2018

11+

LATYMER UPPER SCHOOL
INDEPENDENT & CO-EDUCATIONAL

SAMPLE

Entrance Examination

MATHEMATICS

Time allowed: 60 minutes

Instructions

- Calculators are NOT allowed. You may use a ruler.
- Attempt all questions.
- If you cannot do a question, go on to the next one and try again later on.
- Do not ask the teacher to explain a question to you.
- If you finish before the end, check your answers and then wait quietly in your place.
- If you do not finish, or if you cannot understand all the questions, do not worry.

Section A

- You should spend about 20 minutes on this section. Each question is worth 1 mark. There are **20** marks for section A.
- Each question is provided with FIVE possible answers, only ONE answer is correct.
- Write the **letter** for the correct answer in the box on the right
- If you make a mistake, rub it out and try again.

Section B

- You should spend about 40 minutes on this section. Marks for each question are shown in square brackets after the question. There are **40** marks for section B
- Write your answers **and working** in the spaces provided. **DO NOT** use extra paper.

Section A

1. What is 483 + 58?

A: 431 B: 441 C: 531 D: 541 E: 551

2. Subtract 108 from 525.

A: 327 B: 417 C: 407 D: 427 E: 633

3. What is 55×160?

A: 8055 B: 8000 C: 8800 D: 9800 E: 8400

4. Jenny divides 344 by 9. What remainder should she get?

$$9 \overline{)\,344} = 38 \text{ r } 2$$

A: 6 B: 5 C: 4 D: 3 E: 2

5. What is 912÷16?

A: 58 B: 57 C: 56 D: 54 E: 52

6. Work out three eighths of 264.

A: 61 B: 88 C: 96 D: 99 E: 108

7. Which digit should replace the * below?

$$\begin{array}{r} *\,5\,7 \\ -\;2\,8\,3 \\ \hline 4\,7\,4 \end{array}$$

A: 1 B: 2 C: 4 D: 6 E: 7

8. 60% of a number is 240. What is the number?

$60x = 240$

$x = 400$

A: 60 B: 144 C: 240 D: 300 E: 400

9. Which of the following gives the largest answer?

A: 15×16 240 B: 12×20 240 C: 27×9 243 D: 22×11 242 E: 23×10 230

10. Kofi leaves for the shops at 11:23am and returns 2 hours 48 minutes later. At what time does he return?

11:23 + 3 hrs = 2:23 pm

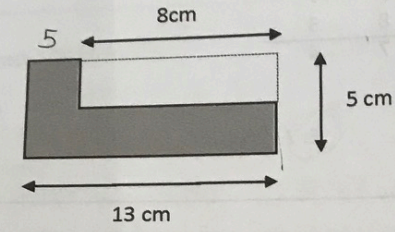
− 12 mins 2:11

A: 1:01pm B: 1:11pm C: 2:10pm D: 2:01pm E: 2:11pm

11. Work out: $\frac{2}{5} - \frac{1}{3}$

A: $\frac{1}{2}$ B: $\frac{3}{8}$ C: $\frac{3}{15}$ D: $\frac{1}{8}$ E: $\frac{1}{15}$

12. What is the perimeter of the shape below? **[Diagram not to scale]**



13 + 5
+13 + 5

A: 36cm B: 29cm C: 26cm D: 18cm E: More information needed

13. I buy 4 Mega Bars at 65 pence each and 3 Star Bars at 83 pence each. How much change do I get from £10?

10 - 4(.65) - 3(.83)

A: £4.91 B: £5.09 C: £5.91 D: £5.19 E: £4.81

14. Two **positive** whole numbers add together to make 23. What is the smallest possible answer when the two numbers are multiplied together?

23 = 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23

Look at answers before trying options

x + y = 23
2x y = ?

1, 22
2, 21
3, 20
4, 19
5, 18
6, 17
7, 16
8, 15
9, 14
10, 13
11, 12

A: 132 B: 1 C: 42 D: 22 E: 23

Repeats now

1 x 23 (not pass)

15. Half of a number is 8 bigger than three sevenths of the number. What's the number?

$\frac{1}{2}x = \frac{3}{7}x + 8$

$\frac{1}{14}x = 8$ $x = 112$

A: 140 B: 126 C: 119 D: 112 E: 98

16. Dave and Eddie are cycling around a track. Dave completes a lap every 30 seconds, and Eddie completes a lap every 25 seconds. How many laps will Eddie complete in the time it takes Dave to complete 15 laps?

D: 1 lap = 30 sec 15 laps = 450 seconds
E: 1 lap = 25 sec
$\frac{450}{25} = 18$

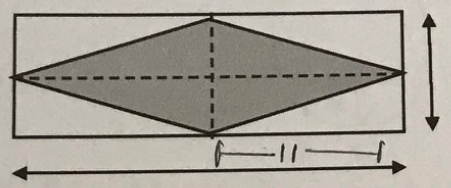
A: 15 B: 16 C: 18 D: 20 E: 25

17. The total of five **different, positive** odd numbers is 85. What's the most that the largest number could be?

try answers first - too many options
1 + 3 + 5 + 7 + 69 (start with biggest)

A: 69 B: 35 C: 25 D: 21 E: 17

18. What is the area of the shaded diamond below? [**Diagram not to scale**]



kite:
or $\frac{1}{2}(22 \times 12) = 132$

$\left[\frac{1}{2}(11)(12)\right]2$

A: 34 cm² B: 264 cm² C: 198 cm² D: 132 cm² E: 66 cm²

19. How many different ways are there of paying exactly 15p using 1p and/or 2p pieces?

1	2
15	0
13	1
11	2
9	3
7	4
5	5
4	6
3	7

A: 2 B: 3 C: 7 D: 8 E: 15

20. I'm thinking of two numbers, one of which is three times as big as the other. When I double one of my numbers and then add it to the other I get 140. Which of the following cannot possibly be one of my numbers?

(a) $x = 3y$ or (b) $y = 3x$
(1) $2x + y = 140$ or (2) $y + 2x = 140$

A: 20 ✓ B: 28 ✓ C: 50 D: 60 ✓ E: 84 ✓

(1)(a) $6y + y = 140$ $7y = 140 \Rightarrow y = 20,\ x = 60$
(b) or $2x + 3x = 140 \Rightarrow 5x = 140 \Rightarrow x = 28,\ y = 84$
(2)(a) $y + 6y = 140 \Rightarrow 7y = 140 \Rightarrow y = 20,\ x = 60$
(b) or $3x + 2x = 140 \Rightarrow 5x = 140 \Rightarrow x = 28,\ y = 84$

Section B

21. Complete the missing numbers in each of the number sequences below:

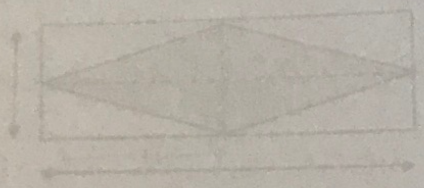
a) 28, 25, 22, 19, 16, 13, 10.

−3

[1 mark]

b) 3, 4, 6, 9, 13, 18, 24, 31

+1, +2, +3, +4, +5, +6



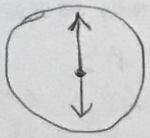
[1 mark]

c) 5, -10, 20, -40, 80, -160, 320

×(−2)

[1 mark]

22. a) What is the angle between the hour and minute hands of a clock at 6.00pm?

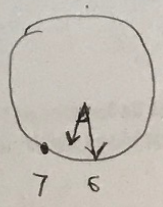


Answer: 180° [1 mark]

b) What is the angle between the hour and minute hands of a clock at 6.30pm? [Draw a picture to help]

Way ①
Formula:

$$\left|6M - \left(30H + \frac{M}{2}\right)\right|$$



$$\left|6(30) - \left(30(6) + \frac{30}{2}\right)\right| = 15°$$

Way ② easier
hour hand moves from 6
$\frac{1}{2}(30°) = 15°$

Answer: 15° [2 marks]

c) At what time between 6pm and 6.30pm will the hour and minute hands be exactly 125° apart?

t = time hours

Use formula:

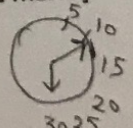
Minute Hand = Starting angle (minute hand) + $360t$ = M
($360t$ covers 360° per hr)

Hour Hand: Starting angle (hour hand) + $30t$ = H
($30t$ covers 30° per hour)

Angle = H − M = $(180 + 30t) - (0 + 360t)$

Answer: 6:10 [2 marks]

Check:



$30(4) + \frac{1}{6}(30) = 125$

So $180 - 330t = 125$

$-330t = -55$

$t = \frac{1}{6}$ $\frac{1}{6}$th hour = 10 mins ie. 6:10

23. a) What is the remainder when 247 is divided by 7?

$7\overline{)247}$ = 35 r2

[1 mark]

Answer: 2

b) Work out 23×438. Show all your working.

Answer: 10074 [2 marks]

c) Put the following list of fractions in order, starting with the smallest:

$\frac{5}{7}$ .714 $\frac{19}{28}$ .679 $\frac{27}{35}$ .7714 $\frac{9}{14}$ .643

$\frac{25}{35}$ $\frac{18}{28}$

So $\frac{5}{7} < \frac{27}{35}$ and $\frac{9}{14} < \frac{19}{28}$

Answer: $\frac{9}{14}, \frac{19}{28}, \frac{5}{7}, \frac{27}{35}$ [3 marks]

compare $\frac{19}{28}$ $<$ $\frac{5}{7}$ $\frac{20}{28}$

compare $\frac{9}{14}$ $<$ $\frac{19}{28}$ $\frac{18}{28}$

24. For each part of this question you should try to find all the possible answers.

a) Three different positive odd numbers add up to 15. What could the three numbers be?

1, 3, 5, 7, 9, 11, ~~13~~, ~~15~~

still need 2 more

1 : 14
3, 11 / 5, 9

3 : 12
~~11~~ / 5, 7,

5 : 10
~~9~~ / ~~3~~ 7

7 : 8
~~3~~ 5 /

9 : 6
~~5~~,

11 : 4
~~3~~

1, 3, 11
1, 5, 9
3, 5, 7

(3 options) [2 marks]

b) Jenny has two younger brothers. The total of all three of their ages is 15, and Jenny's brothers are both an even number of years old. What could the ages of Jenny and her brothers be?

Jenny = 9 or 11 or 7
Brothers = 2, 4 2, 2 2, 6

Ans. 9, 2, 4
11, 2, 2
7, 2, 6
7, 4, 4

15, 0 X
14, 1 X
13, 2 X
12, 3 X
~~11~~, 4 → 2, 2
10, 5 X
9, 6 → 2, 4
8, 7 X
7, 8 → 7, 2, 6 / 7, 4, 4
6, 9 X
5, 10 X

2, 2, 11
3, 4, 9
2, 6, 7
4, 4, 7

4 options [2 marks]

25. The diagram below shows part of a train timetable:

Operator	GW	GW	SW ★	GW	GW	SW ★	GW	SW H★	SW ★	GW	SW H★	SW ★	SW ★
Notes													
Reading d	0434	0524	0539	0554	0606	0609	0634		0639	0704		0709	0721
Earley d	|	|	0544	|	|	0614	|		0644	|		0714	|
Winnersh Triangle d	|	|	0546	|	|	0616	|		0646	|		0716	|
Winnersh d	|	|	0548	|	|	0618	|		0648	|		0718	|
Wokingham → d	0443a	0533a	0553	0603a	0615a	0623	0643a		0653	0712a			0723	0730
Bracknell d	|	|	0559	|	|	0629	|		0659	|		0729	0736
Martins Heron d	|	|	0602	|	|	0632	|		0702	|		0732	0739
Ascot d	|	|	0607	|	|	0637	|	0656	0707	|	0726	0737	0744
Sunningdale d	|	|	0610	|	|	0640	|	0659	0710	|	0729	0740	0747
Longcross d	|	|	|	|	|	|	|	|	|	|	|	|	|
Virginia Water a	|	|	0619	|	|	0649	|	0708	0719	|	0738	|	0755
Egham a	|	|	0623	|	|	0653	|	0712	0723	|	0742	0750	0758
Staines a	|	|	0628	|	|	0658	|	0717	0728	|	0747	0755	0804
Ashford a	|	|	*0636b*	|	|	*0711b*	|	0721	*0741b*	|	0751	*0811b*	|
Feltham a	|	|	0635	|	|	0705	|	0725	0735	|	0755	0802	0811
Hounslow a	|	|	*0646c*	|	|	|	|	*0737c*	|	|	|	*0812c*	|
Twickenham a	|	|	0640	|	|	0710	|	0733	0740	|	0803	0809	0817
Richmond a	|	→	0645	|	|	0715	|	0737	0745	|	0807	0813	0823
Putney a	|	|	0651	|	|	0721	|	*0759e*	*0804e*	|	|	*0829e*	*0834e*
Clapham Junction a	|	|	0656	|	|	0726	|	0746	0753	|	0816	0822	0832
Vauxhall a	|	|	*0711h*	|	|	*0741h*	|	0752	*0811h*	|	0822	|	0838
London Waterloo a	|	|	0707	|	|	0737	|	0759	0806	|	0829	0836	0846

a) How long does the 0548 from Winnersh take to reach London Waterloo?

5:48 → 7:07

Answer: 1 hour 19 mins [1 mark]

b) How long does the fastest train take to travel from Wokingham to Richmond?

5:53 to 6:45 (52 mins)
6:18 to 7:15 (57 mins)
6:53 to 7:45 (52 mins)
7:23 to 8:13 (50 mins)
7:30 to 8:23 (53 mins)

Answer: 50 mins [2 marks]

c) Bob lives in Earley, and needs to be in Waterloo before 8.30am for work. If it takes him 8 minutes to walk from his house to Earley station, what's the latest time he can leave the house?

5:44 to 7:07
6:14 to 7:37 leave 6:06
6:44 to 8:06 leave 6:36
7:14 to 8:36 leave 7:06

Answer: 06:36 [2 marks]

26. a) Tommy thinks of a number. When he doubles the number and then subtracts 11, he gets the answer 17. What was his number?

$2x - 11 = 17$
$x = 14$

Answer: 14 [1 mark]

b) Lilly thinks of a number. When she takes away 11 from the number and then doubles the answer, she gets 82. What was her number?

$2(x - 11) = 82$
$2x = 104$
$x = 52$

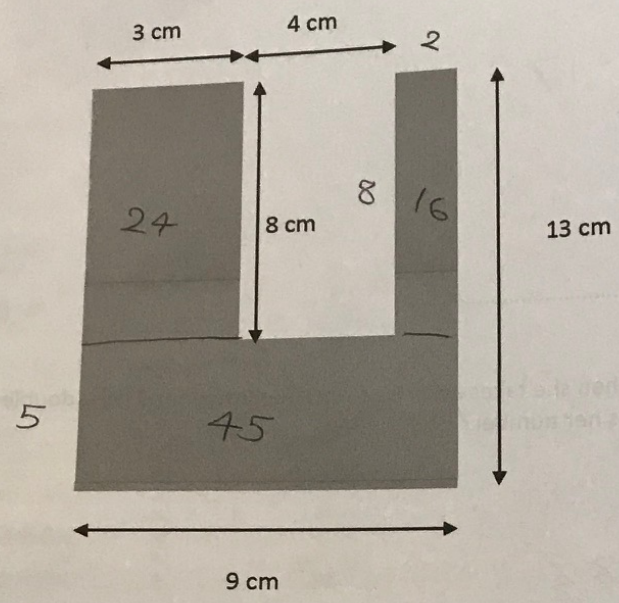
Answer: 52 [1 mark]

c) I'm thinking of a number. When I subtract the number from 45, I get the same answer as when I double the number. What's my number?

$45 - x = 2x$
$45 = 3x$

Answer: 15 [2 marks]

27. What is the area of the shape below?



(Diagram not to scale)

85

Answer: 85 [3 marks]

28. Imran notices that when he takes the digits of the number 652 and multiplies them together he g
60.

a) How many three digit numbers are there whose digits multiply to give 60? Write down all the ones you can find.

2 x 5 x 6 ✓

4 x 3 x 5

60
11
2 x 30
11
3 x 10
11
2 x 5

1, 2, 3, 4, 5, 6, 7, 8, 9

Need single digits

652
625
562
265
526
256

543
453
435
534

354
345

$2^2 \times 3 \times 5$

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

$4 \times 3 \times 5$

$6 \times 2 \times 5$

12

Answer:.....

[2 marks]

b) What's the biggest three digit number whose digits multiply together to give 40?

xyz

xyz = 40
11
8 x 1 x 5 → use ,
↓
biggest number into 40 first

40
11
2 x 20
11
2 x 10
11
2 x 5

$40 = 2^3 \times 5$

$= 2 \times 2 \times 2 \times 5$

$= 8 \times 5$

for 1st number

Answer: 851

[2 marks]

c) Imran says he has found a three digit number whose digits multiply together to give 65. Explain carefully why he must be wrong.

xyz = 65
11
5 x 13
1 x 65
11
5 x 13

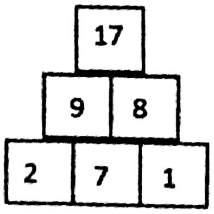
} only factors, can't be broken down into 3 single digit numbers

[1 mark]

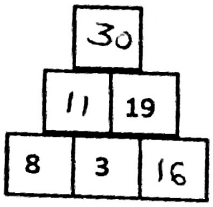
1 x 5 x 13 → all options don't give 3 single digits

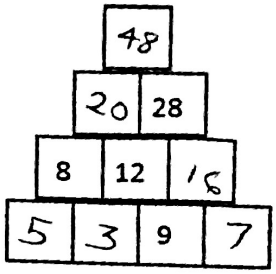
> 9
so 2 digit

29. The diagram below is made using the following rule: the number in each square is the total of the numbers in the two squares below it:



a) Complete the diagrams below using the same rule.

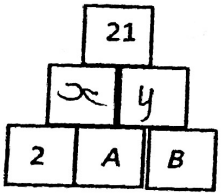




[3 marks]

b) The same rules are used in the diagram below. Also:

- *A* and *B* are positive, whole numbers
- *A* is bigger than *B*



What are the possible values of *A* and *B*?

eg of 1: 21 / 3 18 / 2 1 17

Ans.

A, B: 1,17 X; 2,15 X; 3,13 X; 4,11 X; 5,9 X

A < B

A > B: 6,7 / 7,5 / 8,3 / 9,1 → 4 options

$$\begin{cases} 2 + A = x \\ A + B = y \end{cases}$$

$x + y = 21$

can't add to get 2

to get A: $2 + A = x$

$A + B = y$

x	y
1,	20
2,	19
3,	18
4,	17
5,	16
6,	15
7,	14
8,	13

A	B	x	y
X	X	9,	12
X	X	10,	11
1	17	11,	10
2	15	12,	9
3	13	13,	8
4	11	14,	7
5	9	15,	6
6	7	16,	5
7	5	17,	4
8	3	18,	3
9	1	19,	2
X	X	20,	1

$A + B = y$

A	B
7	5
8	3
9	1
X	X

would be neg + 1 on bottom

$A + B = y$

x	y	A	B
18,	3	16	X
19,	2	17	X
20,	1	18	X

$A + B = y$

Adding

$x + y = 2A + B + 2$

So $2A + B + 2 = 21$

$2A + B = 19$

$A + B = y$

[2 marks]