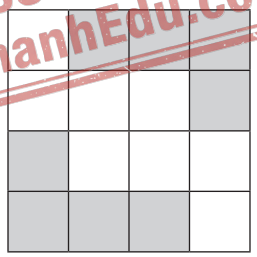
1



Write down the order of rotational symmetry of the diagram.

2 ..... [1]

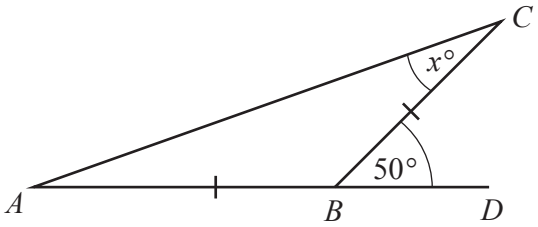
2 At noon the temperature in Maseru was 21 °C.
At midnight the temperature had fallen by 26 °C.

Work out the temperature at midnight.

21 − 26

−5 ..... °C [1]

3



NOT TO SCALE

$AB = BC$ and ABD is a straight line.

Find the value of x.

$\overset{\frown}{ABC} = 180° - 50° = 130°$

$x° = \frac{180° - 130°}{2} = 25°$

$x =$ 25 ..... [2]

4 Write down

(a) a square number greater than 10,

25 ..... [1]

(b) an irrational number.

$\sqrt{2}$ ..... [1]

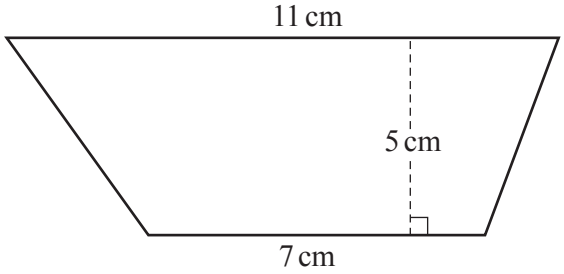
5 $y = mx + c$

Find the value of y when $m = -3$, $x = -2$ and $c = -8$.

$y = (-3)(-2) - 8$

$y =$ -2 [2]

6



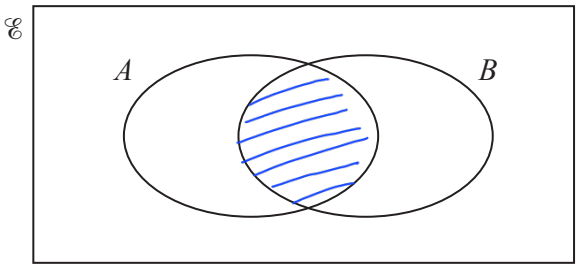
NOT TO SCALE

Calculate the area of the trapezium.

$\frac{(11 + 7)\,5}{2}$

45 cm^2 [2]

7

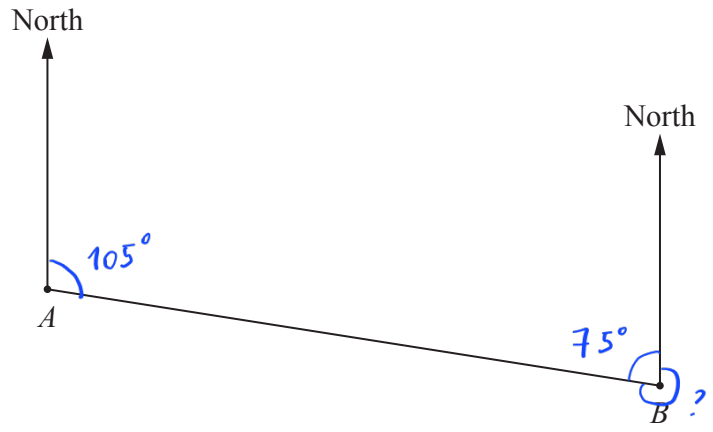


On the Venn diagram, shade the region $A \cap B$. [1]

8 Write 2^{-4} as a decimal.

0.0625 [1]

9



The bearing of B from A is 105°.

Find the bearing of A from B.

Bearing $_{B \to A}$ = 360° − 75° = 285°

285° [2]

10 Simplify.

$$\frac{p}{2q} \times \frac{4pq}{t}$$

$$\frac{4p^2q}{2qt}$$

$\frac{2p^2}{t}$ [2]

11 **Without using a calculator**, work out $1\frac{3}{4} - \frac{11}{12}$.

You must show all your working and give your answer as a fraction in its simplest form.

$$\frac{7}{4} - \frac{11}{12}$$

$$= \frac{21}{12} - \frac{11}{12}$$

$$= \frac{21 - 11}{12} = \frac{10}{12}$$

$\frac{5}{6}$ [3]

12 Roberto buys a toy for \$5.00 .
He then sells it for \$4.60 .

Calculate his percentage loss.

$\frac{5 - 4.6}{5} \times 100$

..... 8 ..... % [2]

13 Simplify $8t^8 \div 4t^4$.

..... $2t^4$ ..... [2]

14 Solve the equation.

$$\frac{1-x}{3} = 5$$

$1 - x = 15$

$x = 1 - 15$

$x =$ ..... -14 ..... [2]

15 Ella's height is 175 cm, correct to the nearest 5 cm.

Write down the upper bound of Ella's height.

$175 + \frac{5}{2}$

..... 177.5 ..... cm [1]

16 Calculate $(3 \times 10^{-3})^3$.
Give your answer in standard form.

$3^3 \times (10^{-3})^3 = 27 \times 10^{-9}$

..... 2.7×10^{-8} ..... [1]

17 A train of length 105 m takes 11 seconds to pass completely through a station of length 225 m.

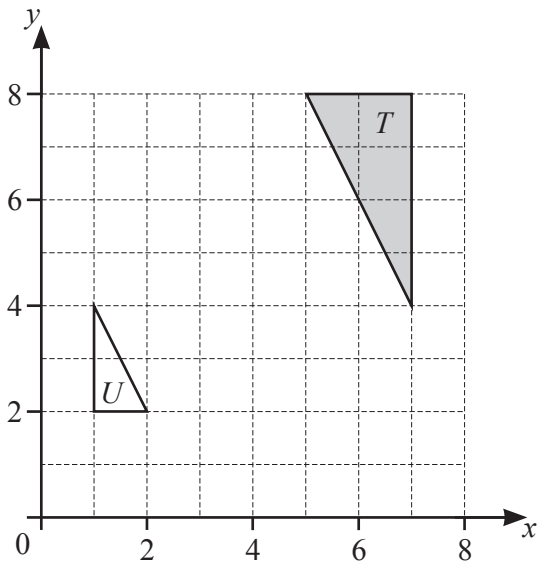
Calculate the speed of the train in km/h.

In 11 s, the train travels $105 + 225 = 330$ m

$$\text{speed} = \frac{330\text{ m}}{11\text{ s}} = \frac{\frac{330}{1000}\text{ km}}{\frac{11}{3600}\text{ h}}$$

.....108..... km/h [3]

18



Describe fully the **single** transformation that maps triangle T onto triangle U.

Enlargement, center (3, 4), scale factor $-\frac{1}{2}$

..... [3]

19 Make y the subject of the formula.

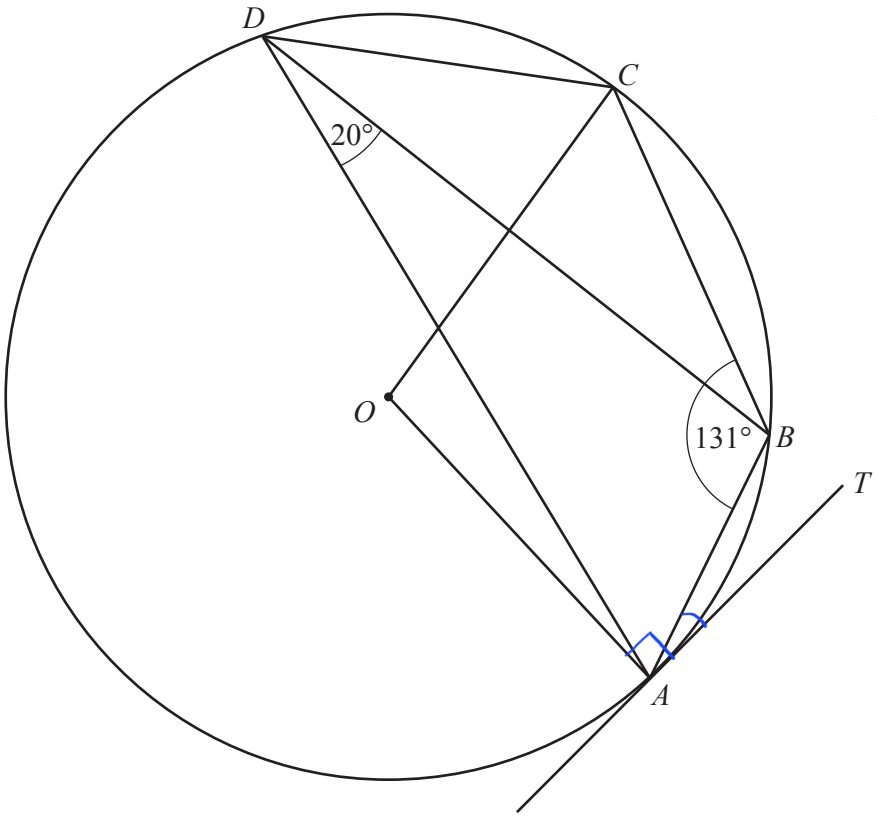
$$h^2 = x^2 + 2y^2$$

$$h^2 - x^2 = 2y^2$$

$$\frac{h^2 - x^2}{2} = y^2$$

$y =$ $\pm\sqrt{\frac{h^2 - x^2}{2}}$ [3]

20



NOT TO SCALE

A, B, C and D lie on the circle, centre O.
TA is a tangent to the circle at A.
Angle $ABC = 131°$ and angle $ADB = 20°$.

Find

(a) angle ADC,

$180° - 131°$

Angle ADC = 49° [1]

(b) angle AOC,

$49° \times 2$

Angle AOC = 98° [1]

(c) angle BAT,

Angle BAT = 20° [1]

(d) angle OAB.

$90° - 20°$

Angle OAB = 70° [1]

21 Simplify.

(a) $(5x^4)^3$

$5^3 (x^4)^3$

$125x^{12}$ [2]

(b) $(256x^{256})^{\frac{3}{8}}$

$256^{\frac{3}{8}} \left(x^{256}\right)^{\frac{3}{8}}$

$\left(\sqrt[8]{256}\right)^3 \; x^{256 \times \frac{3}{8}} = 2^3 x^{96}$

$8x^{96}$ [2]

22 p is directly proportional to $(q+2)^2$.
When $q = 1$, $p = 1$.

Find p when $q = 10$.

$p = k(q+2)^2$

$1 = k(1+2)^2$

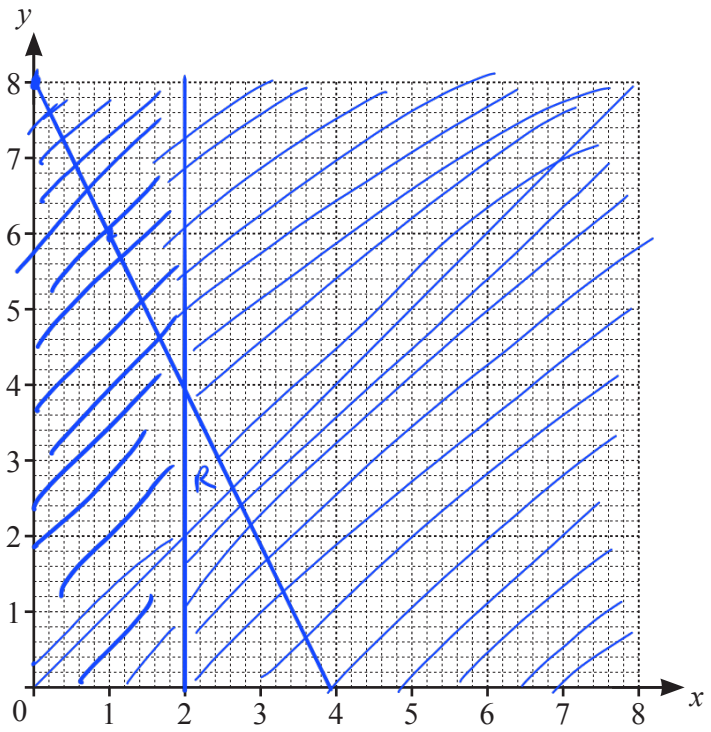
$k = \frac{1}{9}$

$p = \frac{1}{9}(q+2)^2$

when $q = 10$: $p = \frac{1}{9}(10+2)^2$

$p =$ 16 [3]

23



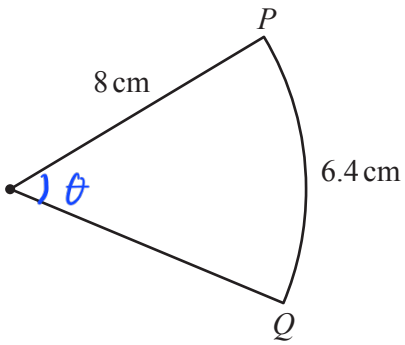
(a) By drawing suitable lines and shading unwanted regions, find the region, R, where

$$x \geqslant 2, \quad y \geqslant x \text{ and } 2x+y \leqslant 8.$$ [5]

24

The diagram shows a sector of a circle of radius 8 cm.
The length of the arc PQ is 6.4 cm.

Find the area of the sector.



NOT TO SCALE

$8\theta = 6.4$

$\theta = 0.8$ rad

$\text{Area}_{\text{sector}} = \frac{1}{2} \times 8^2 \times 0.8$

$= 25.6$

..... 25.6 ..... cm^2 [4]

25 Simplify.

$$\frac{2x^2+x-15}{ax+3a-2bx-6b}$$

$2x^2+6x-5x-15$

$a(x+3)-2b(x+3)$

$2x(x+3)-5(x+3)$

$(a-2b)(x+3)$

$(2x-5)(x+3)$

$(a-2b)(x+3)$

$\frac{2x-5}{a-2b}$ [5]

26 $\sqrt[3]{y^2} = \sqrt[6]{x}$ and $y = \sqrt[n]{x}$.

Find the value of n.

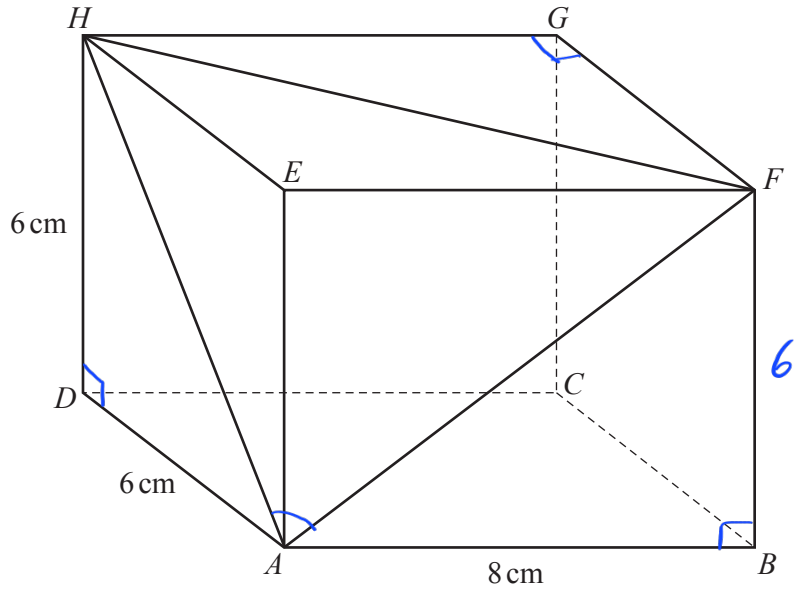
$y^2 = \left(\sqrt[6]{x}\right)^3$

$y^2 = \left(x^{\frac{1}{6}}\right)^3 = x^{\frac{1}{2}}$

$y = \sqrt{x^{\frac{1}{2}}} = \left(x^{\frac{1}{2}}\right)^{\frac{1}{2}} = x^{\frac{1}{4}} = \sqrt[4]{x}$

$n =$ 4 [2]

27



NOT TO SCALE

The diagram shows a cuboid.
$AB = 8\,\text{cm}$, $AD = 6\,\text{cm}$ and $DH = 6\,\text{cm}$.

Calculate angle HAF.

$HA = \sqrt{6^2+6^2} = 6\sqrt{2}$

$AF = \sqrt{6^2+8^2} = 10$

$HF = \sqrt{8^2+6^2} = 10$

$HF^2 = HA^2 + AF^2 - 2\,HA.AF\cos\widehat{HAF}$

$100 = 72 + 100 - 2\times 6\sqrt{2}\times 10\cos HAF$

$120\sqrt{2}\cos\widehat{HAF} = 72$

$\cos\widehat{HAF} = \frac{3\sqrt{2}}{10}$

Angle HAF = 64.9° [6]