Write your name here

Surname	Other names
ANSWERS	

Pearson Edexcel
Level 1 / Level 2
GCSE (9–1)

Centre Number	Candidate Number

Mathematics Shadow Paper Set I

Paper 3 (Calculator)

Foundation Tier

Time: 2 hour 30 minutes

Paper Reference
1MA1/3F

You must have: Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser. Tracing paper may be used.

Total Marks

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided
  – *there may be more space than you need.*
- You must **show all your working**.
- Diagrams are **NOT** accurately drawn, unless otherwise indicated.
- **Calculators may not be used.**

Information

- The total mark for this paper is 175
- The marks for **each** question are shown in brackets
  – *use this as a guide as to how much time to spend on each question.*

Advice

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ▶

P48134A

6/6/6/6/6/7/7/4/

P 4 8 1 3 4 A 0 1 2 0

Pearson

Answer ALL questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

1 Write down the value of the 7 in the number 58 728

700

(1)

2 Write down the value of the 7 in the number 82 172

70

(1)

3 Write down the value of the 7 in the number 71 828

70 600

(1)

4 Find $\sqrt{2.25}$

$15 \times 15 = 225$

$1.5 \times 1.5 = 2.25$

1.5

(1)

5 Find $\sqrt{7.29}$

$9 \times 9 \times 9 = 729$

$9 \times 3 \times 9 \times 3 = 729$

$\sqrt{729} = 27 \therefore \sqrt{7.29} = 2.7$

2.7

(1)

6 Find $\sqrt{1.96}$

$14 \times 14 = 196$

$1.4 \times 1.4 = 1.96$

1.4

(1)

7 Write 39% as a fraction

$\frac{39}{100}$

(1)

8 Write 7% as a fraction

$\frac{7}{100}$

(1)

9 Write 12% as a fraction

$\frac{12}{100} = \frac{3}{25}$ (÷4)

(1)

10 Write $\frac{1}{2}$ as a decimal

$\frac{1}{2} = 0.5$

(1)

11 Write $\frac{4}{5}$ as a decimal

$\frac{10}{5} = 2$ $\frac{1}{5} = 0.2$ $0.2 \times 4 = 0.8$ 0.8

(1)

12 Write $\frac{7}{20}$ as a decimal

$\frac{100}{20} = 5$ $\frac{10}{20} = 0.5$ $\frac{1}{20} = 0.05$ $0.05 \times 7 = 0.35$ 0.35

(1)

13 Write $\frac{3}{4}$ as a percentage

$\frac{3}{4} \times \frac{25}{100}$ (÷4) $3 \times 25 = 75$ 75%

(1)

14 Write $\frac{9}{10}$ as a percentage

$\frac{9}{10} \times 10 = \frac{90}{100}$, $\times 10$

90%

(1)

15 Write $\frac{17}{20}$ as a percentage

$\frac{17}{20} \times 5 = \frac{85}{100}$, $\times 5$

85%

(1)

16 Write down all the factors of 12

1 x 12
2 x 6
3 x 4

1, 2, 3, 4, 6, 12

(2)

17 Write down all the factors of 45

1 x 45
3 x 15
5 x 9

1, 3, 5, 9, 15, 45

(2)

18 Write down all the factors of 32

1 x 32
2 x 16
4 x 8

1, 2, 4, 8, 16, 32

(2)

19 Write down all the factors of 60

1 x 60
2 x 30
3 x 20
4 x 15
5 x 12
6 x 10

1, 2, 3, 4, 5, 6, 10, 12, 15, 20, 30, 60

(2)

20 Here are some fractions.

✓ ✓ ✓ ✗ ✓ ✓

$\frac{12}{36}$ $\frac{3}{9}$ $\frac{5}{15}$ $\frac{3}{10}$ $\frac{6}{18}$ $\frac{2}{6}$

Which of these fractions is not equivalent to $\frac{1}{3}$?

$\frac{3}{10}$

(2)

21 Here are some fractions.

$\frac{33}{44}$ $\frac{6}{8}$ $\frac{10}{15}$ $\frac{21}{28}$ $\frac{18}{24}$ $\frac{4}{6}$

Which of these fractions is not equivalent to $\frac{3}{4}$?

$\frac{10}{15}$ $\frac{4}{6}$

.....

(2)

22 Here are some fractions.

$\frac{8}{10}$ $\frac{18}{20}$ $\frac{40}{50}$ $\frac{12}{15}$ $\frac{80}{100}$ $\frac{5}{6}$

Which of these fractions is not equivalent to $\frac{4}{5}$?

$\frac{18}{20}$ $\frac{5}{6}$

.....

(2)

23 Here are some fractions.

$\frac{4}{10}$ $\frac{17}{30}$ $\frac{38}{45}$ $\frac{13}{15}$ $\frac{27}{30}$ $\frac{3}{4}$

Put them into order.

180th might be better choice of denominator

$\frac{36}{90}$ $\frac{51}{90}$ $\frac{76}{90}$ $\frac{78}{90}$ $\frac{81}{90}$ $\frac{67\frac{1}{2}}{90}$

$\frac{4}{10}$ $\frac{17}{30}$ $\frac{38}{45}$ $\frac{13}{15}$ $\frac{27}{30}$ $\frac{3}{4}$

$\frac{4}{10}$ $\frac{17}{30}$ $\frac{38}{45}$ $\frac{3}{4}$ $\frac{13}{15}$ $\frac{27}{30}$

.....

(3)

24 Here are some fractions.

$\frac{7}{10}$ $\frac{7}{15}$ $\frac{7}{45}$ $\frac{7}{25}$ $\frac{7}{20}$ $\frac{7}{4}$

Put them into order.

$\frac{7}{45}$ $\frac{7}{25}$ $\frac{7}{20}$ $\frac{7}{15}$ $\frac{7}{10}$ $\frac{7}{4}$

.....

(3)

25 Joe has some £10 notes and some £5 notes.

The notes have a total value of £350.

Joe has 11 £10 notes.

Work out the number of £5 notes Joe has.

$11 \times 10 = 110$

$350 - 110 = 240$

$240 \div 5 = 48$

48

.....

(3)

26 Bill has some £20 notes, some £10 notes and some £5 notes.

The notes have a total value of £450.

Bill has 13 £20 notes and 8 £5 notes.

Work out the number of £10 notes Bill has.

$13 \times 20 = 260$

$8 \times 5 = 40$

$450 - (260 + 40) = 150$

$150 \div 10 = 15$

15

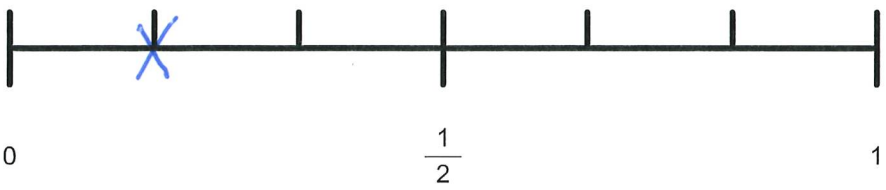
.....

(3)

27 Tilly has an ordinary fair dice.

She rolls it once.

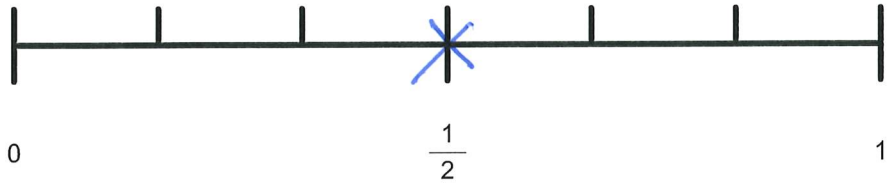
a) On the probability scale below, mark with a cross the probability that she throws the number 4.



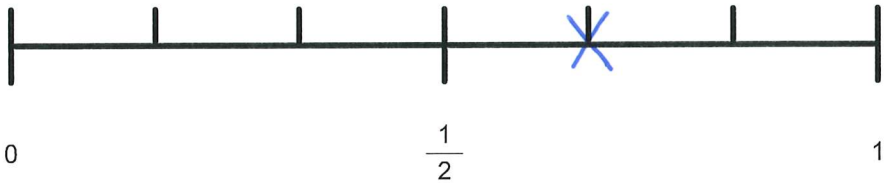
$\frac{1}{6}$

Could throw 1, 2 or 3. $\frac{3}{6}$

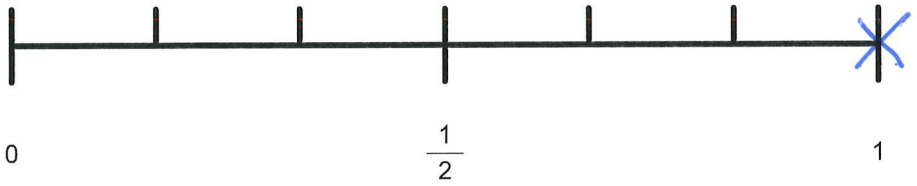
b) On the probability scale below, mark with a cross the probability that she throws a number less than 4.



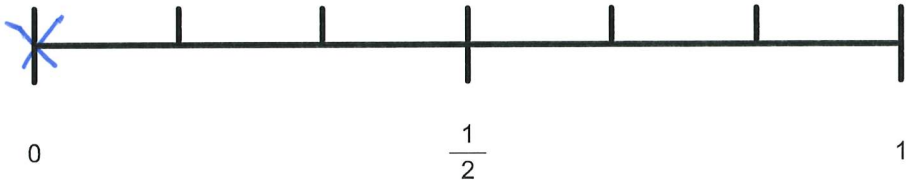
c) On the probability scale below, mark with a cross the probability that Tilly throws a number that is greater than 3 or even. 4, 5, 6 or 2 $\frac{4}{6}$



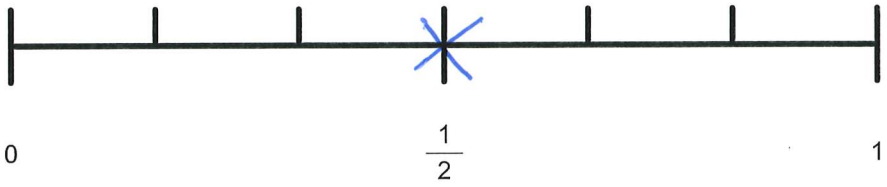
d) On the probability scale below, mark with a cross the probability that Tilly throws a number that is less than nine. certain



e) On the probability scale below, mark with a cross, the probability that Tilly throws a nine. Impossible



f) On the probability scale below, mark with a cross the probability of her throwing an even number. 2, 4, 6 $\frac{3}{6}$



(6)

28 Here is a menu.

Starter	Main Course
Prawn Cocktail (P)	Steak Pie and Chips (S)
Lentil Soup and Roll (L)	Vegetarian Lasagne (V)
Tomato Soup and Roll (T)	Beef, Potatoes, Peas and Carrots (B)
Yorkshire Pudding with Gravy (Y)	
Delicious Pancakes with Brown Sauce and Gravy (D)	

Gabby can choose one starter and one main course.

Write down all the possible combinations Gabby can choose.

PS PV PB YS YV YB
LS LV LB DS DV DB
TS TV TB

(2)

29 Jacob is 1.42m high. 1420 mm

Hayley's height is 154 cm. 1540 mm

Sarah is 1504 mm tall. 1504 mm

a) What is the range in heights?

Tallest 1540 mm
Shortest 1420 mm
Range = 1540 − 1420 = 120

120 mm

(2)

b) What is the mean average height?

$\frac{1420 + 1540 + 1504}{3} = \frac{4464}{3} = 1488$

1488 mm

(2)

c) Sonny joins the group.

The mean average height of the group alters to 150cm.

How tall is Sonny?

$\frac{1488 + 1488 + 1488 + Sonny = 1500}{4}$ ×4

×4 ↓

4464 + Sonny = 6000

Sonny = 6000 − 4464
= 1536

1536mm

(3)

30 The nth term in a sequence is given by $5n - 2$.

a) Work out the fourth term in the sequence.

$5(4) - 2 = 20 - 2$
$= 18$

18

(1)

Here is another sequence.

8 (+7) 15 (+7) 22 (+7) 29

b) What are the next two terms in this sequence?

36, 43

36, 43

(1)

c) Is 64 a number in this sequence?

You must give a reason for your answer.

nth term $= 7n + 1$

$64 = 7n + 1$ -1
$63 = 7n$ $\div 7$
$9 = n$

Yes, 64 is the 9th term

(2)

Here is another sequence.

$1 \quad 2a \quad 4a^2 \quad 8a^3$

(×2a) (×2a) (×2a)

d) What are the next two terms in this sequence?

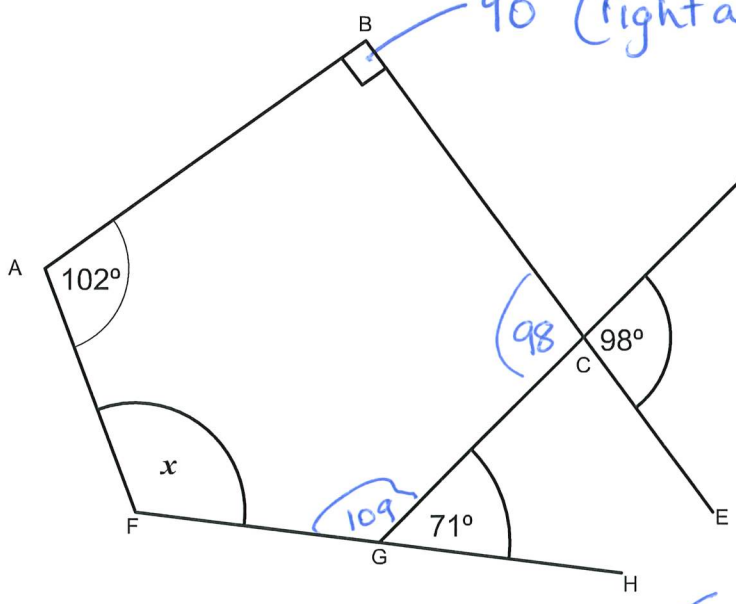
$16a^4$, $32a^5$

$16a^4$ $32a^5$

(2)

31 ABCGF is an irregular pentagon.

FGH, GCD and BCE are straight lines.



90° (right angle)

98

Find the size of angle x.

You must give reasons for your answer.

Must have all the explanations.

"Angle"

$\angle BCG = 98°$ (Vertically Opposite $\angle DCE$)

$\angle FGC = 180 - 71 = 109°$ (Ls on a straight line total 180°)

$\angle x = 540 - (109 + 98 + 90 + 102) = 540 - 399 = 141°$

Sum of interior angles in a pentagon

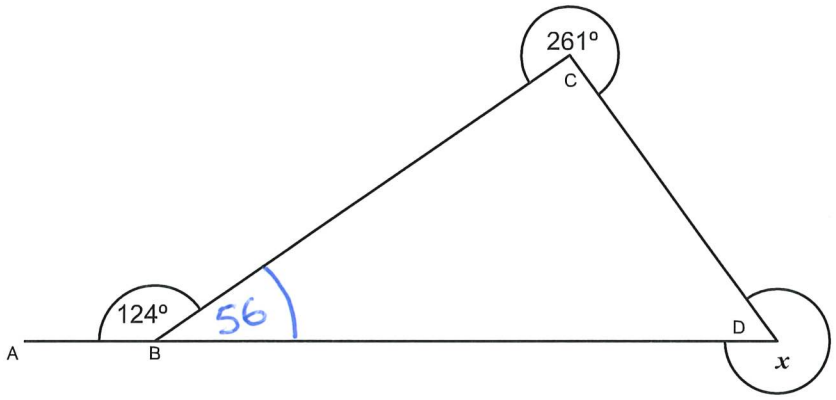
141°

.....

(5)

32 BCD is a triangle.

ABD is a straight line.



Find angle x.

You must give reasons for your answer.

$\angle CBD = 180 - 124 = 56°$ (Angles on a straight line total 180°)

$\angle BCD = 360 - 261 = 99°$ (Angles about a point total 360°)

$\angle CDB = 180 - (56 + 99) = 180 - 155 = 25$ (Ls in a Δ total 180°)

$\angle x = 360 - 25 = 335°$ (Angles about a point total 360°)

x = 335

(4)

33 There are 500 coins in a bag.

10% of the coins are 20p pieces.

15% of the coins are £1 coins.

35% of the coins are 2p pieces.

The rest of the coins are 10p pieces.

What is the total value of the coins in the bag?

10% of 500 = 50

15% of 500 = 75

35% of 500 = 175

50 × 20p = £10.00

75 × £1 = £75.00

175 × 2p = £3.50

100% − (10% + 15% + 35%) = 40%

40% of 500 = 200

200 × 10p = £20.00

20.00 + 75.00 + 10.00 + 3.50 = £108.50

£108.50

(5)

34 Bill put £250 in a bank account that paid 4.5% compound interest per annum.

Bill did not touch his account or the money in it for 15 years.

How much did Bill have in his account after 15 years?

$CI = PR^T$

$= 250 \times 1.045^{15}$

$= 483.8206108$

£483.82

(2)

35 Blake buys a house for £210,000.

Blake pays a deposit of 15% of the cost.

He pays the rest in 360 equal monthly instalments.

How much does he pay each month?

210000 × 15% = 31500

10% is 21,000
5% is 10 500

£178,500 left to pay.

210000 − 31500 = 178500

$360 \overline{)178500}$ = 495.83⅓

For all the ⅓p owing

£495.83 + £1.20 ....

(3)

36 a) Simplify $t^{14} \div t^{8}$

$t^{14-8} = t^{6}$

t^{6} ....

(1)

b) Simplify $(d^{3})^{4}$

$d^{3\times4} = d^{12}$

d^{12} ....

(1)

c) Simplify $q \times q^{7}$

$q^{1} \times q^{7} = q^{1+7} =$

q^{8} ....

(1)

d) Simplify $w + w + w + w^{3}$

$3w + w^{3}$

Not like terms!

$3w + w^{3}$ ....

(1)

37 a) Expand $x(4x^2 + 5p)$

	$4x^2$	$+5p$
x	$4x^3$	$+5px$

$4x^3 + 5px$

(1)

b) Expand $2f(4f^4g^5 + 5f)$

	$4f^4g^5$	$+5f$
$2f$	$8f^5g^5$	$+10f^2$

$8f^5g^5 + 10f^2$

(1)

c) Expand $(8x - 3)(4x - 2)$

	$8x$	-3
$4x$	$32x^2$	$-12x$
-2	$-16x$	$+6$

$32x^2 - 28x + 6$

(2)

d) Expand $(4x + 7)(3x - 2)$

	$4x$	$+7$
$3x$	$12x^2$	$+21x$
-2	$-8x$	-14

$12x^2 + 13x - 14$

(2)

e) Expand $(2x^2 + 5)(3x - 2)$

	$2x^2$	$+5$
$3x$	$6x^3$	$+15x$
-2	$-4x^2$	-10

$6x^3 + 11x - 10$

(2)

f) Expand $x^2(4x^3 - 3x)$

	$4x^3$	$-3x$
x^2	$4x^5$	$-3x^3$

$4x^5 - 3x^3$

(1)

38 a) Factorise $12x^2 - 8$

$3x^2 \quad -2$

$4 \mid 12x^2 \quad -8$

$4(3x^2 - 2)$

(1)

b) Factorise $24p^3q^2 + 9p^4q^5$

$8q \quad + \quad 3pq^3$

$3p^3q^2 \mid 24p^3q^2 + 9p^4q^5$

$3p^3q^2(8q + 3pq^3)$

(1)

c) Factorise $x^2 - 25$

Difference of two squares

$(x+5)(x-5)$

(2)

d) Factorise $16x^4 - 36$

Difference in two squares

$(4x^2 - 6)(4x^2 + 6)$

(2)

e) Factorise $8x^2y + 12xy^3$

$2x \quad + \quad 3y^2$

$4xy \mid 8x^2y + 12xy^3$

$4xy(2x + 3y^2)$

(2)

f) Factorise $15x^4y^6z^7 - 10x^3y^4z^8 + 25x^3y^4z^6$

$3xy^2z - 2z^2 \quad + 5$

$5x^3y^4z^6 \mid 15x^4y^6z^7 - 10x^3y^4z^8 + 25x^3y^4z^6$

~~$5x^3y^4z^6(15x$~~

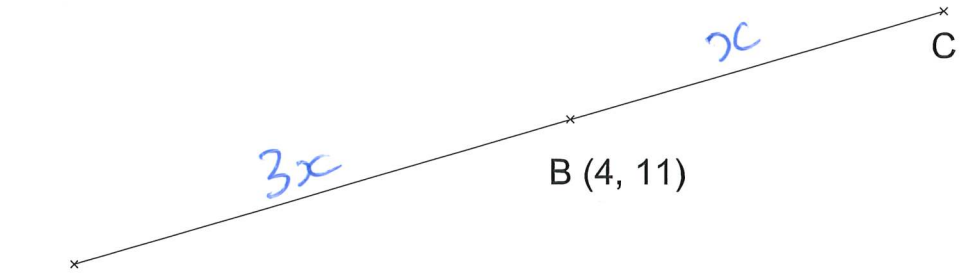
(2)

Take lowest x, y and z term from all terms in the question.

$5x^3y^4z^6(3xy^2z - 2z^2 + 5)$

Answer

39 ABC is a straight line.



Point A has the co-ordinates (-3,8)

Point B has the co-ordinates (4, 11)

$BC = \frac{1}{3}AB$

Find the coordinates of point C.

x : $\frac{4-(-3)}{3} = \frac{7}{3} = 2\frac{1}{3}$

y : $\frac{11-8}{3} = 1$

Point B $(4, 11)$

x : $4 + 2\frac{1}{3} = 6\frac{1}{3}$

y : $11 + 1 = 12$

$(6\frac{1}{3}, 12)$

(3)

40 A line segment runs from (-5,-3) to (12,-9).

Find the midpoint of the line.

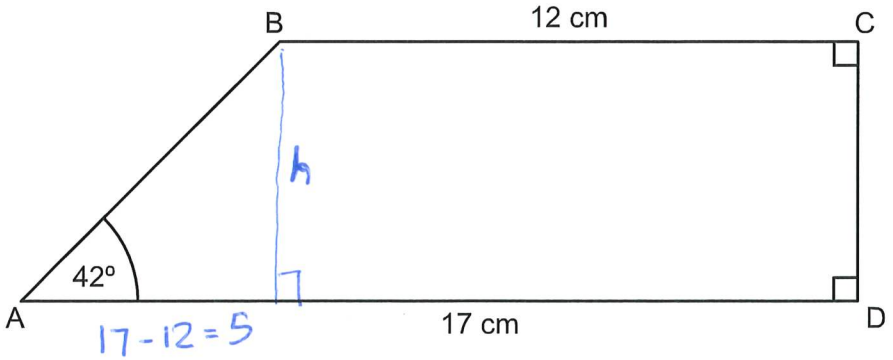
$x = \frac{-5+12}{2} = \frac{7}{2} = 3\frac{1}{2}$

$y = \frac{-3+-9}{2} = \frac{-12}{2} = -6$

$(3\frac{1}{2}, -6)$

(2)

41 The diagram below shows a trapezium ABCD.



$T = \frac{O}{A}$

$17 - 12 = 5$

a) Find the height of the trapezium.

$\tan 42° = \frac{h}{5}$

$\therefore h = 5 \tan 42$

$= 4.502020221$

Put this in memory on your calculator STO ⇒ A.

4.502020221 cm

(4)

b) Find the area of the trapezium.

$\text{Area} = \frac{1}{2}(a+b)h$

$= \frac{1}{2}(12+17) \times 4.502020221$

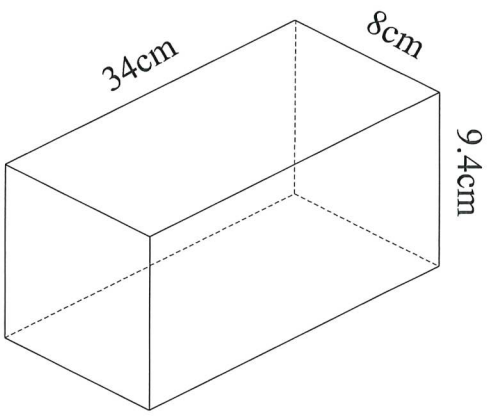
$= \frac{19}{2} \times 4.502020221$

$= 42.7691921$

42.7691921 cm^2

(2)

42 Below is a diagram of a 3D shape.



a) Name the shape in the diagram.

cuboid

(1)

b) How many edges does the shape have?

12

(1)

c) How many vertices does the shape have?

8

(1)

d) How many faces does the shape have?

6

(1)

e) What is the volume of the shape?

$V = l \times b \times h$

$= 34 \times 8 \times 9.4$

$= 2556.8$

$2556.8\ cm^3$

(3)

f) What is the surface area of the shape?

$V = 2((34 \times 8) + (8 \times 9.4) + (34 \times 9.4))$

$= 2(272 + 75.2 + 319.6)$

$= 2(666.8$

$= 1333.6$

1333.6 cm^2

(4)

g) What is the total length of the edges in the shape?

$4(8 + 34 + 9.4) = 4(51.4)$

$= 205.6$

205.6 cm

(2)

43 a) Use your calculator to work out the value of

$$\frac{51.4 - 3.1^2}{5.9 \times 6.7}$$

Give your answer as a decimal.

Write down all the figures on your calculator display.

1.057171768

(2)

b) Write your answer correct to 3 significant figures

1.057

↑ 5 or more rounds up

1.06

(1)

44 Estimate

$$\frac{32.73 \times 67.9 \times 425}{41.75 \times 64.3 \times 73.8}$$

$\approx \frac{30 \times 70 \times 400}{40 \times 60 \times 70}$

$= \frac{10}{2}$

$= 5$

5

(3)

44 Estimate

$\frac{\sqrt{123}}{8.9^2} \approx \frac{\sqrt{121}}{9^2} = \frac{11}{81}$

$\frac{11}{81}$

(2)

45 Billy performs a calculation on his calculator.

The first three digits on his calculator are 7.93 and then there are some more digits on his calculator.

Give the error interval of Billy's calculation.

Must be less than

$7.93 < x \leq 7.94$

(2)

46 Jane performs a different calculation on her calculator.

The first two digits showing on her calculator are 6.7.

Give the error interval of Jane's calculation.

$6.7 < x < 6.8$

(2)

47 Ted has rounded his number to the nearest tenth.

His answer is 8.9.

Write the error interval of Ted's number.

$8.85 \leq x \leq 8.95$

.....

(2)

48 Alice and Nancy both think of a number.

They round their numbers to the nearest 10.

Alice's number has been rounded to 30.

Nancy's number has been rounded to 70.

Give the error interval of the difference between Alice's and Nancy's actual numbers.

$25 \leq$ Alice < 35

$65 \leq$ Nancy < 75

$30 \leq d < 50$

.....

(2)

49 Beatrice and James both think of a number.

They round their numbers to the nearest 50.

Beatrice's number has been rounded to 300.

James' number has been rounded to 1850.

Give the error interval of the difference between their actual numbers.

$275 \leq$ Beatrice < 325

$1825 \leq$ James < 1875

$1500 \leq d < 1600$

.....

(2)

50 Solve algebraically the simultaneous equations

$4x + 7y = 11$ ___(i)

$5x - 4y = 52$ ___(ii)

Multiply (i) × 4, (ii) × 7

$16x + 28y = 44$ ___(iii)

$35x - 28y = 364$ ___(iv)

Add (iii) + (iv)

$51x = 408$

$\therefore x = \frac{408}{51}$

$= 8$

Substitute in (i)

$4x + 7y = 11$

$7y = 11 - 4x$

$7y = 11 - 4(8)$

$\therefore 7y = 11 - 32$

$\therefore 7y = -21$

$\therefore y = -3$

Check in (ii)

$5(8) - 4(-3) = 52$ ✓

$40 - (-12) = 52$

x= 8

y= -3

(3)

51 Solve algebraically the simultaneous equations

$$5x + 8y = 18 \quad \text{—(i)}$$

$$7x + 10y = 21 \quad \text{—(ii)}$$

Multiply (i) × 7, (ii) × 5

$$35x + 56y = 126 \quad \text{—(iii)}$$

$$35x + 50y = 105 \quad \text{—(iv)}$$

Subtract (iii) − (iv)

$$6y = 21$$

$$\therefore y = \frac{21}{6}$$

$$\therefore y = \frac{7}{2}$$

$$= 3\frac{1}{2}$$

Substitute in (i)

$$5x + 8(3\frac{1}{2}) = 18$$

$$5x + 28 = 18$$

$$\therefore 5x = 18 - 28$$

$$= -10$$

$$\therefore x = -2$$

Check in (ii)

$$7(-2) + 10(3\frac{1}{2}) = 21$$

$$-14 + 35 = 21$$

✓

x= -2

y= $3\frac{1}{2}$

(3)

52 Convert 783 into standard form

$a \times 10^n$

$1 \leq a < 10$ n is an integer (whole number)

7.83×10^2

(2)

53 Convert 93 822 into standard form

9.3822×10^4

(2)

54 Convert 83.982 into standard form

8.3982×10^1

(2)

55 Convert 0.0035 into standard form

3.5×10^{-3}

(2)

56 Write 7.36×10^4 in ordinary form

73,600

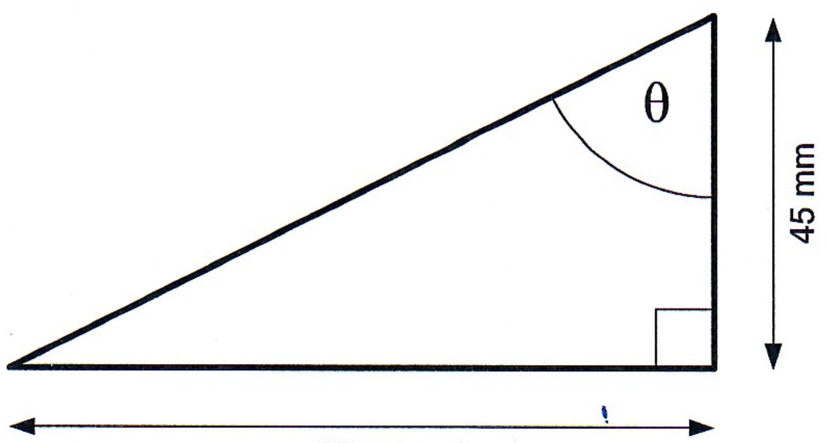
(2)

57 Write 9.656×10^{-3} in ordinary form

0.009656

(2)

58 Find the size of angle θ.



$\tan\theta = \frac{95}{45}$

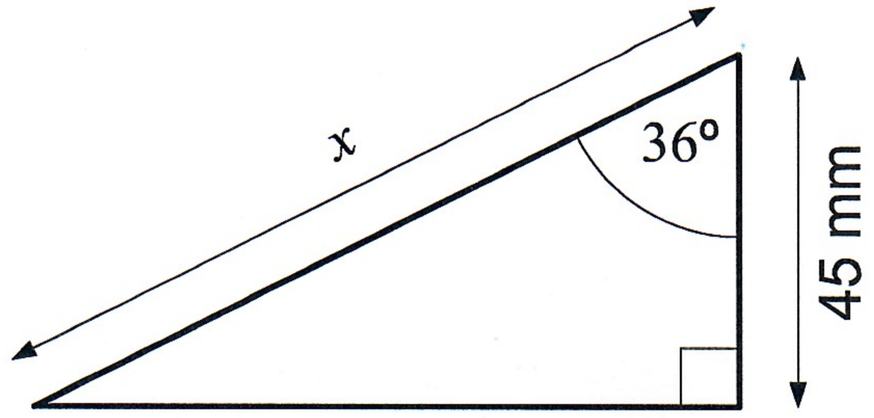
$\therefore \theta = \tan^{-1}\left(\frac{95}{45}\right)$

$= 64.65382406$

$64° 39' 13.767''$

(3)

59 Find the length of side x.



$\cos 36 = \frac{45}{x}$

$= 55.62305899$

$\therefore x = \frac{45}{\cos 36}$

55.62305899 mm

(3)

60 Write down the list of the first five prime numbers.

2, 3, 5, 7, 11

(5)