Weekly check: Grade 3

Worked solutions

GCSE Maths weekly check

All weekly checks online

1 Expand $p(p - 6)$ (2 marks)

multiply both terms by p

$p \times p = p^2$

$p \times -6 = -6p$

$p^2 - 6p$

2 Here are the midnight temperatures, in °C, on five nights.

−5 2 −3 4 −3

Work out the mean temperature. (2 marks)

$-5 + 2 - 3 + 4 - 3 = -5$

mean $= -5 \div 5$

$-1\,^{\circ}C$

3 A fair eight-sided spinner has sections numbered 1 to 8.

The spinner is spun once.

a. Write down the word that best describes the probability that the spinner lands on 9.

b. Find the probability that the spinner lands on a multiple of 3. (2 marks)

The spinner only shows 1 to 8, so landing on 9 cannot happen: it is impossible

The multiples of 3 from 1 to 8 are 3 and 6, so P(multiple of 3) $= \frac{2}{8} = \frac{1}{4}$

4 Write < or > in each box to make each statement true.

a. 0.34 □ 0.4

b. 2.5 □ 2.45 (2 marks)

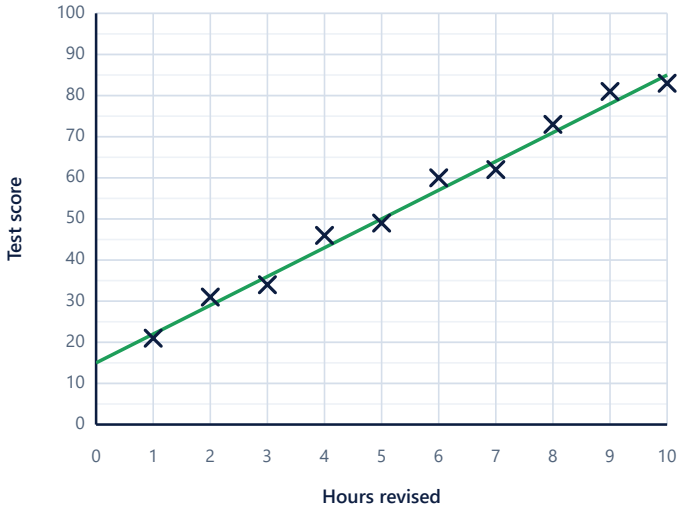
a) 0.34 is less than 0.40, so $0.34 < 0.4$

b) 2.50 is greater than 2.45, so $2.5 > 2.45$

5 The scatter graph shows the number of hours ten students revised and their scores in a test.

a. Draw a line of best fit on the scatter graph.

b. Use your line of best fit to estimate the test score of a student who revised for 6.5 hours.



(3 marks)

a) Straight line through the middle of the points

about the same number of points above and below

b) Up from 6.5 hours to the line, then across

About 60

6 a. $(-2) \times (-3) \times (-4)$

b. $-48 \div 6 \div (-2)$

(2 marks)

a)

$-2 \times -3 = 6$

$6 \times -4 = -24$

-24

b)

$-48 \div 6 = -8$

$-8 \div -2 = 4$

4

7 *PQRS* is a parallelogram.

Angle $P = (3x + 15)°$ and angle $Q = (2x - 10)°$. Angles P and Q are next to each other on the same side of the parallelogram.

Work out the value of x. Give a reason for each stage of your working.

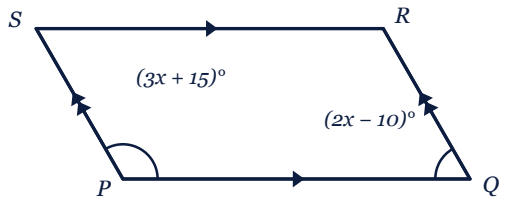


Diagram NOT accurately drawn

(3 marks)

Adjacent angles in a parallelogram add up to 180° (co-interior angles between parallel sides)

$3x + 15 + 2x - 10 = 180$

$5x + 5 = 180$, so $5x = 175$ and $x = 35$

Check

angle P = 120° and angle Q = 60°, and 120 + 60 = 180

$x = 35$

8 Solve $5x - 7 = 23$

(2 marks)

+7 $5x = 30$ +7

÷5 $x = 6$ ÷5

$x = 6$

9 a. Simplify $4 \times 3h$

b. Simplify $9a + 2b - 3a + b$

(2 marks)

a) $4 \times 3h = 12h$

b) Collect the a terms

$9a - 3a = 6a$. Collect the b terms: $2b + b = 3b$

b) The answer is $6a + 3b$

10 An isosceles trapezium has parallel sides of 4 cm and 16 cm.

Its two sloping sides are each 10 cm long.

Its area is 80 cm^2.

a. Work out the perpendicular height of the trapezium.

b. Work out the perimeter of the trapezium.

(4 marks)

a)

$80 = \frac{1}{2} \times (4 + 16) \times h$

$80 = 10h$

÷10 $8 = h$ ÷10

8 cm

b)

$4 + 16 + 10 + 10 = 40$

40 cm

11 In triangle ABC, the point D lies on the side BC, so that BDC is a straight line. Angle ADB = 112° and angle DAC = 30°.

a. Work out the size of angle ADC. Give a reason for your answer.

b. Work out the size of angle ACD. Give a reason for your answer.

(3 marks)

a)

$ADC = 180 - 112$

$ADC = 68°$

angles on a straight line add to 180°

b)

$ACD = 180 - 68 - 30$

$ACD = 82°$

angles in a triangle add to 180°

12 a. Work out an estimate for the value of $\frac{9.72 \times 5.3}{0.48}$

b. Given that $1.8^4 = 10.4976$, write down the value of 18^4

c. Write down the value of 5^{-2}

(4 marks)

a) Round to 1 significant figure

9.72 becomes 10, 5.3 becomes 5, 0.48 becomes 0.5. Then $(10 \times 5) / 0.5 = 50 / 0.5 = 100$

b) $18 = 1.8 \times 10$, so $18^4 = 1.8^4 \times 10^4 = 10.4976 \times 10{,}000 = 104{,}976$

c) $5^{-2} = 1 / 5^2 = \frac{1}{25}$

13 Potatoes cost £1.20 per kilogram.

Work out the cost of 3.5 kg of potatoes.

(2 marks)

Cost = 3.5 × £1.20

3.5 × 1.20 = 4.20, so the cost is £4.20

£4.20

14 A triangle has vertices at (1, 2), (3, 2) and (3, 5).

The triangle is reflected in the line $x = 4$.

Write down the coordinates of the vertices of the image. (2 marks)

Reflecting in the line $x = 4$ maps (x, y) to $(8 - x, y)$, because the image is the same distance from the line on the other side

(1, 2) is 3 left of the line, so its image is 3 right of the line: (7, 2)

(3, 2) maps to (5, 2) and (3, 5) maps to (5, 5)

(7, 2), (5, 2), (5, 5)

15 A swimming pool is a cuboid 10 m long, 5 m wide and 1.5 m deep.

The empty pool is filled with water at a rate of 2.5 m^3 every minute.

Work out how many minutes it takes to fill the pool completely. (3 marks)

$V = 10 \times 5 \times 1.5 = 75\ m^3$

Time $= 75 \div 2.5$

30 minutes

16 a. Write 0.0865 correct to 2 decimal places.

b. Write 9.996 correct to 2 decimal places. (2 marks)

a)

0.0865: the digit after the 2nd place is 6, round up

0.09

b)

9.996: 9.99 rounds up to 10.00

10.00

17 A model car is made using a scale of 1 : 18.

The real car is 4.5 m long.

Work out the length of the model car. Give your answer in centimetres. (2 marks)

Change the real length to centimetres

$4.5\ m = 450\ cm$

Model length $= 450 \div 18 = 25\ cm$

25 cm

18 a. One of these fractions is **not** equivalent to $\frac{3}{5}$

$\frac{6}{10}$ $\frac{9}{15}$ $\frac{12}{25}$ $\frac{15}{25}$

Write down this fraction.

b. Work out $\frac{2}{5} + \frac{1}{3}$ (3 marks)

a) $\frac{6}{10}$, $\frac{9}{15}$ and $\frac{15}{25}$ all simplify to $\frac{3}{5}$, but $\frac{12}{25}$ does not ($\frac{3}{5} = \frac{15}{25}$, not $\frac{12}{25}$)

b) Use denominator 15

$\frac{2}{5} = \frac{6}{15}$ and $\frac{1}{3} = \frac{5}{15}$

$\frac{6}{15} + \frac{5}{15} = \frac{11}{15}$

19 $T = 4x + 3y$

Work out the value of T when $x = 5$ and $y = 2$. (2 marks)

Substitution means replacing each letter with its given value. Numbers next to letters mean multiplication, so 4x becomes 4 x 5. Multiply before adding

Substitute the values

$T = 4 \times 5 + 3 \times 2$

$T = 20 + 6 = 26$

26

20 A rope is 14.4 m long.

It is cut into pieces that are each 0.8 m long.

How many pieces are there? (3 marks)

Multiply both by 10 to make 0.8 a whole number

$14.4 \div 0.8 = 144 \div 8$

$144 \div 8 = 18$

18 pieces