

**Class – X**  
**Mathematics-Basic (241)**  
**Sample Question Paper 2019-20**

**Max. Marks: 80**

**Duration: 3 hrs.**

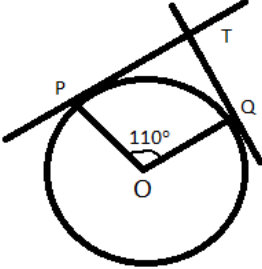
**General Instructions:**

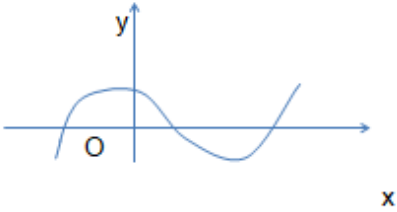
- a) All questions are compulsory
- b) The question paper consists of 40 questions divided into four sections A, B, C & D.
- c) Section A comprises of 20 questions of 1 mark each. Section B comprises of 6 questions of 2 marks each. Section C comprises of 8 questions of 3 marks each. Section D comprises 6 questions of 4 marks each.
- d) There is no overall choice. However internal choices have been provided in two questions of 1 mark each, two questions of 2 marks each, three questions of 3 marks each and three questions of 4 marks each. You have to attempt only one of the alternatives in all such questions.
- e) Use of calculators is not permitted.

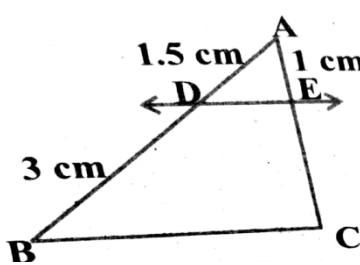
**SECTION - A**

**Q 1- 10 are multiple choice questions. Select the most appropriate answer from the given options.**

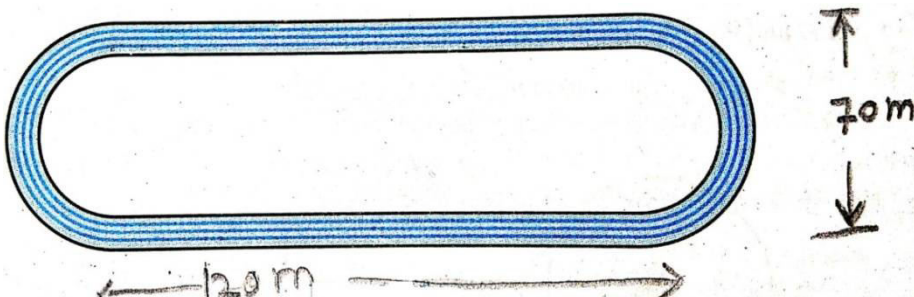
<b>1.</b>	HCF of 168 and 126 is  (a) 21                      (b) 42                      (c) 14                      (d) 18	<b>1</b>
<b>2.</b>	Empirical relationship between the three measures of central tendency is	<b>1</b>

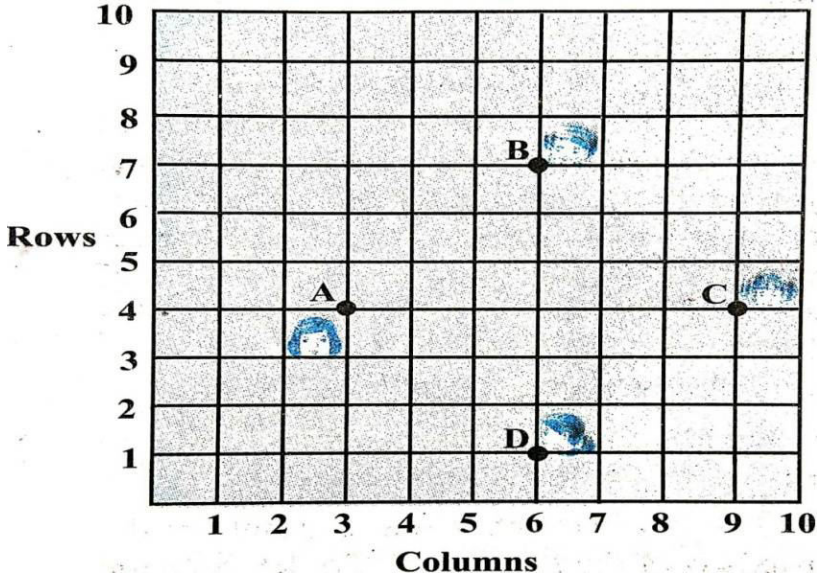
	<p>(a) <math>2 \text{ Mean} = 3 \text{ Median} - \text{Mode}</math>  <math>\text{Median} - \text{Mean}</math></p> <p>(c) <math>\text{Mode} = 2 \text{ Mean} - 3 \text{ Median}</math>  <math>\text{Mode} + \text{Mean}</math></p>	<p>(b) <math>2 \text{ Mode} = 3</math></p> <p>(d) <math>3 \text{ Median} = 2</math></p>	
3.	<p>In the given figure, if TP and TQ are tangents to a circle with centre O, so that <math>\angle POQ = 110^\circ</math>, then <math>\angle PTQ</math> is</p>		1
	<p>(a) <math>110^\circ</math></p> <p>(c) <math>80^\circ</math></p>	<p>(b) <math>90^\circ</math></p> <p>(d) <math>70^\circ</math></p>	
4.	<p>325 can be expressed as a product of its primes as</p>		1
	<p>(a) <math>5^2 \times 7</math></p> <p>(c) <math>5 \times 13^2</math></p>	<p>(b) <math>5^2 \times 13</math></p> <p>(d) <math>2 \times 3^2 \times 5^2</math></p>	
5.	<p>One card is drawn from a well shuffled deck of 52 cards. The probability that it is black queen is</p>		1
	<p>(a) <math>\frac{1}{26}</math></p>	<p>(b) <math>\frac{1}{13}</math></p>	<p>(c) <math>\frac{1}{52}</math></p> <p>(d) <math>\frac{2}{13}</math></p>
6.	<p>The sum of the zeroes of the polynomial <math>2x^2 - 8x + 6</math> is</p>		1
	<p>(a) - 3</p> <p>(d) 4</p>	<p>(b) 3</p>	<p>(c) - 4</p>
7.	<p>Which of the following is the decimal expansion of an irrational number</p>		1
	<p>(a) 4.561</p>	<p>(b) <math>0.\overline{12}</math></p>	<p>(c) 5.010010001...</p> <p>(d) 6.03</p>

8.	<p>The following figure shows the graph of <math>y = p(x)</math>, where <math>p(x)</math> is a polynomial in variable <math>x</math>. The number of zeroes of the polynomial <math>p(x)</math> is</p> <p>(a) 1                      (b) 2                      (c) 3                      (d) 4</p> 	1
9.	<p>The distance of the point P (3, - 4) from the origin is</p> <p>(a) 7 units                      (b) 5 units                      (c) 4 units (d) 3 units</p>	1
10.	<p>The mid point of the line segment joining the points (- 5, 7) and (- 1, 3) is</p> <p>(a) (-3, 7)                      (b) (-3, 5)                      (c) (-1, 5) (d) (5, -3)</p>	1
<b>(11 - 15) Fill in the blanks:</b>		
11.	<p>The point which divides the line segment joining the points A (0, 5) and B (5, 0) internally in the ratio 2:3 is _____</p>	1
12.	<p>The pair of lines represented by the equations <math>2x+y+3 = 0</math> and <math>4x+ky+6 = 0</math> will be parallel if value of <math>k</math> is _____.</p> <p style="text-align: center;"><b>OR</b></p> <p>If the quadratic equation <math>x^2 - 2x + k = 0</math> has equal roots, then value of <math>k</math></p>	1

	is _____.	
13.	The value of $\sin 60^\circ \cos 30^\circ + \sin 30^\circ \cos 60^\circ$ is _____.	1
14.	Value of $\cos 0^\circ \cdot \cos 30^\circ \cdot \cos 45^\circ \cdot \cos 60^\circ \cdot \cos 90^\circ$ is _____.	1
15.	The sides of two similar triangles are in the ratio 2:3, then the areas of these triangles are in the ratio _____	
<b>(16 - 20) Answer the following :</b>		
16.	<p><math>\triangle PQR</math> is right angled isosceles triangle, right angled at R. Find value of <math>\sin P</math>.</p> <p style="text-align: center;"><b>OR</b></p> <p>If <math>15 \cot A = 8</math>, then find value of <math>\operatorname{cosec} A</math>.</p>	1
17.	If area of quadrant of a circle is $38.5 \text{ cm}^2$ then find its diameter (use $\pi = \frac{22}{7}$ )	1
18.	A dice is thrown once. Find the probability of getting a prime number.	1
19.	<p>In the given fig. If <math>DE \parallel BC</math> Find EC.</p> 	1

20.	Find the common difference of the A.P whose first term is 12 and fifth term is 0.	1								
	<b><u>SECTION - B</u></b>									
21.	If two coins are tossed simultaneously. Find the probability of getting 2 heads.	2								
22.	A lot of 25 bulbs contain 5 defective ones. One bulb is drawn at random from the lot. What is the probability that the bulb is good.  <b>OR</b> Two dice are thrown simultaneously at random. Find the probability of getting a sum of eight.	2								
23.	Prove that the tangents drawn at the ends of a diameter of a circle are parallel.	2								
24.	Show that $\tan 48^\circ \tan 23^\circ \tan 42^\circ \tan 67^\circ = 1$ .  <b>OR</b> Evaluate $\cos 48^\circ \cos 42^\circ - \sin 48^\circ \sin 42^\circ$	2								
25.	Find the area of circle whose circumference is 22cm.	2								
26	Read the following passage and answer the questions that follows: A teacher told 10 students to write a polynomial on the black board. Students wrote <table style="width: 100%; border: none;"> <tr> <td style="width: 50%;">1. <math>x^2 + 2</math></td> <td style="width: 50%;">6. <math>x - 3</math></td> </tr> <tr> <td>2. <math>2x + 3</math></td> <td>7. <math>x^4 + x^2 + 1</math></td> </tr> <tr> <td>3. <math>x^3 + x^2 + 1</math></td> <td>8. <math>x^2 + 2x + 1</math></td> </tr> <tr> <td>4. <math>x^3 + 2x^2 + 1</math></td> <td>9. <math>2x^3 - x^2</math></td> </tr> </table>	1. $x^2 + 2$	6. $x - 3$	2. $2x + 3$	7. $x^4 + x^2 + 1$	3. $x^3 + x^2 + 1$	8. $x^2 + 2x + 1$	4. $x^3 + 2x^2 + 1$	9. $2x^3 - x^2$	2
1. $x^2 + 2$	6. $x - 3$									
2. $2x + 3$	7. $x^4 + x^2 + 1$									
3. $x^3 + x^2 + 1$	8. $x^2 + 2x + 1$									
4. $x^3 + 2x^2 + 1$	9. $2x^3 - x^2$									

	5. $x^2 - 2x + 1$	10. $x^4 - 1$	
	(i) How many students wrote cubic polynomial (ii) Divide the polynomial $(x^2 + 2x + 1)$ by $(x + 1)$ .		
	<b>SECTION C</b>		
27.	Find the zeroes of the quadratic polynomial $x^2 - 3x - 10$ and verify the relationship between the zeroes and coefficient.		3
28.	Draw a circle of radius 4 cm. From the point 7 cm away from its centre, construct the pair of tangents to the circle. <b>OR</b> Draw a line segment of length 8 cm and divide it in the ratio 2:3		3
29.	<p>Following figure depicts a park where two opposite sides are parallel and left and right ends are semi-circular in shape. It has a 7m wide track for walking</p>  <p>Two friends Seema and Meena went to the park. Meena said that area of the track is <math>4066\text{m}^2</math>. Is she right? Explain.</p>		3
30.	<p>Prove that <math>\frac{\cot A - \cos A}{\cot A + \cos A} = \frac{\operatorname{cosec} A - 1}{\operatorname{cosec} A + 1}</math></p> <p style="text-align: center;"><b>OR</b></p> <p>Prove that: <math>\frac{\tan A + \sin A}{\tan A - \sin A} = \frac{\sec A + 1}{\sec A - 1}</math></p>		3

31.	<p>Prove that <math>5 - \sqrt{3}</math> is irrational, given that <math>\sqrt{3}</math> is irrational.</p> <p style="text-align: center;"><b>OR</b></p> <p>An army contingent of 616 members is to march behind an army band of 32 members in a parade. The two groups are to march in the same number of columns. What is the maximum number of columns in which they can march ?</p>	3
32.	<p>Prove that the lengths of tangents drawn from an external point to a circle are equal.</p>	3
33.	<p>Read the following passage and answer the questions that follows:</p> <p>In a class room, four students Sita, Gita, Rita and Anita are sitting at A(3,4), B(6,7), C(9,4), D(6,1) respectively. Then a new student Anjali joins the class</p> <div style="text-align: center;">  </div>	3
	(i) Teacher tells Anjali to sit in the middle of the four students. Find the coordinates of the position where she can sit.	1
	(ii) Calculate the distance between Sita and Anita.	1
	(iii) Which two students are equidistant from Gita.	1

<b>34.</b>	Solve $2x + 3y = 11$ and $x - 2y = -12$ algebraically and hence find the value of 'm' for which $y = mx + 3$ .	<b>3</b>
	<b><u>SECTION D</u></b>	
<b>35.</b>	Find two consecutive positive integers sum of whose squares is 365.	<b>4</b>
<b>36.</b>	If the sum of first 14 terms of an A.P. is 1050 and its first term is 10, find the 20 <sup>th</sup> term.  <b>OR</b>  The first term of an A.P. is 5, the last term is 45 and sum is 400. Find the number of terms and the common difference.	<b>4</b>
<b>37.</b>	As observed from the top of a 75m high light house above the sea level, the angles of depression of two ships are $30^\circ$ and $45^\circ$ respectively. If one ship is exactly behind the other on the same side of the light house and in the same straight line, find the distance between the two ships. (use $\sqrt{3} = 1.732$ )	<b>4</b>
<b>38.</b>	If a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points, then prove that the other two sides are divided in the same ratio.  <b>OR</b>  State and prove the Pythagoras theorem.	<b>4</b>
<b>39.</b>	A copper rod of diameter 1 cm and length 8 cm is drawn in to a wire of length 18 m of uniform thickness. Find the thickness of wire.  <b>Or</b>	<b>4</b>



	A metallic sphere of radius 4.2 cm is melted and recast into the shape of a cylinder of radius 6 cm. Find the height of the cylinder.													
40.	<p>The following distribution gives the daily income of 50 workers of a factory</p> <table border="1" data-bbox="386 491 1365 688"> <tr> <td><b>Daily income</b></td> <td><b>400-420</b></td> <td><b>420-440</b></td> <td><b>440-460</b></td> <td><b>460-480</b></td> <td><b>480-500</b></td> </tr> <tr> <td><b>Number of workers</b></td> <td><b>12</b></td> <td><b>14</b></td> <td><b>8</b></td> <td><b>6</b></td> <td><b>10</b></td> </tr> </table> <p>Convert this distribution to less than type of cumulative frequency distribution and draw its ogive.</p>	<b>Daily income</b>	<b>400-420</b>	<b>420-440</b>	<b>440-460</b>	<b>460-480</b>	<b>480-500</b>	<b>Number of workers</b>	<b>12</b>	<b>14</b>	<b>8</b>	<b>6</b>	<b>10</b>	4
<b>Daily income</b>	<b>400-420</b>	<b>420-440</b>	<b>440-460</b>	<b>460-480</b>	<b>480-500</b>									
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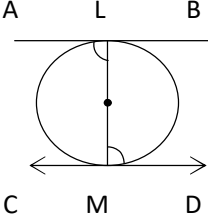
**Class – X**  
**Mathematics-Basic (241)**  
**Marking Scheme-SQP 2019-20**

**Max. Marks: 80**

**Duration: 3 hrs.**

1.	(b) 42	(1)
2.	(a) $2 \text{ Mean} = 3 \text{ Median} - \text{Mode}$	(1)
3.	(d) $70^\circ$	(1)
4.	(b) $5^2 \times 13$	(1)
5.	(a) $\frac{1}{26}$	(1)
6.	(d) 4	(1)
7.	(c) 5.010010001..	(1)
8.	(c) 3	(1)
9.	(b) 5 units	(1)
10.	(b) (- 3, 5)	(1)
11.	(2, 3)	(1)
12.	2 OR 1	(1)
13.	1	(1)
14.	0	(1)
15.	4:9	(1)
16.	$\sin P = 1/\sqrt{2}$	(1)

	<b>OR</b>	
	cosec A = 17/15	
17.	Area of quadrant = $\frac{1}{4} \times \frac{22}{7} \times r^2 = 38.5$ (use $\pi = \frac{22}{7}$ ) $\Rightarrow r = 7\text{cm}$ $\therefore$ diameter = 14 cm	$(\frac{1}{2})$  $(\frac{1}{2})$
18.	$\frac{1}{2}$	1
19.	$\frac{AD}{BD} = \frac{AE}{EC}$ (By B.P.T.)  $\frac{1.5}{3} = \frac{1}{EC}$ $\therefore EC = 2\text{ cm}$	$(\frac{1}{2})$  $(\frac{1}{2})$
20.	$A_5 = a_1 + 4d = 0$ $1^2 + 4d = 0$ $d = -3$	$(\frac{1}{2})$  $(\frac{1}{2})$
<b>SECTION - B</b>		
21.	P (Two Head) = $\frac{1}{4}$	(1) (1)
22.	Good bulbs = 25 - 5 = 20 P (good bulb) = $\frac{20}{25} = \frac{4}{5}$  <p style="text-align: center;"><b>OR</b></p> Of all those outcomes, the ones for which a + b = 8 are: 2+6, 3+5, 4+4, 5+3, 6+2 or 5 outcomes.  P = 5/36	(1) (1)  (1)  (1)

23.	<div style="text-align: center;">  <p style="text-align: center;"> <math>\angle OLA = 90^\circ</math>  <math>\angle OMD = 90^\circ</math>  <math>\angle OLA = \angle OMD</math> </p> <p>Which are alternate angles, hence <math>AB \parallel CD</math></p> </div>	(1)
		(1)
24.	<p>LHS = <math>\tan 48^\circ \tan 23^\circ \tan 42^\circ \tan 67^\circ</math></p> <p style="padding-left: 40px;"><math>= \cot (90^\circ - 48^\circ) \cot (90^\circ - 23^\circ) \tan 42^\circ \tan 67^\circ</math></p> <p style="padding-left: 40px;"><math>= \cot 42^\circ \cot 67^\circ \tan 42^\circ \tan 67^\circ</math></p> <p style="padding-left: 40px;"><math>= 1</math></p> <p style="text-align: center;">OR</p> <p><math>= \cos 48^\circ \cos 42^\circ - \sin 48^\circ \sin 42^\circ</math></p> <p><math>= \sin (90^\circ - 48^\circ) \sin (90^\circ - 42^\circ) - \sin 48^\circ \sin 42^\circ</math></p> <p><math>= \sin 42^\circ \sin 48^\circ - \sin 48^\circ \sin 42^\circ = 0</math></p>	(1)
		(1)
25.	<p style="text-align: center;"><math>r = \frac{7}{2}</math></p> <p>Area of Circle = <math>\frac{\pi r^2}{4} = \frac{77}{2} \text{cm}^2</math></p>	(1)
		(1)
26.	<p>(i) 3 Students</p> <p>(ii) <math>\frac{x^2 + 2x + 1}{x + 1}</math></p> <p style="padding-left: 40px;"><math>= \frac{(x + 1)^2}{x + 1} = x + 1</math></p>	(1)
		(1)
<b>SECTION - C</b>		

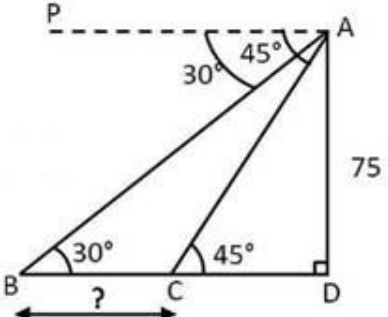


	<p><b>OR</b></p> $\text{L.H.S.} = \frac{\tan A + \sin A}{\tan A - \sin A}$ $= \frac{\frac{\sin A}{\cos A} + \sin A}{\frac{\sin A}{\cos A} - \cos A} = \frac{\sin A [\sec A + 1]}{\sin A [\sec A - 1]}$ $= \text{R.H.S}$	<p>(1)</p> <p><math>(\frac{1}{2})</math></p> <p><math>(\frac{1}{2})</math></p> <p>(1)</p> <p>(1)</p>
31.	<p>Let us assume that <math>5 - \sqrt{3}</math> is a rational</p> <p>We can find co prime a &amp; b ( <math>b \neq 0</math> ) such that</p> $5 - \sqrt{3} = \frac{a}{b}$ <p>Therefore <math>5 - \frac{a}{b} = \sqrt{3}</math></p> <p>So we get <math>\frac{5b-a}{b} = \sqrt{3}</math></p> <p>Since a &amp; b are integers, we get <math>\frac{5b-a}{b}</math> is rational, and so <math>\sqrt{3}</math> is rational. But <math>\sqrt{3}</math> is an irrational number</p> <p>Which contradicts our statement</p> <p><math>\therefore 5 - \sqrt{3}</math> is irrational</p> <p style="text-align: center;"><b>OR</b></p> $616 = 32 \times 19 + 8$ $\Rightarrow r = 8 \neq 0$ $32 = 8 \times 4 + 0$ $\Rightarrow r = 0$ <p>The HCF of 32 and 616 is 8.</p>	<p><math>(\frac{1}{2})</math></p> <p>(1)</p> <p><math>(\frac{1}{2})</math></p> <p>(1)</p> <p>(1)</p> <p>(2)</p> <p>(1)</p>
32.		<p>(1)</p>







37.	 <p>For correct fig</p> <p>In <math>\triangle ADC</math> , <math>\tan 45^\circ = \frac{75}{CD}</math></p> <p><math>1 = \frac{75}{CD} \Rightarrow CD = 75</math></p> <p>In <math>\triangle ADB</math> , <math>\tan 30^\circ = \frac{75}{BD}</math></p> $\frac{1}{\sqrt{3}} = \frac{75}{BD}$ <p><math>\Rightarrow BD = 75\sqrt{3}</math></p> <p><math>\Rightarrow</math>Distance between two ships = <math>BC = 75(\sqrt{3} - 1)m</math></p> <p style="text-align: right;"><math>= 54.9 \text{ m}</math></p>	(1) (1) (1) (1)
38.	<p>For correct, Given, To prove, construction and Figure</p> <p>For correct proof</p> <p style="text-align: center;"><b>OR</b></p> <p>For correct statement, Given, To prove, Construction and Figure</p>	$(4 \times \frac{1}{2})$ $= 2)$ $(2)$  $(5 \times \frac{1}{2})$ $= 2\frac{1}{2})$

	For correct proof	$(1\frac{1}{2})$												
39.	<p>A.T. Q.</p> $\pi r^2 \times 1800 = \pi \times \frac{1}{2} \times \frac{1}{2} \times 8$ $\Rightarrow r^2 = \frac{1}{900}$ $\Rightarrow r = \frac{1}{30}$ <p><math>\therefore</math> Thickness of wire = <math>\frac{1}{15} \text{ cm}</math></p> <p style="text-align: center;"><b>OR</b></p> $\frac{4}{3} \pi r^3 = \pi R^2 h$ $\frac{4}{3} (4.2)^3 = (6)^2 h$ $\Rightarrow h = \frac{2744}{100}$ <p><math>\therefore h = 2.744 \text{ cm}</math></p>	<p>(2)</p> <p><math>(1\frac{1}{2})</math></p> <p><math>(\frac{1}{2})</math></p> <p>(2)</p> <p><math>(1\frac{1}{2})</math></p> <p><math>(\frac{1}{2})</math></p>												
40.	<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Daily Income</th> <th>Number of workers</th> <th>Cumulative Frequency</th> </tr> </thead> <tbody> <tr> <td>400-420</td> <td>12</td> <td>12</td> </tr> <tr> <td>420-440</td> <td>14</td> <td>26</td> </tr> <tr> <td>440-460</td> <td>8</td> <td>34</td> </tr> </tbody> </table>	Daily Income	Number of workers	Cumulative Frequency	400-420	12	12	420-440	14	26	440-460	8	34	
Daily Income	Number of workers	Cumulative Frequency												
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		460-480	6	40	
		480-500	10	50	
		<p>Correct Table</p> <p>Drawing an ogive with co-ordinates</p> <p>(420,12),(440,26),(460,34),(480,40),(500,50)</p>			<p>(2)</p> <p>(2)</p>