BUMPER "BETWEEN PAPERS" PRACTICE

SUITABLE FOR HIGHER AND FOUNDATION TIER

Thanks to: Dawn Denyer, Emma Weston, Kieran McCausland, Donald Walker, Janet Annetts, James Wood + probably people I've missed out ...

SUMMER 2019

~~QUESTIONS~~ SOLUTIONS

... you're all my heroes for sending me your solutions Mel x.

NOT A "BEST" GUESS PAPER.

NEITHER IS IT A "PREDICTION" ... ONLY THE EXAMINERS KNOW WHAT IS GOING TO COME UP! FACT! YOU ALSO NEED TO REMEMBER THAT JUST BECAUSE A TOPIC CAME UP ON PAPER 1 IT MAY STILL COME UP ON PAPERS 2 OR 3 ...

WE KNOW HOW IMPORTANT IT IS TO PRACTICE, PRACTICE, PRACTICE .... SO WE'VE COLLATED A LOAD OF QUESTIONS THAT WEREN'T EXAMINED IN THE AQA 9-1 GCSE MATHS PAPER 1 BUT WE CANNOT GUARANTEE HOW A TOPIC WILL BE EXAMINED IN THE NEXT PAPERS ...

ENJOY!
MEL & SEAGER

1kg = 1000g

1. How many grams are there in 2.5 kilograms? Circle your answer. [1]

0.0025 250 2005 **2500**

2. What is the value of the digit 7 in 3.72? Circle your answer. [1]

$\frac{1}{70}$ **$\frac{7}{10}$** 7 $\frac{1}{00}$

3. Which of $\frac{2}{5}$ or $\frac{5}{8}$ is closer in value to $\frac{1}{2}$? You must show your working. [3]

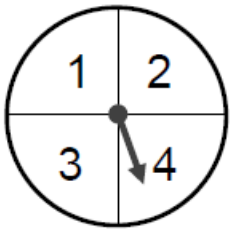
x8 $\frac{16}{40}$ $\frac{25}{40}$ x5 $\frac{20}{40}$ $\frac{2}{5}$

4. Which of these is not used to prove that triangles are congruent?

Circle your answer.

SSS SAS **AAA** RHS

5. A game is played with a fair spinner.



The player spins the spinner twice.
The score is the difference between the two numbers.

(a) Complete the table to show the scores. [2]

Second spin \ First spin	1	2	3	4
1	0	1	2	3
2	1	0	1	2
3	2	1	0	1
4	3	2	1	0

16 options altogether.

(b) The player loses if the score is 0 or 1 10
The player wins if the score is 2 or 3 6
Amy says: "Two scores win and two scores lose, so the chance of winning is evens."
Is Amy correct? Tick the correct answer

Yes **No**

Give a reason for your answer. [2]

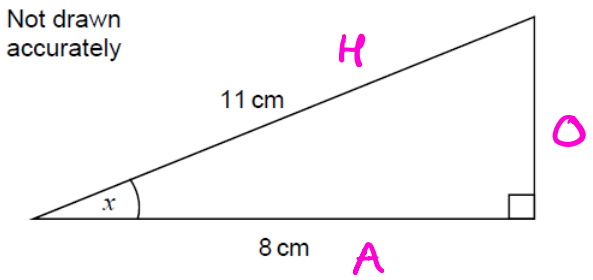
The probability of winning is 6/10 which is not $\frac{5}{10}$ (evens)

6. a) Work out the size of angle x.

SOH CAH TOA

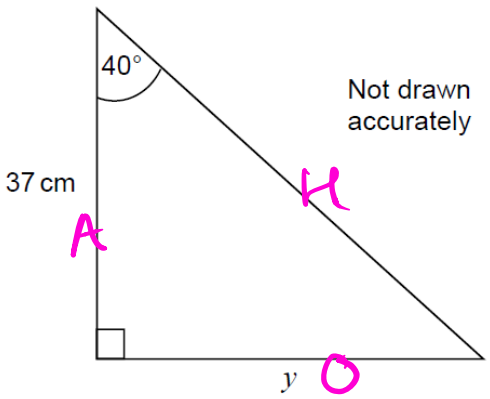
$\cos x = \frac{8}{11}$ $x = \cos^{-1}\frac{8}{11}$

$x = 43.34^\circ$



[2]

(b) Work out length y.



SOH CAH TOA

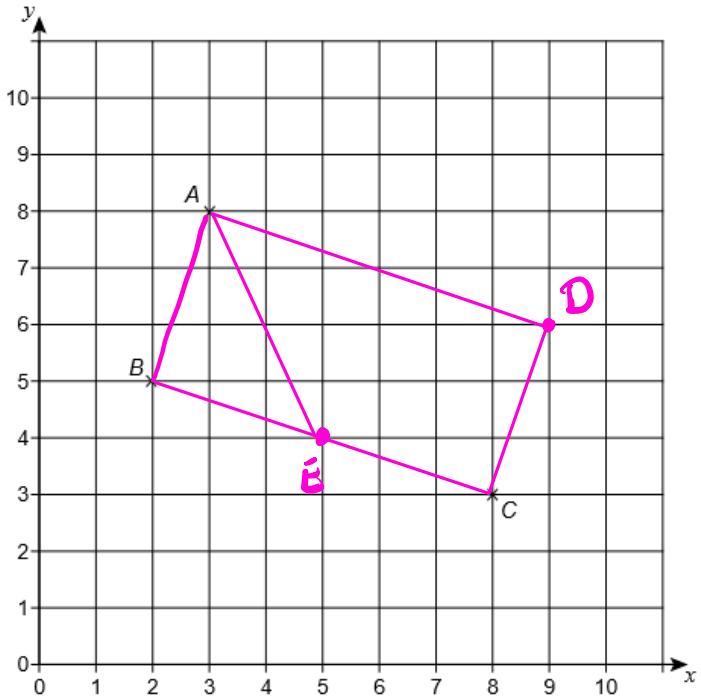
$\tan 40 = \frac{y}{37}$

$y = 37 \times \tan 40 = 31.04668...$

$= 31.05$ cm

[2]

7. *A*, *B* and *C* are three vertices of a quadrilateral plotted on a centimetre grid.



a) Plot *D* on the grid so that *ABCD* is a rectangle.

D = (9, 6)

[1]

b) *E* is the midpoint of *BC*.

Circle the two answers that describe triangle ABE.

Scalene isosceles

equilateral right-angled

[2]

c) Circle the ratio

area of triangle ABE : area of rectangle ABCD

1 : 2 1 : 3 1 : 4 1 : 8

[1]

8. Here are two column vectors.

$f = \begin{pmatrix} 4 \\ 5 \end{pmatrix}$ $g = \begin{pmatrix} 5 \\ -2 \end{pmatrix}$

Work out 3f - 2g

$3\begin{pmatrix} 4 \\ 5 \end{pmatrix} - 2\begin{pmatrix} 5 \\ -2 \end{pmatrix} = \begin{pmatrix} 12 \\ 15 \end{pmatrix} - \begin{pmatrix} 10 \\ -4 \end{pmatrix} = \begin{pmatrix} 2 \\ 19 \end{pmatrix}$

[2]

9. Work out $25.8 + 12.6 \div 2$

$25.8 + 6.3 = 32.1$

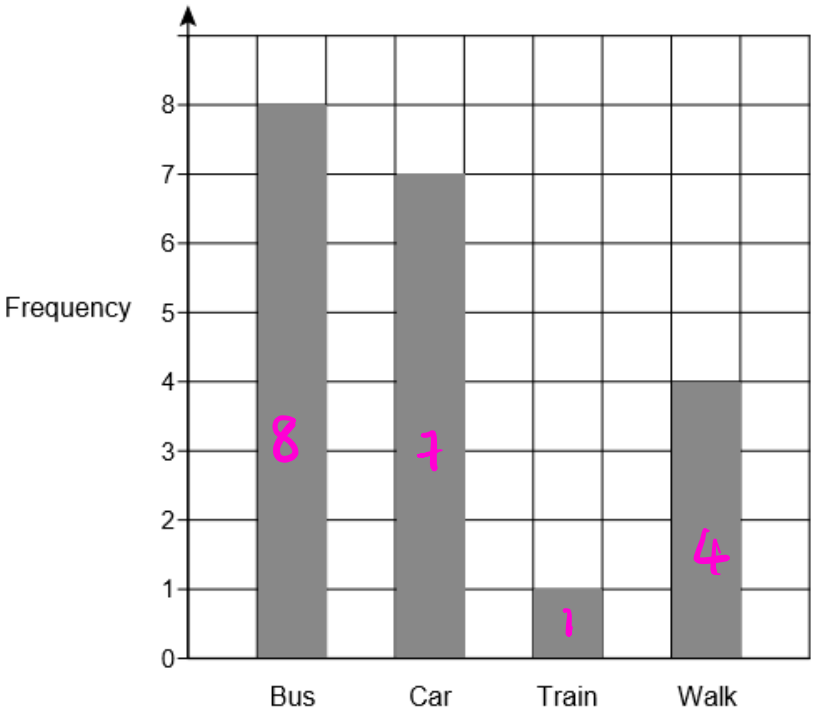
[2]

10. The bar chart shows information about how 20 students travel to school.

Show the information in a pictogram.

Use the key given.

[3]



Key : ○ represents 2 students

Bus	○ ○ ○ ○
Car	○ ○ ○ ◔
Train	◔
Walk	○ ○

11. Work out 81 as a power of 3 Circle your answer.

3^3 3^4 3^5 3^6

[1]

12. Work out $2\frac{3}{4} \times 1\frac{5}{7}$

LOOK

Give your answer as a mixed number in its simplest form.

$\frac{11}{4} \times \frac{12}{7} = \frac{132}{28} = \frac{33}{7}$ $4\frac{5}{7}$

[3]

13. Which statement is true? Circle your answer.

–6 is greater than –2

–6 is greater than 2

–2 is greater than –6

–2 is greater than 6

[1]

14. Write 280 as a product of its prime factors.

280 < 2 140 < 2 70 < 2 35 < 5 7

$2^3 \times 5 \times 7$

[2]

15 In a sale, the original price of a bag was reduced by $\frac{1}{5}$

The sale price of the bag is £29.40

Work out the original price.

4/5 | 1/5

29.40

$\frac{1}{5} \Rightarrow 29.40 \div 4 = 7.35$ $\frac{5}{5} = 7.35 \times 5 = £36.75$

[3]

16. Toilet rolls come in packs of 4 and 9

Which pack is better value?

You must show your working.

£1.89

1.89 ÷ 4

= 0.4725

£3.99

3.99 ÷ 9

= 0.4433 [3]

The pack of 9 is better value

17. The scale on a map is 1 : 200 000

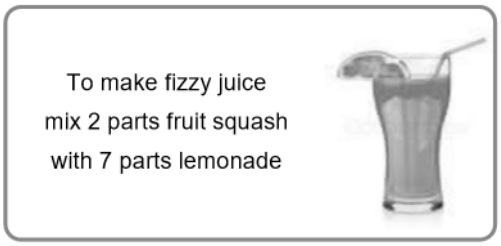
Work out the number of kilometres represented by 2.5 cm on the map.

2.5 : 500,0000cm
= 5000m
= 5km

5km

[2]

18. Here are the instructions on a bottle of fruit squash.



a) How much fruit squash is needed to make 450 ml of fizzy juice?

squash lemonade

450ml ÷ 9 = 50

100 : 350

Squash → 100ml

[2]

b) Tom has 80 ml of fruit squash. He also has 210 ml of lemonade.

What is the maximum amount of fizzy juice he can make?

S 80 ÷ 2 = 40ml
L 40 × 7 = 280ml
not enough lemonade

30 × 2 = 60ml ✓
210 ÷ 7 = 30ml.
210 + 60 = 270ml.

[3]

19. £800 is invested for 3 years at 2% simple interest per year.

Work out the total interest.

1% = 8 2% = £16 per year

Simple interest = 16 × 3 = 48

[3]

20. (a) Use your calculator to work out $19.42^2 - \sqrt[3]{1006} \div 4.95$

Write down your full calculator display.

375.1121656

[1]

(b) Use approximations to check that your answer to part (a) is sensible.

You must show your working. $20^2 - \sqrt[3]{1000} \div 5$
$400 - 10 \div 5 = 400 - 2 = 398$.
sol is sensible.

[2]

21. Here are four numbers.

0.42857
0.43000 $\frac{3}{7}$ ✓ 43.8% $\frac{7}{16}$
0.4380 0.43750

Write these numbers in order of size.

Start with the smallest number.

$\frac{3}{7}$ 0.43 $\frac{7}{16}$ 43.8%

[2]

22. 120 men and 80 women were asked if they drive to work.

Altogether $\frac{1}{4}$ of the people said yes.

$\frac{1}{3}$ of the men said yes.

What fraction of the women said yes?

	M	W	Total
Drive.	40	10	50
Dont Drive	80	70	150
	120	80	200

$\frac{10}{80} = \frac{1}{8}$

[4]

23. In Scotland, squirrels are red or grey in the ratio red : grey = 1 : 2 $\frac{1}{2}$

What fraction of the squirrels in Scotland are red?

R : G

1 : 2.5 $\frac{1}{3.5} = \frac{2}{7}$

[2]

24. Circle the expression that can be written as $2y^2$

$4y^2 \times$ $4y$ $2y^2$ $4y^2$

$(2y)^2$ $2 \times 2 \times y$ $2 \times y \times y$ $2 \times 2 \times y \times y$

[1]

25. Simplify 7a + 5b + 3a − 2b

10a + 3b

[2]

26. Here is a formula. $V = \frac{1}{2} x^2 h$

Work out the value of V when $x = 11$ and $h = 6$

$V = \frac{1}{2} \times 11^2 \times 6 = 363$

[2]

27. Solve 12x = 3 Circle your answer.

$x = \frac{3}{12} = \frac{1}{4}$

x = -9 $x = \frac{1}{4}$ x = 4 x = 36

[1]

28. A drink is mixed in the ratio lemonade : orange : cranberry = 6 : 3 : 2
What fraction is orange? Circle your answer.

$\frac{3}{8}$ $\frac{2}{11}$ $\frac{3}{11}$ $\frac{1}{2}$

[1]

29. There are 25 counters in a bag. 12 are red, 5 are green and the rest are white.
A counter is chosen at random. Work out the probability that it is white.

25 − 17 = 8 $\frac{8}{25}$

[2]

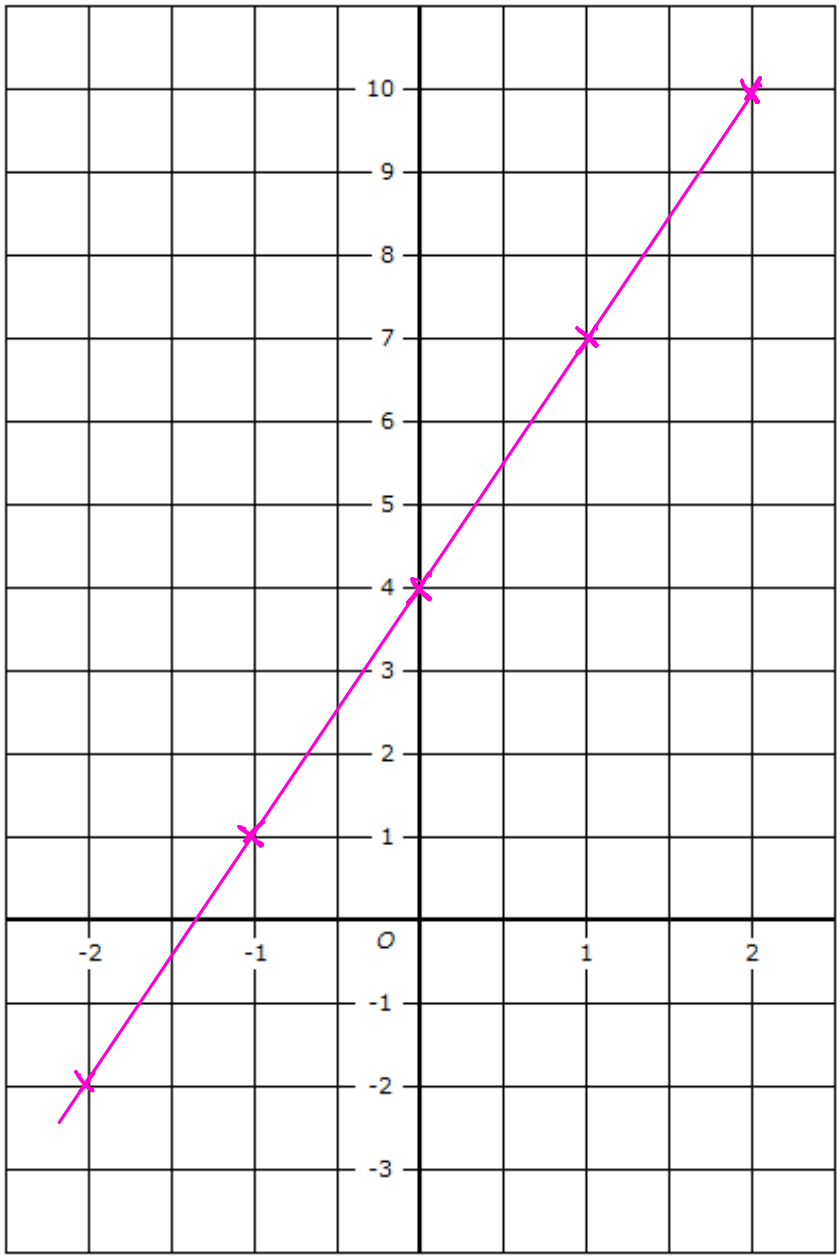
30.a. Complete the table of values for $y = 3x + 4$

x	-2	-1	0	1	2
y	-2	1	4	7	10

[2]

(b) On the grid, draw the graph of $y = 3x + 4$

[2]



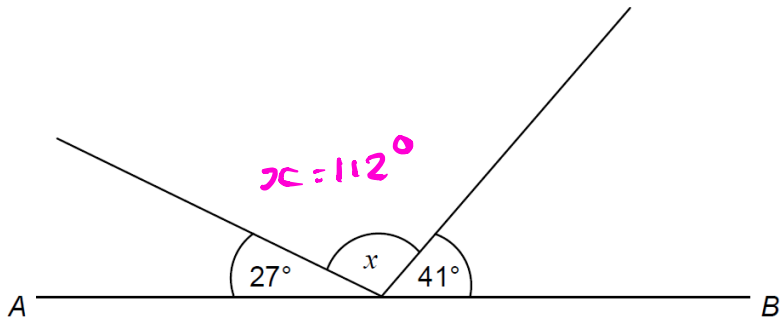
31. AB is a straight line. Work out the size of angle x.

27+41 = 68

180 - 68 = 112

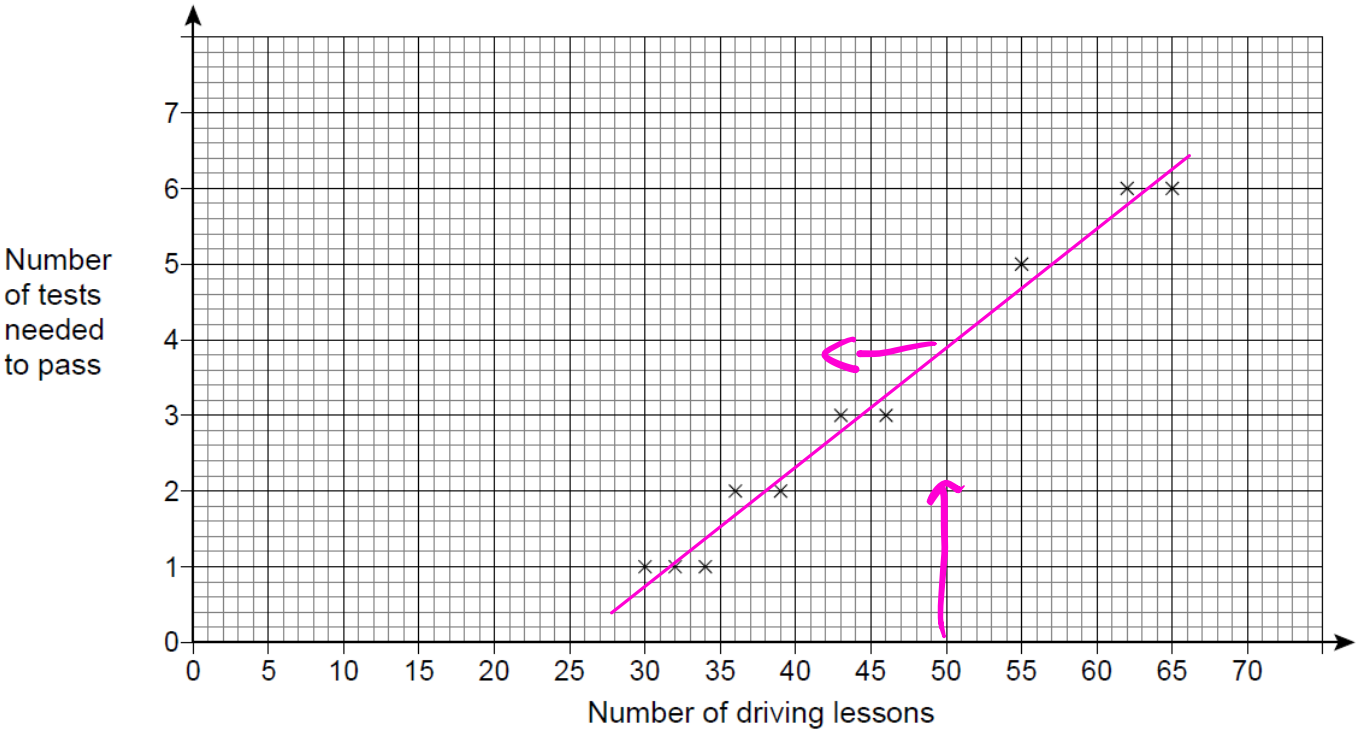
angles on a straight line = 180°

Not drawn accurately



[2]

32. The scatter graph shows the number of driving lessons and the number of tests needed to pass by 10 people.



(a) Describe the correlation. Circle your answer.

[1]

strong positive weak positive weak negative strong negative

(b) Use a line of best fit to estimate the number of tests needed to pass by a person who has 50 lessons.

4

[2]

(c) Meera says: "I can use the trend to predict the number of driving tests needed to pass for any number of driving lessons."
Comment on her statement.

[1]

She should only make predictions about people who have had between 30 and 65 lessons... extrapolating outside the range of the data makes it unpredictable.

33. $2x + 3y = 15.5$ ①
$x + y = 6$ ②
Work out the values of x and y.

$2x + 3y = 15.5$ ①
$2x + 2y = 12$ ③
$y = 3.5$
$x + 3.5 = 6$
$x = 2.5$

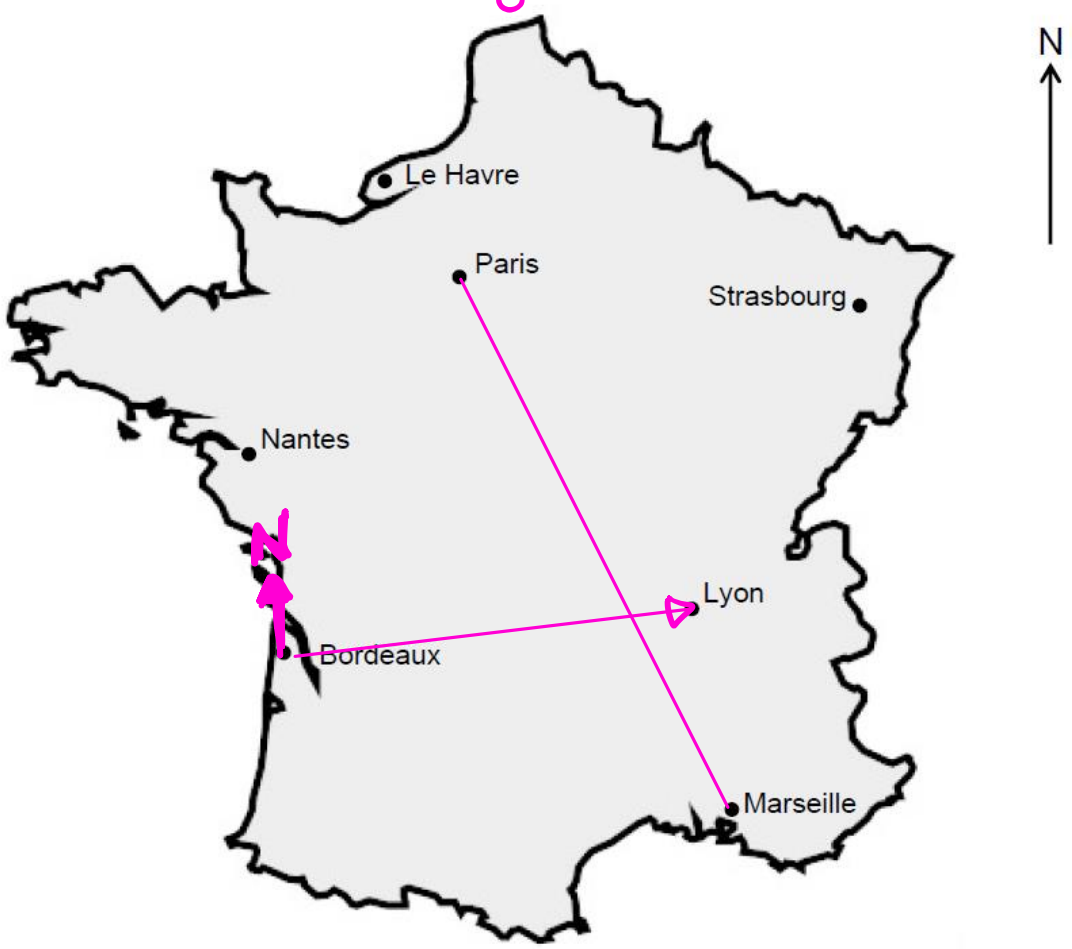
$x = 2.5$
$y = 3.5$ [3]

34 A cinema has:
37 rows of seats
23 seats in each row.
Adult tickets are £8 each.
Child tickets are £6 each
The cinema has sold tickets for every seat.
The manager estimates that £6400 was raised from these tickets.
200 child tickets were sold.
Check whether the manager's estimate was close to the exact amount of money raised.

Total seats 851.
$200 \times 6 = 1200$
adult $851 - 200 = 651$
$651 \times 8 = 5208$
Total $= 1200 + 5208$
£6408
the manages estimate was close!

[6]

35. Here is a map of France.



Scale: 1 cm represents 80 km
(a) What is the three-figure bearing of Lyon from Bordeaux? Circle your answer.

[1]

005° 085° 095° 175°

(b) Work out the actual straight-line distance from Paris to Marseille.

7·5cm 7·5 × 80 = 600 km (depends on printing scale!) [2]

36. Which symbol makes this statement correct?

0.062 ___>_____ 0.52

Circle your answer.

[1]

$=$ $<$ $>$ $\geqslant$

37. a) Solve the inequality $\frac{3x}{2} \leq 9$

$3x \leq 18$ $x \leq 6$

[2]

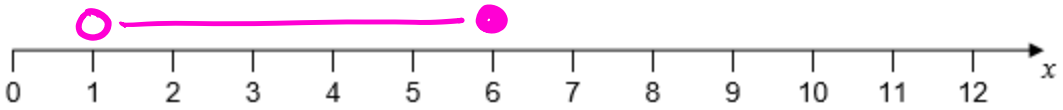
b) Solve the inequality $4(x + 2) > 12$

$x + 2 > 3$

$x > 1$

[2]

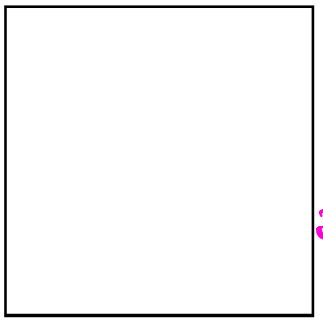
c) Represent the solution set that satisfies both answers to parts (a) and (b) on the number line.



[1]

38. The diagram shows a square. ← all sides are the same

Work out the length of one side of the square.



$7x - 3 = 3x + 3$

$4x = 6$

$x = \frac{6}{4} = \frac{3}{2} = 1.5$

$3(1.5 + 1)$

$= 3 \times 2.5$

$= 7.5\text{cm}$

$3x + 3$

[4]

39. Factorise $x^2 - y^2$ $(x + y)(x - y)$ Difference of two squares.

[1]

40 (a) Factorise fully $9a^2 - 6a$

$3a(3a - 2)$

[2]

(b) Solve $x^2 - 12x + 20 = 0$

$(x - 10)(x - 2) = 0$

$x - 10 = 0$ or $x - 2 = 0$

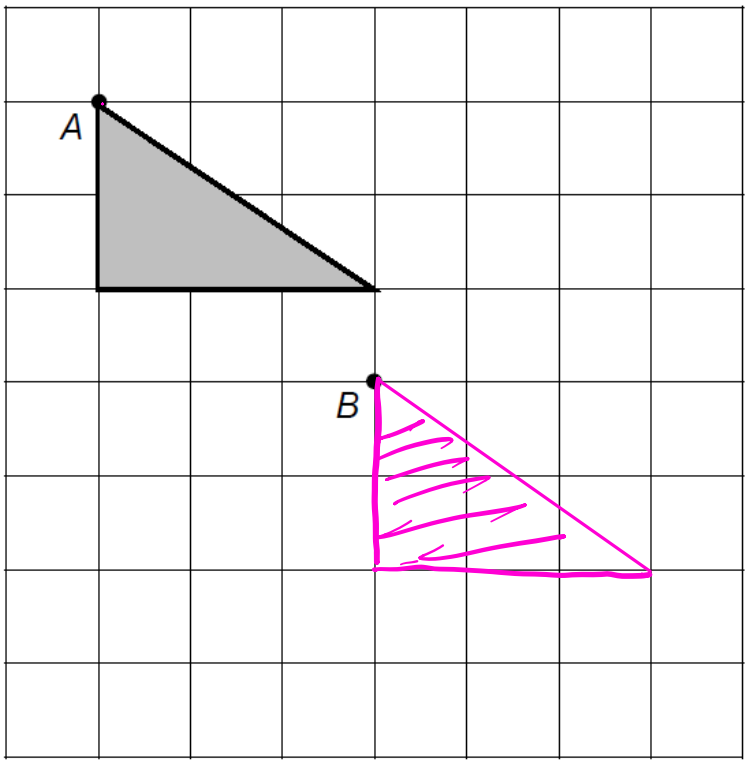
$x = 10$ $x = 2$

[3]

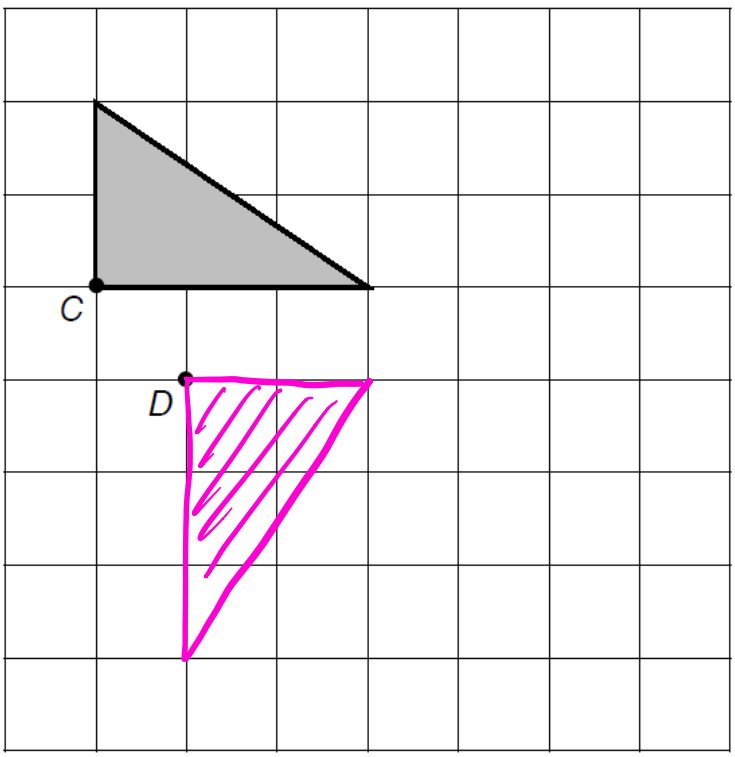
move

41 (a) Translate the triangle so that point A moves to point B.

[1]



(b) Rotate the triangle 90° clockwise so that point C moves to point D.



[2]

42. Factorise $15x + 35y - 40z$

$5(3x + 7y - 8z)$

[1]

43. A square has an area of 100 cm^2.

Find its perimeter.

10 × 10 = 100

Perimeter = 40cm

[2]

44. Circle the equation with roots 4 and -8

-4 +8

$4x(x - 8) = 0$

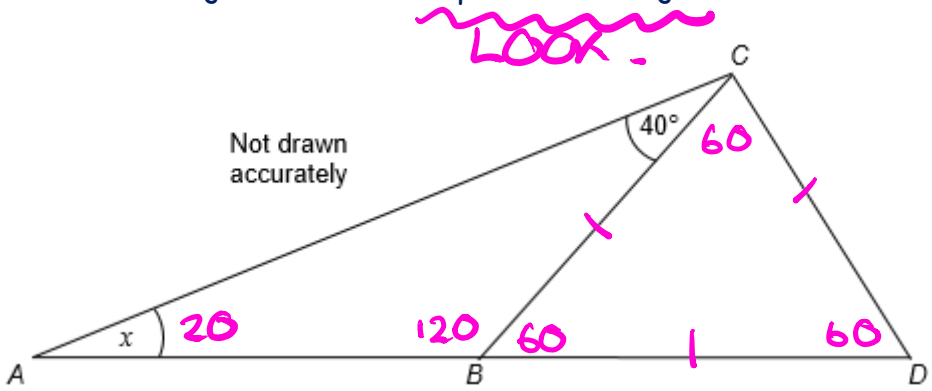
$(x - 4)(x + 8) = 0$

$x^2 - 32 = 0$

$(x + 4)(x - 8) = 0$

[1]

45. The diagram shows a triangle ACD and an equilateral triangle BCD.

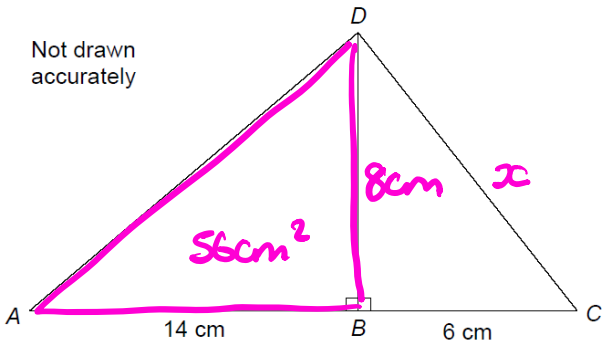


Work out the size of angle x.

x = 20

[2]

46. In the diagram the area of triangle ABD is 56 cm^2 Work out the length of CD.



ABD $56 = \frac{1}{2} h \times 14$

$h = 8$

CD $x^2 = 8^2 + 6^2$

$= 64 + 36$

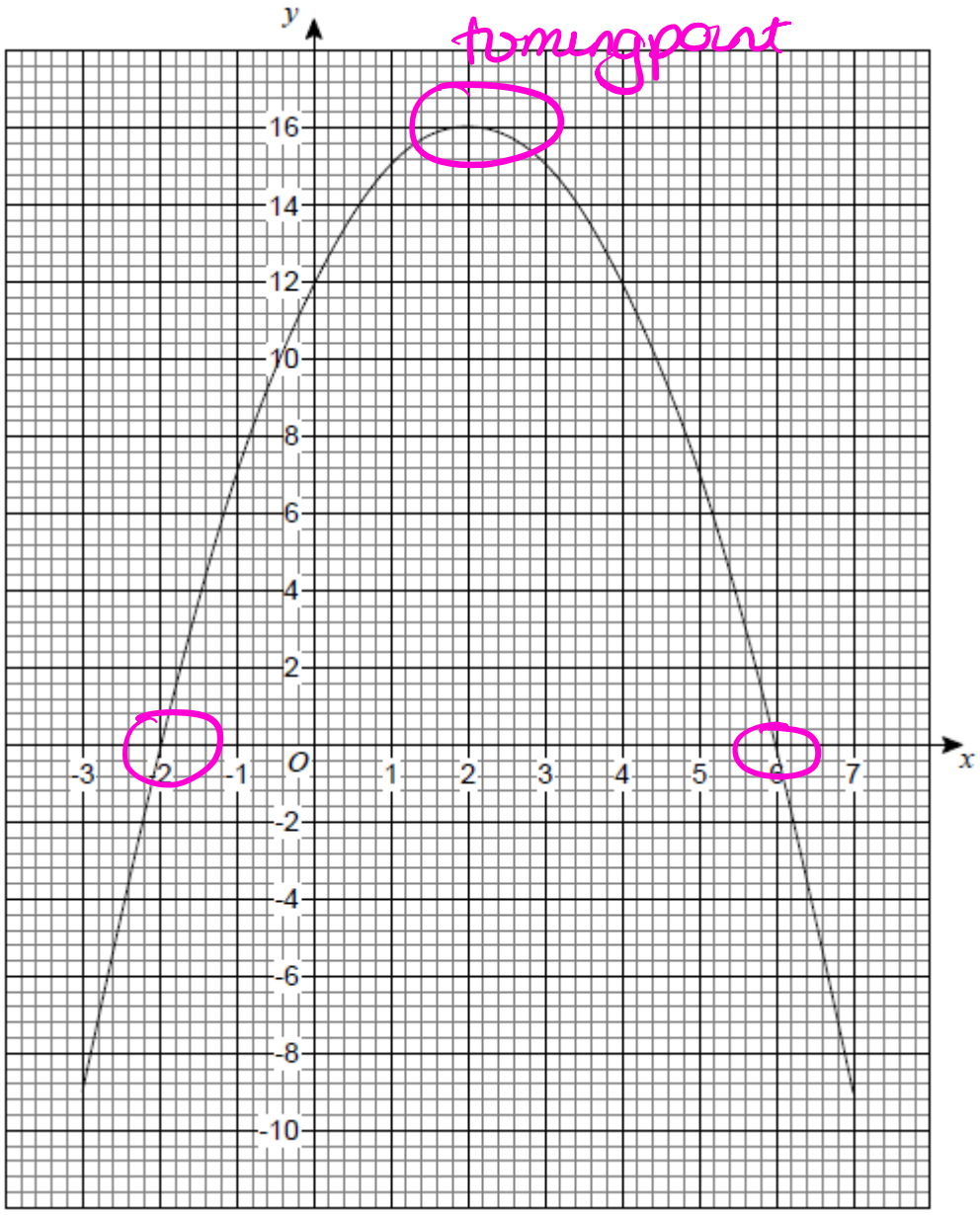
$= 100$

$x = \sqrt{100}$

$= 10cm$

[4]

47. The graph $y = a + bx - x^2$ is shown.



turning point

(a) Circle the coordinates of the turning point of the curve.

(-2, 0) (0, 12) (2, 16) (6, 0)

[1]

(b) Circle the value of a.

[1]

-2 12 16 6

(c) Circle the two roots of $a + bx - x^2 = 0$

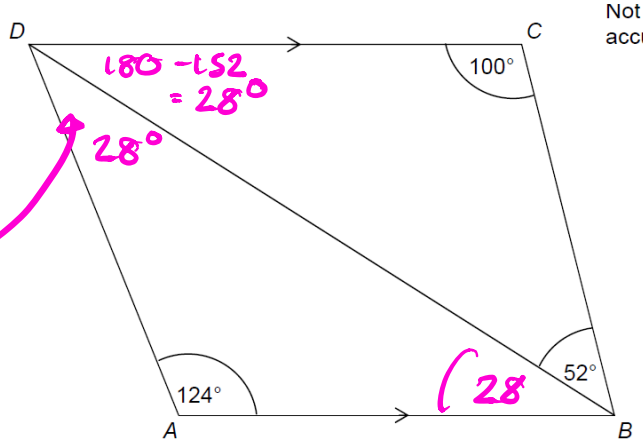
-2 and 6 2 and -6 2 and 6 -2 and -6

[1]

when y = 0 (where graph cuts x-axis)

48. In the diagram, DC is parallel to AB.

Show that triangle ABD is isosceles.



DBA = 28° (alternate angles are equal)

180 − (124 + 28)
= 180 − 152 = 28

180 − 152 = 28°

28°

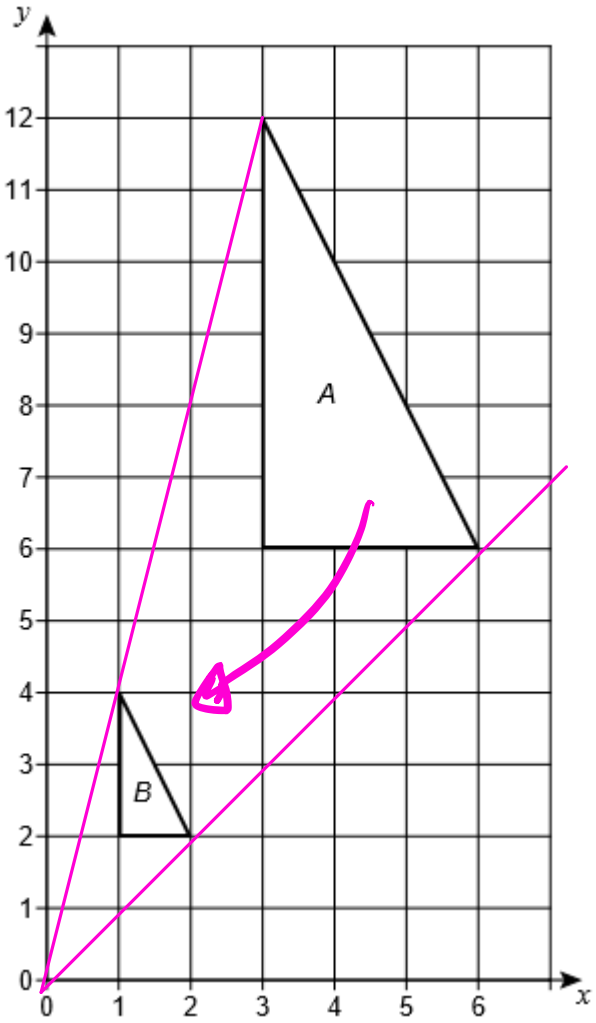
28

[3]

△ABD angle ADB = angle ABD

so △ABD is isosceles

49. Describe fully the single transformation that maps triangle A to triangle B.



[3]

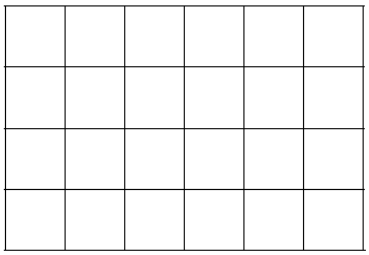
Enlargement,

Scale factor $\frac{1}{3}$

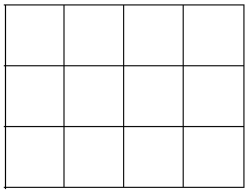
Centre (0,0)

50. A solid cuboid is made from centimetre cubes.

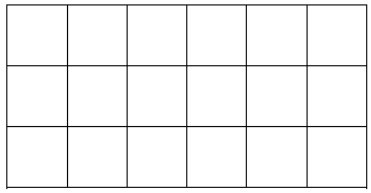
The plan view, front elevation and side elevation are shown.



Plan view



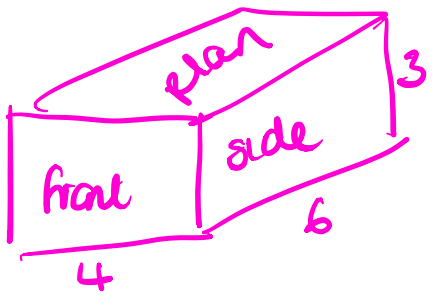
Front elevation



Side elevation

How many centimetre cubes were used to make the cuboid?

[2]



$4 \times 6 \times 3$

$= 72$