



SECTION 1

INSTRUCTIONS TO CANDIDATES

Please read this page carefully, but do not open the question paper until you are told that you may do so.

This paper is Section 1 of 2. Your supervisor will collect this question paper and answer sheet before giving out Section 2.

A separate answer sheet is provided for this section. Please check you have one. You also require a soft pencil and an eraser.

Please complete the answer sheet with your:

- TSA candidate number
- Centre number
- Date of birth
- Name

Speed as well as accuracy is important in this section. **Work quickly, or you may not finish the paper.** There are no penalties for incorrect responses, only marks for correct answers, so you should attempt **all** 50 questions. Each question is worth one mark.

Answer on the sheet provided. Questions ask you to show your choice between five options. Choose the one option you consider correct and record your choice on the separate answer sheet. If you make a mistake, erase thoroughly and try again.

You **must** complete the answer sheet within the time limit.

You can use the question paper for rough working or notes, but **no extra paper** is allowed.

Calculators are NOT permitted.



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This paper consists of 32 printed pages and 4 blank pages.



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- 1 It may seem like we're living in the age of the conspiracy theory, but 'alternative facts' have been around since long before conspiracy theorists claimed the 1969 moon landing was faked by a movie production crew. The truth is that society could be much smarter in how it addresses the popularity of such theories. While it may sound counter-intuitive, it's actually not all that useful to directly challenge someone's belief in a conspiracy theory. That sort of intervention just tends to reinforce existing beliefs. More effective strategies focus on how information is delivered by scientists and other authorities and on developing open communication between the public and those providing 'official' or 'expert' information. Finally, it's critical not to simply dismiss conspiracy theories as trivial nonsense, as they can reveal much about levels of trust, equality, and other key components of a functioning society.

Which one of the following best expresses the main conclusion of the above argument?

- A Society could be much smarter in how it addresses the popularity of conspiracy theories.
 - B It's not all that useful to directly challenge someone's belief in a conspiracy theory.
 - C Challenging someone's belief in a conspiracy theory just tends to reinforce it.
 - D Better strategies for dealing with conspiracy theories focus on authorities' information delivery and communication with the public.
 - E It's critical not to simply dismiss conspiracy theories as trivial nonsense.
- 2 The table shows the number of cold drinks sold, per hour, yesterday at a 24-hour service station.

	<i>cold drinks</i>
day time (15 hours)	18
night time (9 hours)	12

The service station also sells hot drinks. One-third fewer hot drinks were sold per hour than cold drinks, regardless of the time of day.

How many drinks in total were sold yesterday?

- A 252
- B 378
- C 450
- D 630
- E 720

- 3** Religious believers often try to convince others to act morally by offering the reward of some kind of 'heaven'. But this approach misunderstands the nature of morality. We should do the right thing because it is the right thing, not because of selfish desires about the consequences. Ethics is a matter of virtuous character, not seeking rewards and avoiding punishments. For instance, if you believe it is right to pray daily then you should do so even if it will not get you into heaven.

Which one of the following best illustrates the principle used in the above argument?

- A** You should not jump queues even if you are in a rush to get somewhere.
- B** You should be honest about your friend's new outfit even if you might offend them.
- C** You should not steal from an organisation even if you believe that it is corrupt.
- D** You should not give to charity just to avoid feeling guilty.
- E** You should return lost property even if the owner is not offering any compensation.

- 4** When we are walking our centre of mass is constantly moving up and down. If we are wearing a backpack then this also moves up and down as we walk. A new prototype has been developed in which the backpack is suspended on sliding rails that allow it to move more smoothly. It is attached to a pair of rubber ropes on a pulley system which acts like a car's suspension to reduce the impact of the pack as you walk, making it easier to carry. Additionally, the relative movement between the pack and the body is used to power a small generator that converts the mechanical power into electricity. Although these features will increase the price of the product, this backpack is likely to become one of the most popular on the market.

Which one of the following is an underlying assumption of the above argument?

- A** Cars that have better suspension systems tend to be more popular than other models.
- B** People carrying this new type of backpack will be able to use the electricity as it is generated.
- C** The most important feature of a backpack is the ease with which it can be carried.
- D** Current devices that can generate electricity as you walk do not create as much electricity as the new backpack will.
- E** Consumers will consider the benefits of the new backpack design to be worth the increase in price.

- 5** Unfortunately, in recent years, teachers in the UK have ‘gone soft’ and no longer have the right priorities. Most schools these days are concerned with children’s happiness, confidence and self-expression rather than maximising academic achievement. We should reverse this trend and re-introduce more traditional teaching methods (such as those focused on memorisation) in all schools. After all, the purpose of teaching is to develop children’s learning, and discipline and good exam results can get you into a top university and ensure a high-paying career later in life. Traditional methods are tried-and-tested, so they are the best way of ensuring good academic outcomes for children.

Which one of the following, if true, most weakens the above argument?

- A** Some private schools have maintained a focus on traditional teaching methods despite changes in attitudes among education professionals.
 - B** Traditional teaching methods involve the use of strict punishment in schools to improve discipline, which some parents dislike.
 - C** Modern technology has increased the range of teaching methods available.
 - D** Careers have changed significantly over time and now require a wider range of skills than those represented by academic achievement.
 - E** As part of a pilot programme, some schools have started allowing students to opt out of homework in order to provide a better ‘work–life balance’.
- 6** The 4-digit PIN of my bank card has been set so that the first two digits and the last two digits both separately add up to 11.

The first digit is odd and the last digit in the PIN is the smallest of the four. All four digits are different, and no two digits in the PIN are numerically consecutive with each other. So, for example, if the PIN contains the digit ‘6’ then it cannot contain either the digits ‘5’ or ‘7’.

What is the first digit of my PIN?

- A** 1
- B** 3
- C** 5
- D** 7
- E** 9

- 7 Jarold weighs 60 kg. He decides to start a daily exercise regime of fast walking for 10 minutes, slow cycling for 20 minutes and slow swimming for 20 minutes.

The table below shows the rate at which calories are used up, per 30 minutes of exercise, by people of different weights.

	<i>50 kg</i>	<i>55 kg</i>	<i>60 kg</i>	<i>65 kg</i>
slow cycling	160	170	180	190
fast cycling	190	210	230	240
slow swimming	190	200	210	220
fast swimming	220	250	280	295
slow walking	50	55	60	75
fast walking	100	110	120	150

How many calories will Jarold use during exercise on the first day of this regime?

- A 170 calories
- B 190 calories
- C 300 calories
- D 340 calories
- E 510 calories

- 8 As I waited for a train yesterday I was puzzled when I noticed the digital clock on the platform change from

15:25

to

15:36

but then a minute later it changed to

15:34

And then, after another minute, it changed to

15:3E

I realised that the last digit was not displaying properly.

What was wrong with the last digit?

- A One element was permanently on and one element was permanently off.
- B One element was permanently on and two elements were permanently off.
- C Two elements were permanently on and one element was permanently off.
- D Two elements were permanently on and two elements were permanently off.
- E Three elements were permanently on and one element was permanently off.

- 9** Researchers believe that shortened sleep, and shortened rapid eye movement (REM) sleep in particular, contributes to a shorter lifespan. For every 5% reduction in REM sleep, mortality rates increase by 13% to 17% among older and middle-aged adults, they report. But is there really a connection? A study comparing the sleeping patterns of men and women from 28 different countries using fitness trackers has shown that Japan is the country that sleeps the least. Japanese men and women sleep only an average of 6 hours and 30 minutes, and 6 hours and 40 minutes, respectively. Yet Japanese women have a life expectancy of 87.3 years – the second highest in the world after Hong Kong – while male life expectancy in Japan is the third highest internationally. What this shows is that shortened sleep does not, in fact, contribute to a shorter lifespan.

Which one of the following best illustrates the flaw in the above argument?

- A** Health problems that shorten people’s lifespans might also interfere with their sleep in old age.
 - B** The proportion of sleep that is REM sleep might decrease with age.
 - C** The length of time that the Japanese sleep might be gradually increasing.
 - D** Japanese life expectancy might now be falling to a level closer to the global average.
 - E** The life expectancy of Japanese people might be even longer if they slept for longer.
- 10** Every participant in the cross-country race received either a trophy for finishing in the top ten, or a medal for participating. Amy finished in twelfth place, which means she will have been awarded a medal for participating.

Which one of the following most closely parallels the reasoning used in the above argument?

- A** The school can take in one hundred more pupils next year if they build more classrooms. They have not received approval for the building work, so they will not be able to increase their pupil intake.
- B** The shopkeeper can keep her store open on the weekends if she hires people who can work weekend shifts. It is Sunday and the store is open, so she must have hired new employees.
- C** Whenever Cara and her family visit the zoo they have an ice cream at the outdoor café or – if it’s raining – visit the butterfly house. It wasn’t raining when they went yesterday, so they must have had an ice cream at the café.
- D** If fireworks continue to be sold illegally, hospitals can expect a spike in fire-related injuries during the holiday season. There was a decrease in hospital admissions due to such injuries this year, so the efforts to crack down on illegal fireworks must be succeeding.
- E** There is only enough space left in the moving van for an armchair or a side table. The armchair has some sentimental value to Peter, so the side table will be left behind.

- 11** It is widely claimed that ancient stone circles were designed as astronomical observatories – that the stones were laid out to create sightlines to various celestial objects. While it seems clear that solar and lunar alignments were important in the layout of many circles, there are problems when it comes to the stars. Many stones are missing or have toppled over and it is extremely difficult to fix their original position. Further, the position of the stars in relation to each other is constantly changing. Using the laws of physics, we can recreate a map of the heavens for any period in the past. But to draw conclusions about the orientation of any sightline, we have to know exactly when the stones were erected. Unfortunately, none of the dating methods used, including radiocarbon dating, is accurate enough for that. Finally, there are hundreds of combinations of stones at any site that produce sightlines.

Which one of the following can be drawn as a conclusion from the above passage?

- A** The builders of the stone circles knew less about the stars than modern humans.
 - B** Better dating methods would let us determine the importance of sightlines.
 - C** Ancient astronomical observations made using stone circles were inaccurate.
 - D** It is unclear whether the stars were important in the layout of stone circles.
 - E** The sun and moon were more important to ancient humans than the stars.
- 12** David set out at 09:00 on a 10 km path up a hill, walking at 3 km/hour. Andrew set out from the top of the hill one hour later, walking the same path in the opposite direction, at 4 km/hour.

How far apart will David and Andrew be 1 hour after they pass each other?

- A** 1 km
- B** 3 km
- C** 4 km
- D** 6 km
- E** 7 km

- 13 Juan needs to buy some boxes to store his collection of badges. The types of box that are available from his local shop are shown in the table below.

<i>box material</i>	<i>length (cm)</i>	<i>width (cm)</i>	<i>depth (cm)</i>	<i>capacity (cm³)</i>	<i>price (\$)</i>
plastic	30	8	2	450	12
plastic	20	6	4	450	13
wood	20	10	3	500	15
wood	30	5	4	550	18
wood	20	10	4	600	22

Juan wants two different boxes with a combined capacity of at least 1000 cm³. He also wants to make sure that neither box has any side longer than 25 cm.

What is the least that Juan can pay for the boxes?

- A \$28
 - B \$30
 - C \$31
 - D \$34
 - E \$35
- 14 Dan wants to buy 12 kg of rock salt to help keep his driveway clear of ice during the winter. He has looked online and found four different offers on the recommended retail price of a 1 kg bag.
- 1 Store 1 has 30% off the price of a 1 kg bag.
 - 2 Store 2 has buy one and get one at half price.
 - 3 Store 3 has buy two and get one free.
 - 4 Store 4 has one third extra for same price as a 1 kg bag.

Which pair of offers works out to be the same price per kg?

- A 1 and 2
- B 1 and 4
- C 2 and 3
- D 2 and 4
- E 3 and 4

- 15** A cataract is a clouding of the lens inside the eye, which results in decreased vision and eventually blindness. Approximately half of all cases of blindness globally are cataract-related. Cataracts often lead to social exclusion, unemployment, depression and lower life expectancy. Treatment by surgical replacement of the affected lens offers great value for the immense benefits it brings not only to the individual but also to society as a whole. Cataract surgery is usually quite quick, does not require large, big-budget equipment or an overnight stay in hospital, and has a more than 90 per cent success rate. This medical intervention is relatively inexpensive and straightforward if the necessary infrastructure and expertise are in place.

Which one of the following best expresses the main conclusion of the above argument?

- A** Approximately half of all cases of blindness globally are cataract-related.
 - B** Cataracts often lead to social exclusion, unemployment, depression and lower life expectancy.
 - C** Surgical cataract treatment offers great value for the immense benefits it brings not only to the individual but also to society as a whole.
 - D** Cataract surgery is usually quite quick, does not require large, big-budget equipment or an overnight stay in hospital, and has a more than 90 per cent success rate.
 - E** Cataract surgery is relatively inexpensive and straightforward if the necessary infrastructure and expertise are in place.
- 16** Stora Karlsö is a Swedish island that is now set aside for wildlife conservation and is uninhabited by people except for the presence of 'day-trippers', who visit for only a few hours at a time. The population of murre seabirds there declined in the past because of people hunting them and collecting their eggs, but started to recover once these activities were banned. During one recent summer, Stora Karlsö was closed to the tourists, and scientists monitoring the island made a surprising discovery. The percentage of eggs hatched by the murrelets dropped by 26% as dozens more white-tailed eagles flocked to the island. It turns out that the eagles were encouraged by the lack of human visitors, while the murrelets were scared away from their nests by the influx of the larger birds.

Which one of the following can be drawn as a conclusion from the above passage?

- A** Focusing the efforts of a nature reserve on one particular species is not always an effective conservation strategy.
- B** The presence of people has a beneficial effect on wildlife species' populations in some cases.
- C** Some kinds of bird species are less of a conservation priority than others.
- D** Limiting certain kinds of human activity is the fastest approach to increasing the population of a wildlife species.
- E** It is not always possible to conserve every species in some kinds of ecosystems.

- 17 Calling a colleague 'immature' is not unlawful if they are behaving in a genuinely childish manner, a tribunal has ruled. In a recent case an employee sued the director of the company where he worked for age discrimination. However, the director successfully argued that her calling the employee 'immature' was prompted by his abrasive manner and inability to lead a team, rather than his relatively young age. The tribunal dismissed the claims of discrimination, so directors of companies should not be overly concerned about the legality of accusing their employees of being immature.

Which one of the following best illustrates the flaw in the above argument?

- A An abrasive manner and inability to lead a team may be an indicator of immaturity.
 - B The fact that a tribunal has dismissed a case does not mean that the company in question acted ethically.
 - C The tribunal may have examined the character of the director rather than what had actually happened.
 - D Whether or not something is lawful may not be the only concern that directors might have.
 - E The fact that one case has been dismissed does not mean that all future cases will be dismissed.
- 18 Five friends play a word game called Wordsmith. The objective is to score as many as points as possible, using the letters of a randomly chosen starting word to create new words. Each letter used in a word scores one point, and the player with the most points after five rounds is the winner.

The word chosen for this particular game was 'RAINBOW'. In the first four rounds, the words selected by the five players were as follows:

<i>Georgina</i>	<i>Riaz</i>	<i>Bobby</i>	<i>Vandy</i>	<i>Sonny</i>
BRAIN	BROWN	ROBIN	BRAWN	WORN
WARN	BARON	BORN	IRON	BOAR
BRAN	RAIN	WAR	BROW	BAN
NOW	WON	AN	NO	OR

The words given in the final round by the five players were: 'ROW', 'BAR', 'AIR', 'ON' and 'I' (not in order).

Which one of the following is **not** a possible difference between the final scores of the players with the most and least points?

- A 1
- B 2
- C 3
- D 4
- E 5

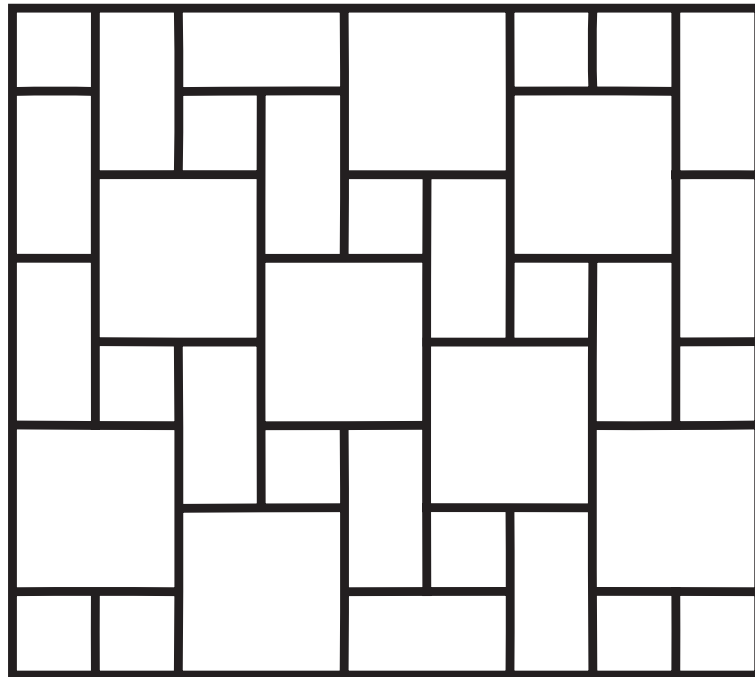
- 19 I need to make sure that my three children all have a piece of fruit to take to school on each of the five days next week. Jessica and Bruce will not eat apples and Victoria will not eat oranges. My local shop sells a variety of bags containing either just apples, just oranges or different mixtures of the two fruits. The options available are shown below:

<i>option</i>	<i>apples</i>	<i>oranges</i>	<i>price (p)</i>	<i>total number in bag</i>
apple bag	6	0	99	6
orange bag	0	6	109	6
lucky dip	at least 1	at least 1	95	6
half and half	3	3	105	6

What is the minimum that I could spend to be **sure** that I have enough fruit for all three children next week?

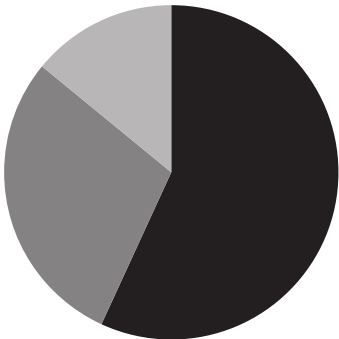
- A £2.85
- B £2.99
- C £3.04
- D £3.17
- E £3.19

20 The block paved area shown below is laid using three different-sized blocks.

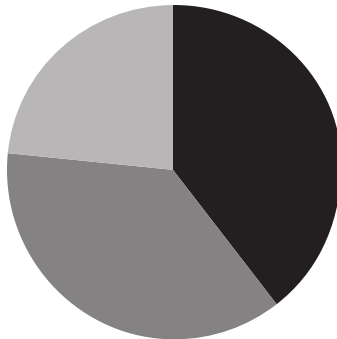


Which one of the following charts shows the relative comparison of the number of each size of block used in this paved area?

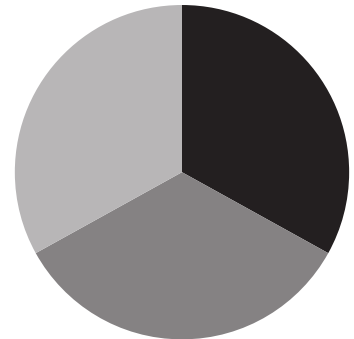
A



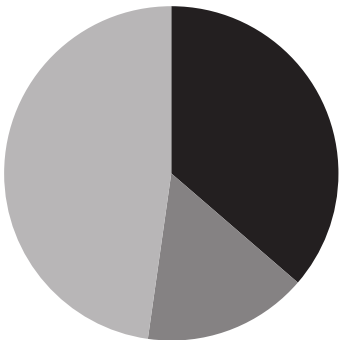
B



C



D



E



- 21** In recent years, the production and visibility of colourised and 'restored' historical photographs has grown exponentially, owing to both social media and the introduction of user-friendly colourisation software. But the expansion of the technical capacity and popular appetite to alter historical photography has not been matched by sufficient debate about the assumptions and consequences of this practice. Colourisers do not address photographs as physical artefacts with unique histories of creation and reception: they treat original photos as 'windows' onto the past that can be 'improved' for viewers. But a photograph is never just a neutral representation of the past. Every photograph carries with it a complicated history of who took it, who looked at it, how it was shaped by the technology behind it, and what all this means for questions of representation, experience, and history. Colourisation blocks out this rich repository of historical meaning, substituting a fleeting jolt of novelty for deeper understanding of the image.

Which one of the following, if true, most strengthens the above argument?

- A** Artificial intelligence is now being used to colourise photographs automatically.
 - B** Colourisation techniques are almost as old as photography itself.
 - C** Some photographers of the past chose to use black and white film instead of colour.
 - D** Some universities no longer teach courses on the history of photography.
 - E** Colourisers rarely have academic experience of studying history.
- 22** There has been discontent amongst students following the decision of a number of UK universities to use automated marking software to assess students' written work. Of course, there are ethical issues surrounding the use of such software. But a simple reason why the students are right to feel aggrieved is that it is not clear that they were told, when embarking on the course, that this would happen. You have every right to complain about something which affects you if you have not previously been informed, consulted, or given your consent. The students are therefore justified in their complaints.

Which one of the following illustrates the principle used in the above argument?

- A** A customer has every right to demand a refund rather than accept an alternative product offered by a supplier.
- B** Someone selling their house ought to inform the buyer if they cannot guarantee the property will be left satisfactorily clean.
- C** A patient who has been prescribed a medication that has unpleasant side effects is entitled to complain if they were not warned of this possibility.
- D** A consumer who is offered a no-returns purchase ought to be fully informed about the implications of this transaction.
- E** A citizen who is arrested for a suspected crime has every right to complain if they believe the police used unnecessary force.

- 23** The chef will not go ahead with her cooking class tomorrow unless at least fifteen people sign up for it by 5 pm today. It is now 4 pm and twenty people have already registered, so she will be teaching the class tomorrow.

Which one of the following most closely parallels the reasoning used in the above argument?

- A** Unless enough rain fell during the summer months to water the crops, they would all have died out by July. It is now August and the crops are still surviving, so there was adequate rainfall earlier in the year.
 - B** The architect's plan cannot be approved by the local authorities unless it meets all of the relevant regulations. The plan will be rejected since the architect has disregarded two of the rules.
 - C** Unless more public transport options are made available, traffic congestion in town will never improve. The mayor has announced that new bus lines will be introduced next month, so traffic will start to ease up after that.
 - D** The competition is not conducted fairly unless all of the judges are completely impartial. One of the judges is biased in favour of one of the competitors because they are from the same country, so that competitor is more likely to win.
 - E** Unless the data has been analysed accurately, it cannot be included in the final report. The report was handed in today and did not contain the data, so mistakes must have been made with its analysis.
- 24** Every Christmas season, an ice-skating rink is laid in the central square in Boland. The rink is open to the public from 12th December to 9th January inclusive, between 2 pm and 5 pm. It is closed on Sundays and Christmas Day (25th December), but there is an extra session on Saturdays between 10 am and 1 pm. The charge is £2 an hour.

When Jimmy was learning to skate, he went to the rink for two hours every session that it was open. That year, 12th December was on a Monday.

What is the total amount that Jimmy had to pay?

- A** £100
- B** £104
- C** £108
- D** £112
- E** £116

- 25** I need to create gift bags for the guests who are coming to my party this weekend. Each bag will contain 5 sweets, a small toy and a balloon. The prices for the items are shown in the table below.

	<i>price per pack</i>		
	<i>first 10 packs</i>	<i>next 20 packs</i>	<i>any further packs</i>
sweets (20 in a pack)	\$0.45	\$0.40	\$0.35
balloons (20 in a pack)	\$0.90	\$0.80	\$0.70
toys (1 in a pack)	\$3.50	\$3.00	\$2.50

I need 23 gift bags for my party and do not wish to buy any more of any item than is necessary.

What will be the total price I will pay for the items in my gift bags?

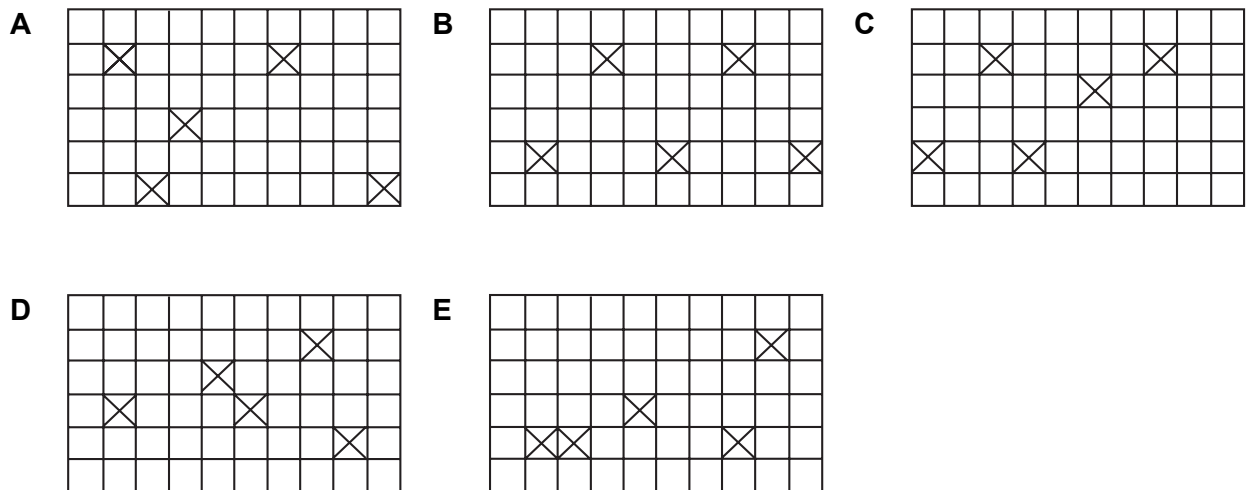
- A** \$73.00
- B** \$78.50
- C** \$85.50
- D** \$95.10
- E** \$103.10

- 26 A roofer is looking at the front-facing roofs of four houses. The survey finds five broken tiles on the roof of each house. The positions of the broken tiles are shown in the table below, with the column (col) and row numbers starting from the bottom left-hand tile on each roof.

	<i>broken tile 1</i>		<i>broken tile 2</i>		<i>broken tile 3</i>		<i>broken tile 4</i>		<i>broken tile 5</i>	
	<i>col</i>	<i>row</i>	<i>col</i>	<i>row</i>	<i>col</i>	<i>row</i>	<i>col</i>	<i>row</i>	<i>col</i>	<i>row</i>
house W	2	2	4	5	6	2	8	5	10	2
house X	2	3	5	4	6	3	8	5	9	2
house Y	2	5	3	1	4	3	7	5	10	1
house Z	1	2	3	5	4	2	6	4	8	5

The roofer also draws a diagram for each of the roofs, showing the position of each of the broken tiles marked with an X, with the bottom left-hand tile of the roof in the bottom left-hand corner of the diagram.

Which one of the diagrams shown below does **not** correspond to one of the four houses?



- 27** When hiring new employees for senior positions, many companies focus their search on applicants who already have some previous experience working in a similar job. This happens even though simply having had another job does not automatically mean that that person performed well in that role. Moreover, some people got their jobs because they have personal connections with the employers, not because they were the most competent or suitable candidate. And even if an applicant is highly qualified and did excel at another job, the different work environments at different organisations often make it challenging for them to apply their previous work experience to a new role. This shows that companies that automatically reject inexperienced applicants are taking the wrong approach.

Which one of the following best illustrates the flaw in the above argument?

- A** Companies may be trying to save time by focusing on candidates who have previous work experience.
 - B** It may be that good performance, although not guaranteed by previous experience, is impossible without it.
 - C** Just because someone got a job through personal connections does not mean that they are unqualified for it.
 - D** Inexperienced applicants may be able to access internships and other training opportunities.
 - E** Just because companies focus on applicants with previous work experience does not mean they do not consider other qualifications.
- 28** According to legend, the ancient cities of both Thebes and Troy were founded, not at the summit of a hill, nor the junction of two waterways, but where a cow decided to lie down. The practice of allowing cows to choose where a city should be built would seem to be arbitrary and bizarre; a little reflection tells us that it is perhaps not so strange after all. Since a city means a sizeable population, there must be plentiful sources of meat, milk, leather and cheese, not to mention strong draught animals for ploughing fields and pulling carts. If a cow is taken enough by the amenities of a place to feel able to lie down, then it is worth paying attention.

Which one of the following best expresses the main conclusion of the above argument?

- A** According to legend, both Thebes and Troy were founded where a cow chose to lie down.
- B** The practice of allowing cows to choose where a city should be built would seem to be arbitrary and bizarre.
- C** A little reflection tells us that it is not so strange to allow a cow to choose where to build a city.
- D** Cities demand plentiful sources of meat, milk, leather, cheese, as well as strong draught animals.
- E** If a cow is taken enough by the amenities of a place to feel able to lie down, then it is worth paying attention.

- 29** Why is it that disagreements have a tendency to become so heated? The problem arises from the fact that people who think differently from you, on any topic, are perceived subconsciously as a threat. Not a physical threat, necessarily, but a threat to your reputation. Why is this? Because if someone who thinks differently from you is right (or merely perceived by others to be right), it typically implies that you are wrong. And being wrong (or seen to be wrong) is something that we all fear. Our worry is that it will damage our credibility as someone others should listen to or trust. And trust, naturally, is an extremely valuable commodity for social creatures such as ourselves.

Which one of the following can be drawn as a conclusion from the above passage?

- A** If two people think differently, they cannot both be right.
 - B** In order to be effective in a debate, someone must earn the trust of those around them.
 - C** We fear reputational threats just as much as we do physical threats.
 - D** If someone thinks the same way as you, they will not perceive you as a threat.
 - E** If we did not fear being wrong, disagreements would be less likely to get heated.
- 30** Tabatha has a block of cheese with the dimensions 12 x 10 x 5 cm. She cuts it into 1 cm cubes for a party. She forgets to cut the rind (tough outside layer) off before she cuts the block into cubes. As she doesn't have a lot of time before her guests start to arrive she only removes the rind from cheese cubes which have rind on two or more faces.

From how many cheese cubes will she remove rind?

- A** 84
- B** 92
- C** 100
- D** 108
- E** 192

- 31 Imani is looking to book a four-night stay in May at the Highgate Hotel, to include a Sunday night so that she can attend an evening orchestral concert.

The table below shows the daily rates for the Highgate Hotel.

<p style="text-align: center;">Highgate Hotel Daily rates for a single room with breakfast May</p>						
<i>Monday</i>	<i>Tuesday</i>	<i>Wednesday</i>	<i>Thursday</i>	<i>Friday</i>	<i>Saturday</i>	<i>Sunday</i>
1st £30	2nd £40	3rd £50	4th £50	5th £20	6th £50	7th £40
8th £30	9th £40	10th £50	11th £50	12th £20	13th £50	14th £40
15th £30	16th £40	17th £60	18th £40	19th £30	20th £40	21st £40
22nd £30	23rd £20	24th £50	25th £40	26th £30	27th £60	28th £30
29th £40	30th £50	31st £50				
<p style="text-align: center;">May Special Offers Book Saturday and Sunday and stay Friday for free. Book Sunday and Monday and stay Tuesday for free. Only one special offer can be used per booking.</p>						

What is the least amount Imani needs to pay for her four-night stay?

- A £100
- B £110
- C £120
- D £130
- E £140

- 32 In a particular coding system, letters of the alphabet are represented by two-character or three-character combinations of the symbols 0, + and –.

For example, the letter A is represented as 0+, and the letter Z is represented as –0+.

The table shows how certain words are represented in this coding system.

<i>word</i>	<i>code</i>
AND	0+–++–0
MAN	–+–0+–++
MEND	–+–++–++–0
RUNNY	00+0–++–++000

How is the word EAR represented by the code?

- A ++0+00
- B –++0+00
- C ++0+–00
- D ++0+00+
- E –++0+–00+

- 33** Over the past few decades, many companies have developed sustainability initiatives designed to improve their environmental performance across areas ranging from water usage to the recyclability of products. At the same time, there has been an increase in award programmes designed to recognise achievement in such initiatives. Unsurprisingly, these awards attract criticism and scepticism, especially since it is often the companies that nominate themselves to receive them. While some of the awards may not represent meaningful progress, we shouldn't dismiss or reject them entirely. Many are awarded by judging panels that include representatives from environmental organisations. Moreover, the positive publicity and other benefits that come with winning awards help gain support for a company's sustainability efforts amongst the senior decision-makers at that company.

Which one of the following, if true, most strengthens the above argument?

- A** Participation in award programmes can be an enjoyable experience for company employees.
 - B** The award programmes provide a way for companies to learn about environmental management advancements within their own industries.
 - C** Members of the public lack the knowledge needed to assess claims about sustainability-related achievements.
 - D** Companies that have been previous award winners go on to participate on judging panels for the award programmes.
 - E** The awards help companies that win them reduce the amount of money they spend on advertising their products.
- 34** A common method of punishing minor offences such as speeding or dropping litter is to impose monetary fines on the offender. These fines also aim to deter people from breaking the law in the first place. However, it is evident that fines are an unfair method of deterring and punishing people. If caught, wealthy people will be able to pay off fines with little to no trouble, and are therefore unlikely to feel deterred by the punishment. On the other hand, poorer people are more likely to have to borrow money to pay the fine, or even face further punishment such as jail time for not paying the original fine, which are disproportionately negative outcomes for committing a minor offence.

Which one of the following is an underlying assumption of the above argument?

- A** There are other methods of punishment that are fairer than imposing fines.
- B** People are aware of the punishments they will face if they are caught breaking the law.
- C** Poorer people are more likely to get caught committing minor offences than wealthier people.
- D** An offender's wealth does not affect the amount they are fined.
- E** People are unlikely to repeat an offence if they are punished for it the first time.

- 35** So far, most attention given to reproductive health has focused on women's fertility. Therefore, it's a welcome development that researchers are showing more concern about what impacts the fertility of men. Factors already known to affect sperm production range from the ageing process to poor diets and fitness levels. Now, increasing attention is being paid to workplace chemical exposure as another potential factor. For example, some studies have found that the longer men work in certain factory jobs, the lower the quality of their sperm production. This finding is enough to identify factory chemical exposure as a priority risk and begin changing factory working conditions to reduce it.

Which one of the following best illustrates the flaw in the above argument?

- A** Fertility problems may be more common amongst women than they are amongst men.
 - B** Just because there are risks associated with workplace chemical exposure does not mean other risks to men's fertility should be ignored.
 - C** Lower quality sperm production may already be an issue by the time men start factory jobs.
 - D** Just because lower quality sperm production is associated with more time in a job doesn't mean it is caused by that job.
 - E** Just because one risk to fertility is reduced doesn't mean that someone's reproductive health will actually be improved.
- 36** Becky works from home making soft toys which she sells online. Each one takes her exactly 16 minutes to make and she takes a 5-minute break between finishing one item and starting the next. She always takes a 40-minute break for her lunch. Today she is starting on a new batch of toys and is planning to work from 08:30 until 17:30.

How many soft toys will she have completed by 17:30?

- A** 23
- B** 24
- C** 25
- D** 26
- E** 27

- 37 Last Saturday a large number of men and women competed in a long-distance cycling event. The time that each competitor took to complete the course was recorded. The following table shows the range of times taken and the percentages of men and women who achieved these times.

<i>time in minutes</i>	<i>percentage of men</i>	<i>percentage of women</i>
0–120	5	1
121–150	5	5
151–180	6	4
181–210	12	21
211–240	30	15
241–300	26	36
301–420	16	12
421 or more	0	6

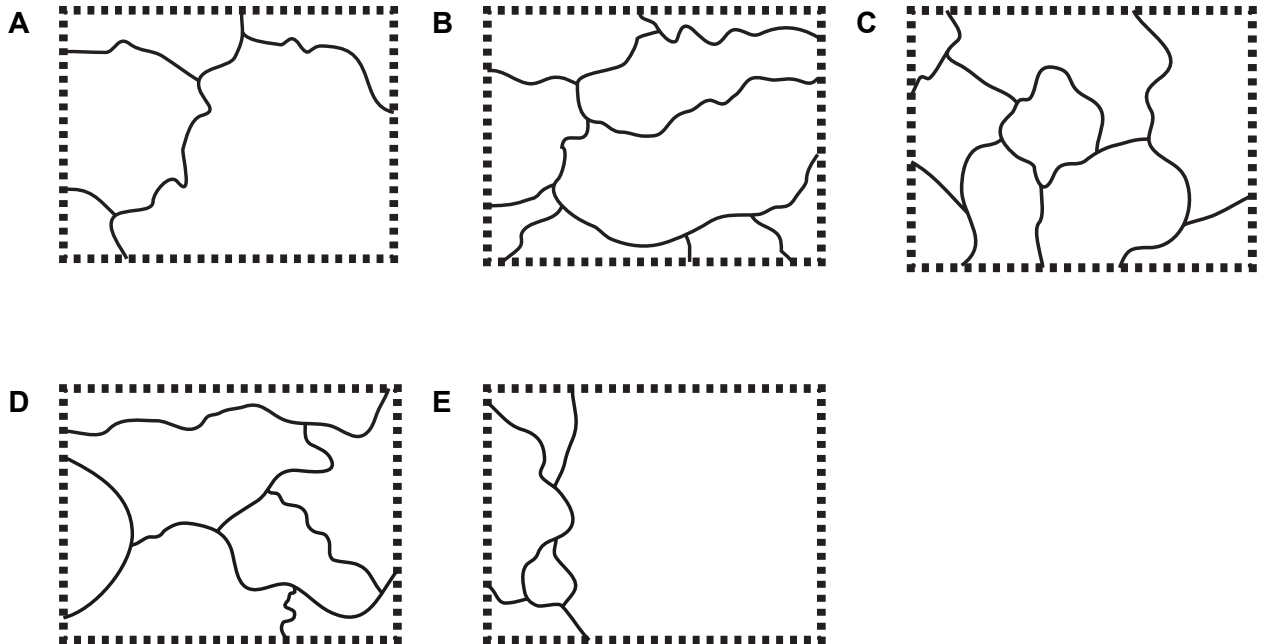
There were twice as many men as women in the event.

What percentage of all the competitors took more than four hours to complete the event?

- A 46%
- B 48%
- C 54%
- D 69%
- E 71%

- 38** The following pictures are blank maps. The continuous lines indicate country borders, the dotted lines show the borders of the maps. These maps need to be painted so that each country is filled with one colour and that no two neighbouring countries (countries with a common border) have the same colour. The fewest number of colours should be used on a given map.

Which one of the following blank maps will require 4 different colours to be painted?



- 39** For an earthquake to take place, there needs to be pressure generated between the Earth's tectonic plates. The pressure has increased along this fault line, so we can expect an earthquake soon.

Which one of the following most closely parallels the reasoning used in the above argument?

- A** An increase in wages implies an increase in a company's running costs. As wages have been frozen for a year, we can assume that it costs the same now to run the company as it did 12 months ago.
- B** To survive, coral reefs need clear water that lets sunlight through. This reef is thriving, so the water conditions must be ideal for it.
- C** If a cat is to live with humans successfully when it is fully grown, it must be socialised with them while still a kitten. This cat grew up in the wild, so it is unlikely to make a good pet.
- D** A sonic boom implies that an object has broken the sound barrier. The jet did not break the sound barrier, so cannot have created a sonic boom.
- E** A ship cannot be steered without a rudder. This vessel is equipped with one, so we should be able to change course.

- 40** A political party in Freedonia has raised overblown concerns about freedom of speech, claiming that hate-speech laws are a form of censorship and undermine academic freedom. After all, these laws may prevent people from voicing their opinions in public, and academics may not be able to teach and write without interference. However, the party has no leg to stand on in decrying these hate-speech laws: they proposed a law that would ban Freedonian teachers from teaching negative perspectives on the history of the Freedonian empire. This hypocrisy is very disappointing: as the old saying goes, people in glass houses shouldn't throw stones.

Which one of the following best illustrates the principle used in the above argument?

- A** Those who have only negative things to say should say nothing at all.
 - B** Those who cheat in their university exams should automatically fail their degree.
 - C** Those who are rude to their friends should not complain if their friends are rude in return.
 - D** Teachers should be careful what they teach pupils, in case they upset their parents.
 - E** Historical figures who did awful things should be scrutinised and criticised in public debate.
- 41** Most countries around the world only allow citizens to vote in elections when they are at least 18 years old. Many oppose lowering this to 16, pointing out that at this age, people cannot even legally drive a car in most places. However, voting is not like driving a car – it does not require impulse control or split-second decision-making, abilities which are not well developed during the teenage years. Voters are not presented with the candidates just seconds before they must make a choice. Rather, voters have time to deliberate and think about their decision, and this type of dispassionate reasoning matures, on average, in the mid-teens. This is the key factor that should determine who is allowed to vote. Moreover, many adults much older than 16 are not more knowledgeable about politics than your average 16-year-old, nor do they even deliberate all that much before casting their votes.

Which one of the following can be drawn as a conclusion from the above passage?

- A** The minimum age at which someone can legally vote should be the same as the minimum age for legal driving.
- B** The minimum ages to vote and to drive should be based on individual ability, not on age alone.
- C** Lowering the minimum age to vote to 16 would increase the number of people turning up to vote in elections.
- D** The minimum age to vote is influenced by the minimum age at which one can drive.
- E** The average 16-year-old is just as qualified to vote in an election as many older adults.

- 42** Isaac has been on a diet to lose weight. He wants to be certain how much weight he has lost, so he checks himself on three different weighing scales consecutively. One reads 95 kg, one reads 93 kg, and one reads 96 kg. Each weighing scale is accurate to within 2 kg above or below the value they actually read.

What is the minimum range in which Isaac's true weight must lie?

- A** 91–94 kg
 - B** 91–98 kg
 - C** 93–96 kg
 - D** 94–95 kg
 - E** 95–98 kg
- 43** A box contains equal numbers of each colour of red socks, white socks and blue socks. Additional red socks are put into the box which doubles the number of red socks in the box. 24 of the white socks are removed from the box and replaced with 24 blue socks.
- If there are now four times as many blue socks as white socks in the box, how many red socks are there in the box?
- A** 40
 - B** 60
 - C** 64
 - D** 72
 - E** 80

- 44** Three numbers are combined in a particular way, using addition, subtraction, multiplication and/or division.

The numbers 3, 4 and 18 (used once each) are combined to give the number 10.

Which one of the following sets of numbers combines the first three numbers, in the same way to produce the final number?

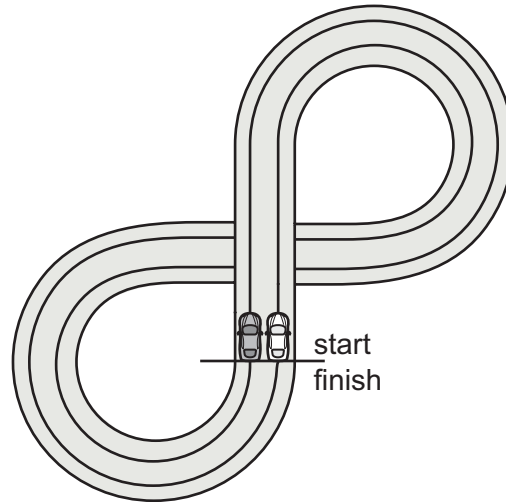
- A** 2, 5 and 12 to give 11
 - B** 4, 6 and 12 to give 8
 - C** 5, 12 and 20 to give 18
 - D** 6, 8 and 12 to give 14
 - E** 8, 16 and 24 to give 32
- 45** Online courses are becoming more common in colleges and universities, which is a worrying trend given the data that we have on how effective they are. Studies have found that students taking online courses are much more likely to multitask during their lessons compared to students in traditional in-person classes. After all, with no teacher present in the room to deter you from checking your emails, listening to music, and scrolling through social media, it is much easier to be tempted by these distractions. This is a problem because we also have plenty of data to show that multitasking during educational activities significantly reduces how much you learn. Indeed, students taking online courses, on average, end up performing worse in assessments and are more likely to drop out than students taking in-person courses. Clearly, online courses are detrimental to learning compared to in-person ones.

Which one of the following, if true, most weakens the above argument?

- A** Online courses tend to attract students who are also working part time or have childcare responsibilities.
- B** Highly focused students attending online courses still perform well in assessments.
- C** Some students can only attend online courses because they have difficulty moving around.
- D** There are also distractions during in-person classes, such as the presence of classmates.
- E** Older students tend to be more motivated than younger students.

46 The drawing shows a slot car track.

A grey car and a white car start together at the same point and travel in the same direction. Because of the figure-of-eight arrangement of the track, each car travels exactly the same distance to complete one lap of the track. The grey car is 12% faster than the white car.



How many laps will the grey car have completed before it passes the white car for the first time?

- A 8
- B 9
- C 10
- D 11
- E 12

- 47** In the USA, interest paid on a home loan is tax-deductible (meaning it can be deducted from your taxable income, reducing the tax you pay to the government). This tax break is known as mortgage interest deduction, and it should be abolished. After all, the poorest Americans generally rent their homes rather than owning them, and rent cannot be deducted from taxes. And certain technicalities related to how taxes are filed often prevent poorer homeowners from receiving the deduction. This means that the poorest Americans benefit the least from mortgage interest deduction. The people who benefit the most are the richest, since they own the most expensive houses and have the largest tax bills, and often employ accountants to file their taxes for maximum deductions. The American government could more than double rental assistance payments to poorer Americans with the money lost as a result of this tax break.

Which one of the following is an underlying assumption of the above argument?

- A** Government money should not be spent subsidising private household consumption choices.
- B** The financial benefits you receive from the government should not depend on whether you are rich or poor.
- C** Money raised by taxing the rich should be used to support the poor.
- D** There are no low-cost accounting services that poorer Americans can access.
- E** The government should not offer tax breaks that benefit the richest most and the poorest least.

- 48 The charges at the Puffins adventure park are shown in the following table.

	<i>price (\$)</i>
adult entry	30
child entry	25
family ticket (entry for 2 adults and 2 children, includes 8 single-ride tokens)	120
single-ride token	5
super ride (10 single-ride tokens)	40

A single-ride token allows one person one ride on any of the adventure rides.

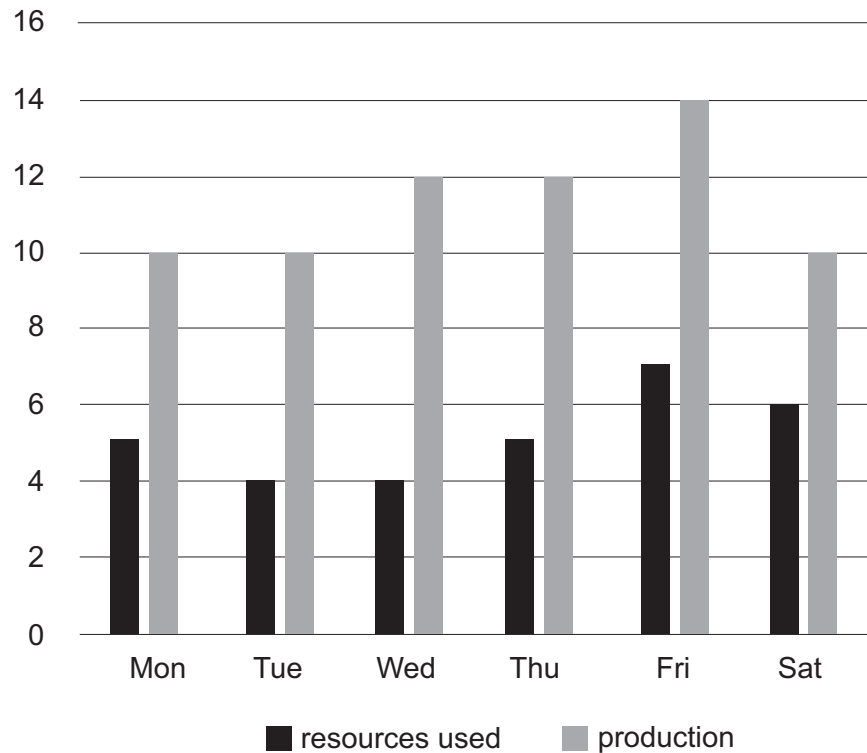
Mike and Helen are visiting Puffins with their two children, Amy and Ben, and Helen's mother, Pearl. They pay \$250 and want to have as many rides as possible. Mike, Helen, Amy and Ben will each have the same number of rides. Pearl will have at least two rides.

What is the maximum number of rides that Amy will have?

- A 4
 - B 5
 - C 6
 - D 7
 - E 8
- 49 To win business investment, you need a good product and a well-developed business plan. Your product is brilliant, but you haven't spent enough time on the plan. So it's unlikely you'll get funding.
- Which one of the following most closely parallels the reasoning used in the above argument?
- A For the school to approve their proposal for meat-free lunches, the students must develop a menu and win support from their peers. The student body has approved their new menu in a poll, so it's unlikely the school will continue to serve meat.
 - B The only way their team will be disqualified is if they miss a match and fail to notify the tournament director at least three hours before the start of play. They couldn't attend the first match but told the director in plenty of time, meaning they won't be disqualified.
 - C The new hotel manager must be fluent in Mandarin and Korean. This candidate speaks both, meaning the hotel won't need to interview anyone else.
 - D To earn a distinction in music, you must perform in public concerts or write your own music composition. You don't have time for the concerts or the composition, so it's unlikely you'll earn a distinction.
 - E If they want to take a holiday that is affordable and unique, the friends can volunteer on a farm or at a nature reserve. The farm only hosts volunteers for the weekend, so they probably won't go there.

- 50** At a factory, the senior management are monitoring the ratio of production to resources used each day. For example, if on one day the production is \$200 000 and the resources used is \$40 000, then the ratio is 5.

Last week, the production and resources used each day (both in tens of thousands of dollars) were as shown in the graph below.



Between which two days did the ratio of production to resources used increase by the greatest percentage?

- A** Monday to Tuesday
- B** Tuesday to Wednesday
- C** Wednesday to Thursday
- D** Thursday to Friday
- E** Friday to Saturday

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