平成22年度　推薦入試　基礎学力検査

数　　学

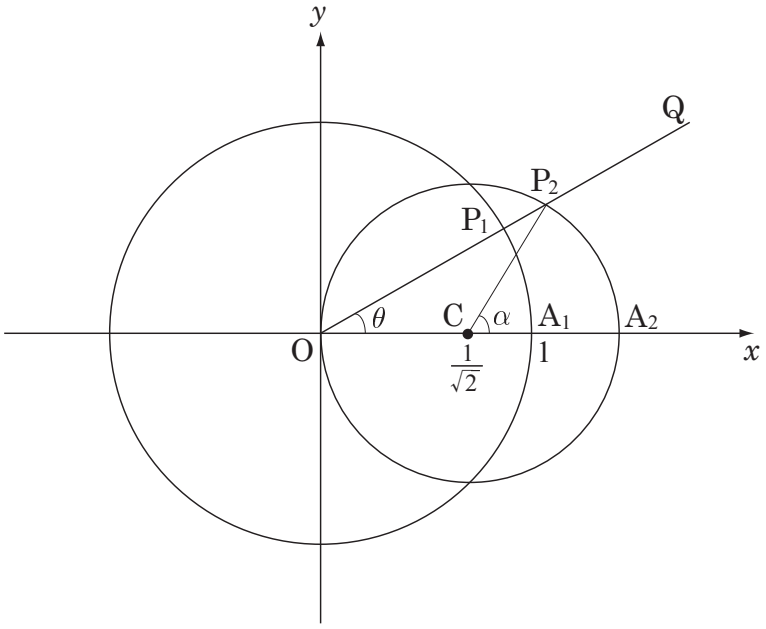
注 意 事 項

1. 基礎学力検査開始の合図があるまで，この問題冊子と解答冊子を開かないでください.
2. 問題は全部で4問あります（1ページから2ページ）．ページ番号のついていない紙は下書き用紙です.
3. 解答冊子の中には，解答用紙9枚と計算用紙が一緒に綴じてあります．解答冊子のどのページも切り離してはいけません.
4. 解答冊子の表紙とすべての解答用紙の所定欄に氏名と受験番号をはっきりと記入してください.
5. 基礎学力検査中に問題冊子の印刷不明瞭，ページの落丁・乱丁および解答用紙の汚れ等に気がついた場合は，静かに手を上げて監督員に知らせてください.
6. 基礎学力検査終了後，問題冊子は持ち帰ってください.
7. 解答時間は90分です.
8. 設問ごとに配点が記されています.
9. 解答用紙には，答えだけでなく，結論に至る過程を必ず記述してください.

I 座標平面上の原点 O を中心とする半径 1 の円と，点 C $(\frac{1}{\sqrt{2}}, 0)$ を中心とする半径 $\frac{1}{\sqrt{2}}$ の円を考える．下図のように，それぞれの円と x 軸の正の部分との交点を A_1, A_2 とし，動径 OQ との原点以外の交点を P_1, P_2 とする．また，OQ と x 軸の正の部分がなす角 θ は，$0 < \theta < \frac{\pi}{2}$ をみたすとする．このとき，以下の問いに答えよ．（配点 40 点）

問 1　線分 CA_1 と線分 CP_2 のなす角 α を，θ を用いて表せ．

問 2　$\theta = \frac{\pi}{6}$ とする．2 つの線分 A_1A_2, P_1P_2 と 2 つの弧 A_1P_1, A_2P_2 で囲まれる図形の面積 S を求めよ．



II 3 個のさいころを同時に投げたとき，以下の問いに答えよ．（配点 35 点）

問 1　出た目の和が 5 以下になる確率を求めよ．

問 2　出た目 3 つのうち 2 つだけが等しくなる確率を求めよ．

III $f_0(x) = x^2 + 3x$ とする．このとき

$$f_{n+1}(x) = f_n(2x) - f_n(x) \quad (n = 0, 1, 2, \cdots)$$

で定まる関数 $f_1(x),\ f_2(x),\ f_3(x),\ \cdots$ について，以下の問いに答えよ．
（配点 40 点）

問 1 $f_1(x)$ と $f_2(x)$ を求めよ．

問 2 $f_n(x)$ を求めよ．

問 3 曲線 $y = f_n(x)$ と x 軸で囲まれた図形の面積 S_n を求めよ．
また，$\dfrac{S_n}{S_1} \leqq \dfrac{1}{3^{10}}$ となる n の最小値を求めよ．

IV 座標平面上の直線 $y = \dfrac{3}{4}x - 3$ と x 軸との交点を A，y 軸との交点を B とする．原点 O と点 A，点 B の 3 点を通る円 C について，以下の問いに答えよ．
（配点 35 点）

問 1 円 C の方程式を求めよ．

問 2 $f(x)$ を 2 次関数とする．曲線 $y = f(x)$ が，点 A において円 C と接線を共有し，かつ，原点 O を通るとき，$f(x)$ を求めよ．

問題は，このページで終りである．

2010 Entrance Exam (Achievement Test)
for recommended applicants
平成22年度 推薦入試 基礎学力検査

English

英 語

注 意 事 項

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6. 基礎学力検査終了後，問題冊子は持ち帰ってください.
7. 解答時間は60分です.
8. 辞書を使用することができます.
9. 設問ごとに配点が記されています.

Part 1　Reading Comprehension

次の文章を読み，以下の問いに答えよ．(配点 70 点)

The Galapagos Syndrome

The Galapagos Islands lie in the South Pacific, almost 1,000 kilometres from the coast of Ecuador. They were made famous by Charles Darwin when he wrote about their endemic flora and fauna. He theorized that the animals on the islands had developed separately from other species on mainland South America and so had evolved unique features and characteristics. Even now, there are animals living on the Galapagos Islands that cannot be seen anywhere else.

① It is often said that Japanese consumer electronic products have, like the animals on the Galapagos Islands, developed independently from gadgets that are manufactured in Europe and the United States. A prime example of this "Galapagos Syndrome" is Japanese mobile phone technology.

Mobile phones in Japan have always been ahead of the technological curve. They were the first to be able to send and receive e-mail, the first to have in-built cameras, and the first to use third-generation (3G) networks. It was possible to download music to mobile phones in Japan before it could be done in the West. The ability to make electronic payments and watch TV with mobile phones is common in Japan but still rare elsewhere.

Yet, despite developing these high-tech gadgets, Japanese mobile phones makers have not been able to break into Western markets. According to Strategy Analytics, a market research company, only one of the top five handset manufacturers in 2008 was Japanese, and that was probably thanks to its partnership with a Swedish company. So why is it that such advanced mobile phones are not popular outside of Japan? The answer is the Galapagos Syndrome.

In the 1990's, the start of the evolution process for mobile phones, there was an abundance of demand within the domestic market, so Japanese manufacturers did not need to try and sell their products abroad. This meant that manufacturers created products without any consideration of the tastes or infrastructures of overseas markets. Japanese mobile phones have thus followed an evolutionary path quite different from

mobiles in the West.

One of the biggest differences between mobile phones that have evolved in the West and their Japanese counterparts is the greater emphasis placed on hardware by Japanese makers, hence their mobile phones with multiple functions. In comparison, mobile phones in the West tend to have fewer functions but are easier to use because of better-designed software. As a result, western mobiles are easier to navigate and can be much more easily connected to other devices such as computers.

This Galapagos Syndrome is a problem for Japanese mobile phone makers because now that the Japanese market is saturated, these companies need to sell their products abroad in order to survive. However, they are finding it difficult to do so because western consumers' expectations of mobile phones are not the same as their Japanese peers.

(1) 次の (ア)〜(カ) のそれぞれの文について，その内容が本文で著者が述べていることと一致するものには○，一致しないものには×をつけよ．（配点 30 点）

（ア）Mobile phones in Japan are not as advanced as their counterparts in the West.

（イ）Western mobile phones were the first to use third-generation networks.

（ウ）Japanese mobile phones are not popular with consumers in Europe.

（エ）In the 1990's, Japanese mobile phone manufacturers created devices for overseas markets.

（オ）The software in mobile phones sold in the United States is superior to that of Japan.

（カ）People in Japan are buying fewer mobile phones than in the past.

(2) 本文によれば，日本と欧米の携帯電話の特性が違っているのはなぜなのか．その理由として，最も適切なものを次の (ア)〜(エ) の選択肢の中から一つを選び，記号で答えよ．(配点 10 点)

（ア）Japanese electronic companies are far more advanced than their western counterparts.

（イ）Mobile phone manufacturers in Japan and the West have developed their products independently of each other's markets.

（ウ）Consumers in the West would prefer to have the multiple functions that exist on mobile phones made and sold in Japan.

（エ）The Galapagos Syndrome has prevented the development of mobile phones in Europe and the United States.

(3) 著者によれば，ガラパゴス症候群が日本の携帯電話製造会社にとって問題であるのはなぜなのか．その理由として，最も適切なものを次の (ア)〜(エ) の選択肢の中から一つを選び，記号で答えよ．(配点 10 点)

（ア）Japanese consumers' expectations of mobile phones are the same as their peers in the West.

（イ）The Japanese market is soaked, so western makers of mobile phones are finding it as hard as their Japanese counterparts to sell their products.

（ウ）American makers of mobile phones are now finding it increasingly easy to sell their products in the Japanese market.

（エ）People in the West have become accustomed to mobile phones that the Japanese manufacturers do not make.

(4) 本文の要約（要旨）として最も適切と考えられるものを，次の (ア)〜(エ) の選択肢の中から一つを選び，記号で答えよ．(配点 10 点)

（ア）Mobile phones on the Galapagos Islands have evolved differently from phones in other countries. Consequently, mobile phones in the West have many more functions. This means that Japanese mobile phone makers are unable to sell their products in other countries.

（イ）Japanese mobile phones are unpopular outside of Japan because they have evolved in a completely different way from their cousins in the Galapagos. Accordingly, western manufacturers are now faced with the problem of having to sell their phones in Japan.

（ウ）Japanese mobile phones are not the same as phones that have been developed in the West. As a result, Japanese manufactures are finding it difficult to sell their mobile phones in Europe and the United States.

（エ）The Galapagos Syndrome is a condition in which Japanese mobile phones have acquired numerous functions. Despite this, they are far less advanced than their counterparts in the West. Therefore, Japanese mobile phone manufactures are now very popular in the West.

(5) 本文中の下線部①を和訳せよ．(配点 10 点)

Part 2　Personal Response to the Writing

Part 1 では携帯電話の開発について述べられていた．これについて，以下の問いに**英語**で答えよ．ただし，解答は英文として明瞭かつ論理的に表現されていれば，どのような立場のものでも可とするが，箇条書きのような書き方をせずに，必ず完全な英語の文章で答えること．(配点 30 点)

(1) What are two advantages and two disadvantages of mobile phones? (配点 15 点)

(2) If you had to design a new mobile phone, describe two main features and explain why it would have those features. (配点 15 点)