.

QUESTION 1

A 4 L can of varnish costs $19.95. To complete a job, a cabinet maker needs 5 cans of the varnish. How much will the varnish cost in total?

Answer:

QUESTION 2

One litre of varnish costs $5.50. If an apprentice purchases 16 L of varnish, what is the total cost?

Answer:

Sample Chapter

QUESTION 7

Calculate the circumference of a round living room table with a diameter of 130 cm.

Answer:

QUESTION 8

Find the circumference of a circular power saw with a diameter of 24 cm.

Answer:

QUESTION 9

Determine the circumference of a sanding disc with a diameter of 14 cm.

Answer:

QUESTION 10

Find the circumference of an orbital sander with a diameter of 17 cm.

Answer:

Section B: Diameter

Short-answer questions

Specific instructions to students

- This section is designed to help you both to improve your skills and to increase your speed in measuring the diameter of a round object.
- Read the following questions and answer all of them in the spaces provided.
- No calculators.
- You will need to show all working.

$$\text{Diameter (D) of a circle} = \frac{\text{circumference}}{\pi(3.14)}$$

EXAMPLE

Find the diameter of a cooking pot with a circumference of 80 mm.

$$D = \frac{80}{\pi(3.14)} = 25.48 \text{ mm}$$

QUESTION 1

Find the diameter of an orbital sander with a circumference of 24 cm.

Answer:

QUESTION 2

Calculate the diameter of a round table with a circumference of 628 cm.

Answer:

QUESTION 3

Find the diameter of a round hole in a door for a window with a circumference of 200 mm.

Answer:

QUESTION 4

Determine the diameter of a hole made by a hole-saw with a circumference of 130 mm.

Answer:

Sample Chapter

Section C: Area

Short-answer questions

Specific instructions to students

- This section is designed to help you both to improve your skills and to increase your speed in measuring surface area.
- Read the following questions and answer all of them in the spaces provided.
- No calculators.
- You will need to show all working.

Area = length × breadth and is given in square units

$= l \times b$

QUESTION 1

If the measurements of the base of a trade assistant's tool box are 40 cm long by 21 cm wide, what is the total area?

Answer:

QUESTION 2

A carpenter's workshop measures 60 m by 13 m. What is the workshop's total area?

Answer:

QUESTION 3

If a sheet of plywood measures 2.85 m by 1.65 m, what is its total area?

Answer:

QUESTION 4

The front of a wooden door measures 2.1 m by 0.8 m. What is the door's total area?

Answer:

QUESTION 5

A carpenter purchases a 3 m × 1.5 m sheet of plywood. What is its total surface area?

Answer:

QUESTION 6

The top of a rectangular dining table measures 1.55 m by 1.28 m. What is the total area of the tabletop?

Answer:

QUESTION 7

The measurement of a desktop that a carpenter needs to make is 45 cm by 45 cm. What is the total area of the desktop?

Answer:

QUESTION 8

A storage area for timber is 65.3 m by 32.7 m. How much storage area is available?

Answer:

QUESTION 9

A carpenter's workshop is 8.6 m long by 3.2 m wide. What is its area?

Answer:

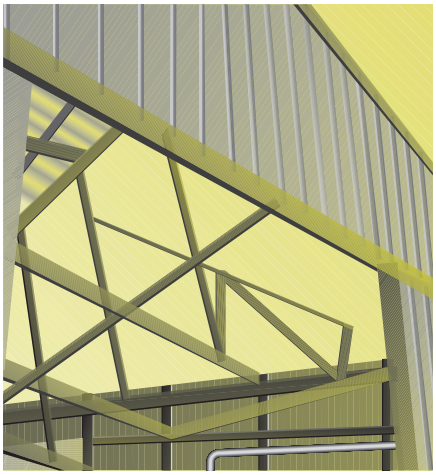
QUESTION 10

A van that carries timber measures 8.9 m long and 2.6 m wide. How much floor area is there?

Answer:

Sample Chapter

QUESTION 8



A house suffers storm damage and needs repairing. The carpentry crew spends 116 hours working on the house. If they work 8 hours per day, how many days will it take?

Answer:

QUESTION 9

An apprentice begins work at 7.00 a.m. and works until 3.30 p.m. The morning break lasts for 20 minutes, the lunch break goes for 60 minutes and the afternoon break lasts 20 minutes.

a How much time has been spent on breaks?

Answer:

b How much time has been spent working?

Answer:

QUESTION 10

The cost of labour on a renovation job is $960.00. The carpenter spends 24 hours on the job. How much is the rate of pay per hour?

Answer:

Sample Chapter

QUESTION 2

If the diagonal length of a roof is 8000 mm and the angle that the roof makes with the span is 25°, find the height of the rise and the length of the span.

Answer:

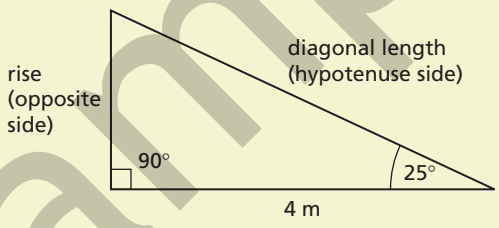
QUESTION 3

If the diagonal length of a rafter is 11 m and the angle that the roof makes with the span is 27°, find the height of the rise and the length of the span.

Answer:

EXAMPLE

In a rafter construction job, the angle that a rafter makes with the span is 25° on each side. The length of the span is 4 m. Calculate the rise and diagonal length of the rafters on each side of the roof. (Remember to make a right angle in your drawing before you begin.)



To find the diagonal length of the rafter:

$$\cos 25° = \frac{4}{\text{diagonal length}}$$
$$\text{diagonal length} = \frac{4}{\cos 25°}$$
$$\text{diagonal length} = \frac{4}{0.9063}$$
$$\text{diagonal length} = 4.41 \text{ m}$$

Therefore, the diagonal length of the rafter is 4.41 m.

To find the rise:

$$\sin 27° = \frac{\text{rise}}{4.41}$$
$$\sin 27° \times 4.41 = \text{rise}$$
$$0.4539 \times 4.41 = \text{rise}$$
$$2 = \text{rise}$$

Therefore, the height of the rise is 2 m.

Solve the following by first drawing a diagram to illustrate each problem and then using sin, cos or tan.

QUESTION 4

If the total length of the span is 4 m and the angle that the rafter makes with the span is 28° on both sides, find the diagonal length of the rafters of the roof and the rise.

Answer:

QUESTION 5

If the total length of the span is 10 m and the angle that the rafter makes with the span is 23° on both sides, find the diagonal length of the rafters and the rise.

Answer:

QUESTION 6

If the total length of the span is 9 m and the angle that the rafter makes with the span is 25° on both sides, find the diagonal length of the rafters and the rise.

Answer:

Sample chapter

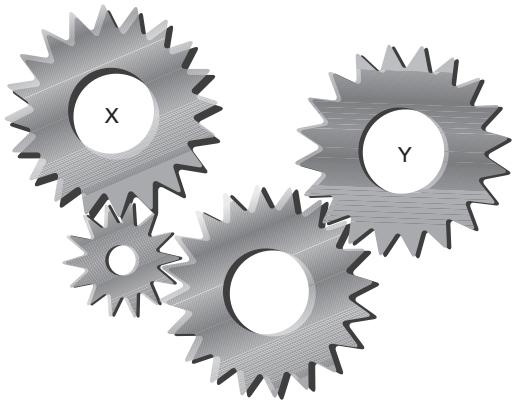
Unit 16: Mechanical Reasoning

Short-answer questions

Specific instructions to students

- This section is designed to help to improve your skills in mechanical reasoning.
- Read the following questions and answer all of them in the spaces provided.
- No calculators.
- You will need to show all working.

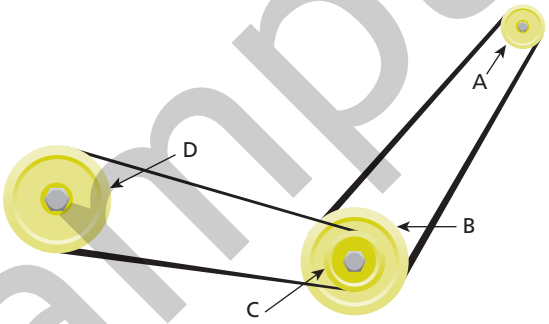
QUESTION 1



If cog X turns in a clockwise direction, which way will cog Y turn?

Answer:

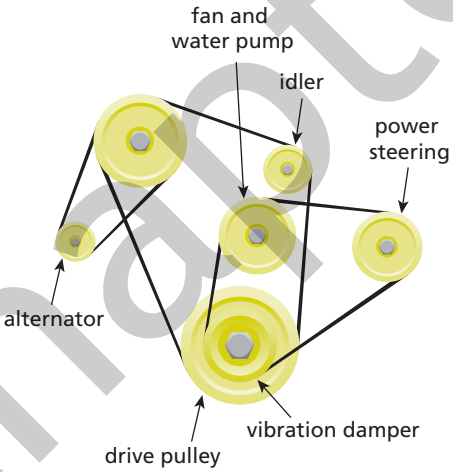
QUESTION 2



If pulley A turns in a clockwise direction, which way will pulley D turn?

Answer:

QUESTION 3

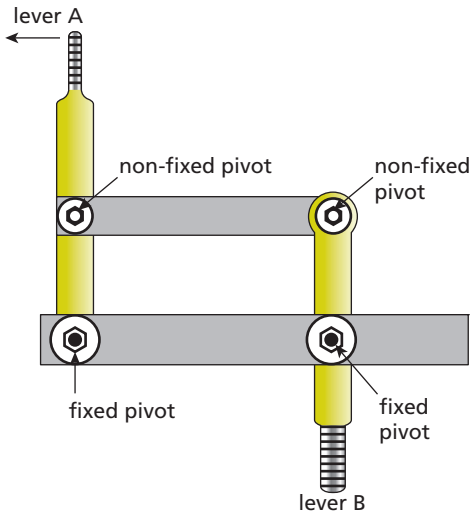


If the drive pulley in a work van engine turns in a clockwise direction, in which direction will the alternator turn?

Answer:

QUESTION 4

Looking at the following diagram, if lever A moves to the left, in which direction will lever B move?



Answer:

Sample Chapter

Division

QUESTION 1 2 marks

A builder has a box of 250 wood screws.

a How many jobs can be completed if each standard job requires 8 wood screws?

Answer:

b Would any screws be left over?

Answer:

QUESTION 2 1 mark

If an apprentice earns $288.80 for working a 5-day week, how much is earned per day?

Answer:

Decimals

Addition

QUESTION 1 1 mark

A set of sockets and a hammer drill are purchased for $27.99 and $156.50 respectively. How much is paid in total?

Answer:

QUESTION 2 1 mark

An apprentice carpenter purchases a heat gun kit for $49.95, a 1500 W circular saw for $89.95, a 900 W planer for $95.95 and a 1500 W compound mitre saw for $199.50. How much has been spent in total?

Answer:

Subtraction

QUESTION 1 1 mark

A builder has a 4 m length of pine to be used on three different jobs: 1185 mm is used for job 1, 1560 mm on job 2 and 1135 mm on job 3. How much pine is left?

Answer:

QUESTION 2 1 mark

A woodworker has a 6 m length of pine. If 2.78 m is used on one job, 1.76 m on another and 1.44 m on the last job, how much is left on the reel?

Answer:

Multiplication

QUESTION 1 1 mark

A builder replaces 6 drill bits at a cost of $6.99 each and buys 4 quick grip clamps for $5.99 each. What is the total cost?

Answer:

QUESTION 2 1 mark

If an apprentice carpenter uses 6 packets of 50 mm wood screws that cost $9.50 per packet, how much is the total cost?

Answer:

Sample Chapter