Weekly check: Year 8 whole year

Worked solutions

KS3 Maths weekly check

This check online

1 It takes 8 bricklayers 15 days to build a wall.

a. Work out how many days it would take 12 bricklayers to build the same wall.

b. State one assumption you have made.

(3 marks)

a)

Total work in worker-days

$8 \times 15 = 120$

Share the work between 12 bricklayers

$120 \div 12 = 10$

10 days

b)

All the bricklayers work at the same rate

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2 The diagram shows a sector of a circle with radius 9 cm and angle 100°.

Work out the area of the sector. Give your answer correct to 1 decimal place.

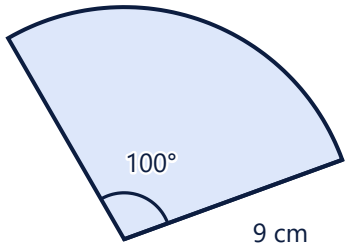


Diagram NOT accurately drawn

(2 marks)

Fraction of the circle $= \frac{100}{360}$

Area $= \frac{100}{360} \times \pi \times 9^2$

$= 70.68...$

$70.7\ cm^2$

3 At midnight the temperature in York was −4 °C.

By 4 am the temperature had fallen by 5 °C.

By 10 am the temperature had risen by 8 °C from its 4 am value.

Work out the temperature at 10 am.

(2 marks)

4 am: fallen by 5

$-4 - 5 = -9\ ^\circ C$

10 am: risen by 8

$-9 + 8 = -1\ ^\circ C$

$-1\ ^\circ C$

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4 A block of pine wood has a volume of 240 cm^3.

The density of the pine wood is 0.65 g/cm^3.

Work out the mass of the block.

(2 marks)

Mass = density x volume

Mass = 0.65 x 240

Mass = 156

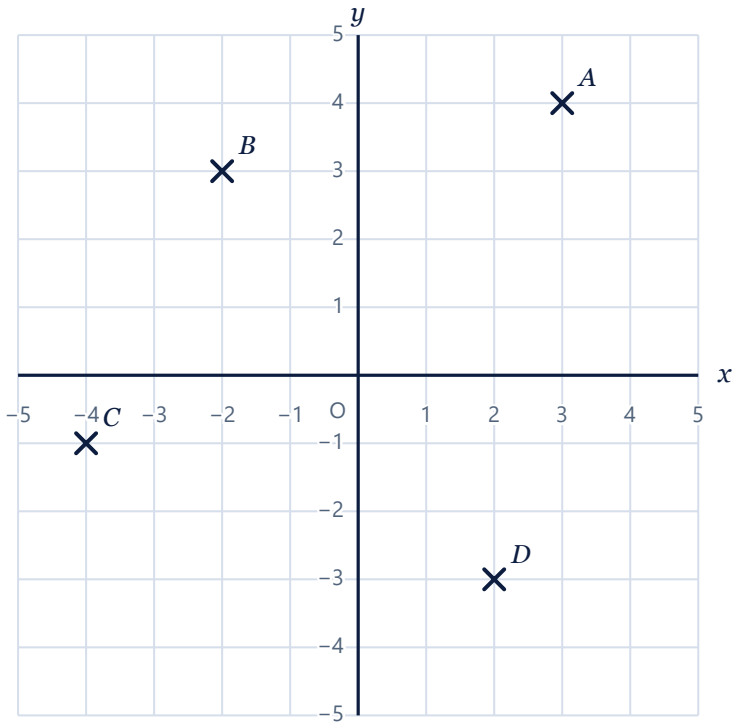
156 g

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5 The points A, B, C and D are shown on the grid.

a. Write down the coordinates of A and B.

b. Write down the coordinates of C and D.



(2 marks)

a)

across first, then up or down

A: 3 right, 4 up

A (3, 4)

B: 2 left, 3 up

B (-2, 3)

b)

C: 4 left, 1 down

C (-4, -1)

D: 2 right, 3 down

D (2, -3)

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6 Ben wants to work out the perimeter of a square with sides of length 6 cm.

Ben writes:

perimeter = 6 × 6 = 36 cm

Explain the mistake Ben has made.

(2 marks)

6 x 6 is the area

Area = 6 x 6

Area = 36 cm²

Perimeter: add all 4 sides

Perimeter = 6 + 6 + 6 + 6

Perimeter = 4 x 6

Perimeter = 24 cm

He found the area, not the perimeter (24 cm)

7 A garden pond is a cuboid 2.5 m long, 1.2 m wide and 0.6 m deep.

The pond is filled with water from a hose. Water flows from the hose at 15 litres per minute.

Work out how long it takes to fill the pond. Give your answer in hours.

1 m^3 = 1000 litres

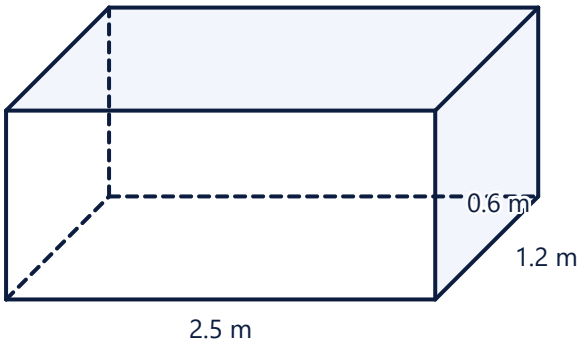


Diagram NOT accurately drawn

(3 marks)

volume = length x width x depth

V = 2.5 x 1.2 x 0.6

V = 1.8 m^3

1.8 x 1000 = 1800 litres

1800 ÷ 15 = 120 minutes

2 hours

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8 By rounding each number to 1 significant figure, work out an estimate for

(587 + 214) ÷ 3.9

(2 marks)

Round to 1 significant figure

$587 \approx 600$

$214 \approx 200$

$3.9 \approx 4$

$(600 + 200) \div 4 = 800 \div 4$

$= 200$

200

9 The stem and leaf diagram shows the masses, in grams, of some tomatoes.

Stem	Leaves
2	1 4 6
3	0 2 5 8
4	3 7

Key: 2 | 1 = 21 grams

Find the range of the masses.

(2 marks)

Smallest: 21 g

Largest: 47 g

Range = Largest - smallest

Range = 47 - 21

Range = 26

26 grams

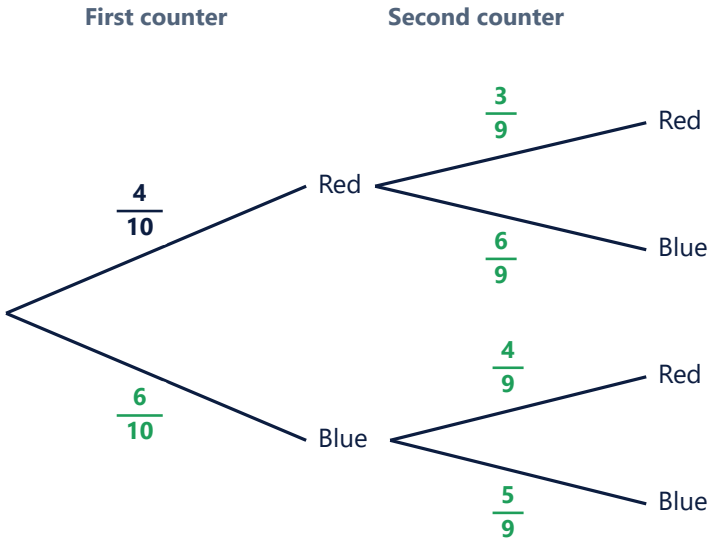
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10 A bag contains 4 red counters and 6 blue counters. Isla takes a counter at random and does **not** put it back. She then takes a second counter at random.

a. Explain why the colour of the second counter is not independent of the colour of the first counter.

b. Complete the probability tree diagram.

c. Work out the probability that both counters are red.



(4 marks)

a) no replacement

the counters left depend on the first pick

dependent events

b) first pick out of 10

red $\frac{4}{10}$, blue $\frac{6}{10}$

after red: 3 red, 6 blue left

red $\frac{3}{9}$, blue $\frac{6}{9}$

after blue: 4 red, 5 blue left

red $\frac{4}{9}$, blue $\frac{5}{9}$

R $\frac{4}{10}$, B $\frac{6}{10}$; after R: R $\frac{3}{9}$, B $\frac{6}{9}$; after B: R $\frac{4}{9}$, B $\frac{5}{9}$

c) multiply along the branches

$P(R, R) = \frac{4}{10} \times \frac{3}{9}$

$P(R, R) = \frac{12}{90}$

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$= \frac{2}{15}$

$\boxed{\frac{2}{15}}$

11 Work out the size of each interior angle of a regular decagon. (3 marks)

A decagon has 10 sides

$$\text{Sum} = (n - 2) \times 180^\circ$$
$$\text{Sum} = (10 - 2) \times 180^\circ$$
$$\text{Sum} = 1440^\circ$$
$$\text{Each angle} = 1440^\circ \div 10$$
$$\text{Each angle} = 144^\circ$$

$\boxed{144^\circ}$

12 n is an integer.

$-2 < n \leq 3$

Write down all the possible values of n. (2 marks)

$-2 < n \leq 3$

$<$ means -2 is not included

$\leq$ means 3 is included

$\boxed{-1, 0, 1, 2, 3}$

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13 Amara bakes cakes. Each cake needs $2\frac{1}{4}$ cups of flour.

a. How many cups of flour does she need for 3 cakes? Give your answer as a mixed number.

b. Amara has 10 cups of flour. Work out how many whole cakes she can make, and how much flour she has left over.

(4 marks)

a)

$2\frac{1}{4} = \frac{9}{4}$

$\frac{9}{4} \times 3 = \frac{27}{4}$

$= 6\frac{3}{4}$

$6\frac{3}{4}$ cups

b)

$10 \div \frac{9}{4} = 10 \times \frac{4}{9}$

$= \frac{40}{9} = 4\frac{4}{9}$

Only whole cakes count

4 cakes use $4 \times \frac{9}{4} = 9$ cups

$10 - 9 = 1$

4 cakes, 1 cup left over

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14 The diagram shows triangle PQR and triangle XYZ.

Are the two triangles congruent? Give a reason for your answer.

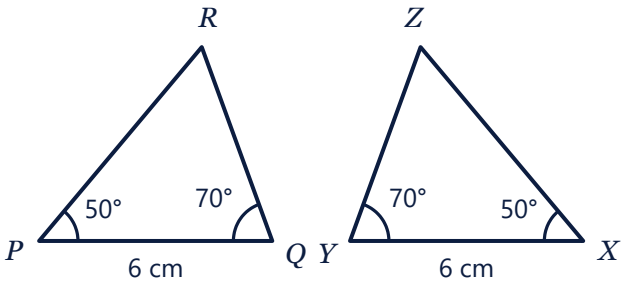


Diagram NOT accurately drawn

(2 marks)

PQ = XY = 6 cm

Angle P = angle X = 50°

Angle Q = angle Y = 70°

The 6 cm side is between the two angles in both

Yes, congruent (ASA)

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15 The table shows information about the time, t minutes, that 30 customers waited at a garage.

Time (t minutes)	Frequency
$0 < t \leq 10$	4
$10 < t \leq 20$	9
$20 < t \leq 30$	12
$30 < t \leq 40$	5

Work out an estimate for the mean waiting time. (3 marks)

Use the midpoint of each class

Midpoints: 5, 15, 25, 35

Midpoint x frequency

$5 \times 4 = 20$

$15 \times 9 = 135$

$25 \times 12 = 300$

$35 \times 5 = 175$

Total

$20 + 135 + 300 + 175 = 630$

Divide by the total frequency

$\text{Mean} = 630 \div 30$

$\text{Mean} = 21$

21 minutes

16 Make x the subject of the formula

$5(x + 2y) = w + 3x$ (3 marks)

$5(x + 2y) = w + 3x$

Expand the bracket

$5x + 10y = w + 3x$

$-3x$ $2x + 10y = w$ $-3x$

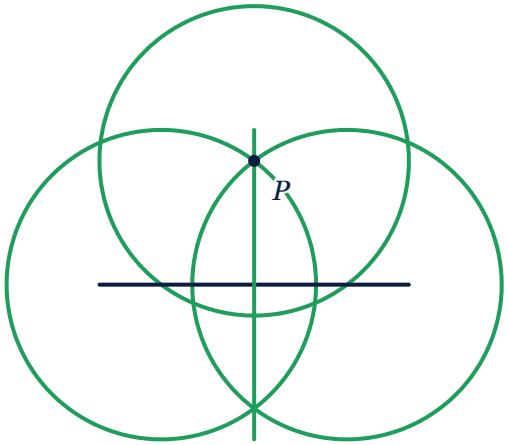
$-10y$ $2x = w - 10y$ $-10y$

$\div 2$ $x = \frac{w - 10y}{2}$ $\div 2$

$$x = \frac{w - 10y}{2}$$

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17 Draw a straight line 10 cm long. Mark a point P about 4 cm above the line.
Using a ruler and compasses only, construct the perpendicular from P to the line.
You must show all your construction lines.



(2 marks)

Arc from P crossing the line twice

Crossing points X and Y

Same radius: arcs from X and Y

Arcs cross below the line

Join P to that crossing point

The line from P meets the line at 90°

18 Find the highest common factor (HCF) of 54 and 90

(2 marks)

Prime factors of each

$54 = 2 \times 3 \times 3 \times 3$

$90 = 2 \times 3 \times 3 \times 5$

Primes in both: 2, 3, 3

$HCF = 2 \times 3 \times 3$

$HCF = 18$

18

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19 The line AB is perpendicular to the line CD. They cross at O. The straight line EF also passes through O.

Angle BOE = 27°.

a. Work out the size of angle x. Give a reason.

b. Work out the size of angle y. Give a reason.

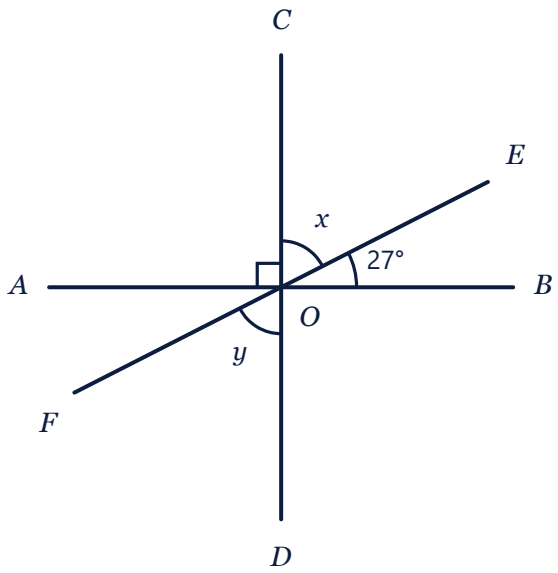


Diagram NOT accurately drawn

(3 marks)

a) Perpendicular, so angle BOC = 90°

$x = 90 - 27$

$x = 63$

$x = 63°$

b) Vertically opposite angles are equal

$y = x$

$y = 63$

$y = 63°$

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20 a. Write $7^4 \times 7^3$ as a single power of 7

b. Write $12^9 \div 12^4$ as a single power of 12

(2 marks)

a)

Multiplying: add the powers

$7^4 \times 7^3 = 7^{4+3}$

$= 7^7$

$\boxed{7^7}$

b)

Dividing: subtract the powers

$12^9 \div 12^4 = 12^{9-4}$

$= 12^5$

$\boxed{12^5}$

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