1. Which of the following is the equation of a line perpendicular to the line $x + 3y + 4 = 0$

   A $y = 3x$

   B $y = \dfrac{1}{3}x$

   C $y = -\dfrac{1}{3}x$

   D $y = -x$

2. Given that $f : x \rightarrow 2x,\ g : x \rightarrow 3 - 5x$, then $(g \circ f)^{-1}$ maps x onto

   A $\dfrac{3}{11}$

   B $\dfrac{6}{11}$

   C $\dfrac{1}{10}(3 - x)$

   D $\dfrac{1}{10}(6 - x)$

3. $A = 2\pi r^2 + 6\pi r$. The rate of change of A with respect to r, when $r = 2$, is

   A 10π
   B 12π
   C 14π
   D 20π

4. The graph of $y = \frac{1}{2}\ \log_{10} x$ cuts the x-axis at

   A $(1, 0)$
   B $(2, 0)$
   C $(10, 0)$
   D $(100, 0)$

5. The line $2y = 3x + 6$ meets the y-axis at C. The gradient of the line joining C to A $(4, -3)$ is

   A $\dfrac{9}{4}$

   B $\dfrac{2}{3}$

   C $-\dfrac{2}{3}$

   D $-\dfrac{3}{2}$

6. The range of the function $f : x \rightarrow \sin 2x,\ x\, \varepsilon\, R$, where R is the set of real numbers,

   A $[-1, 1]$
   B $[-2, 2]$
   C $[0, \pi]$
   D $[0, 2\pi]$

7. For which real values of x is the function $f : x \rightarrow \dfrac{1}{\sqrt{(1 - x^2)}}$ defined on the set of real numbers
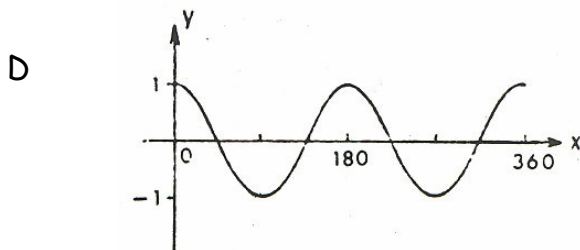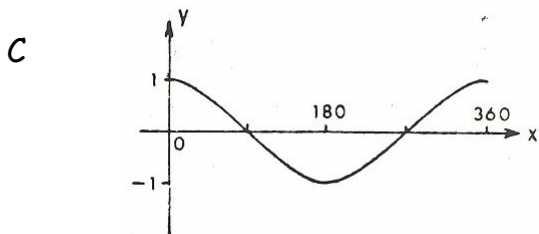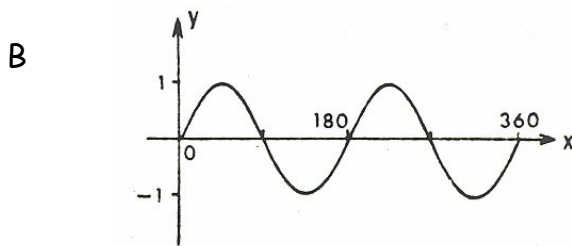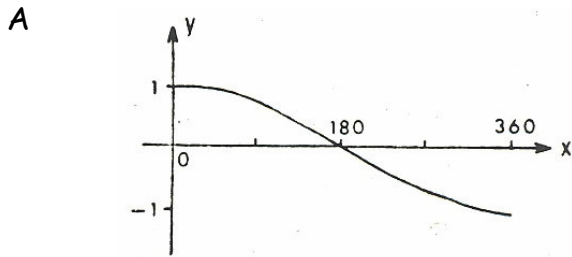
   A   All x except $x = 1$ and $x = -1$
   B $x > 1$ only
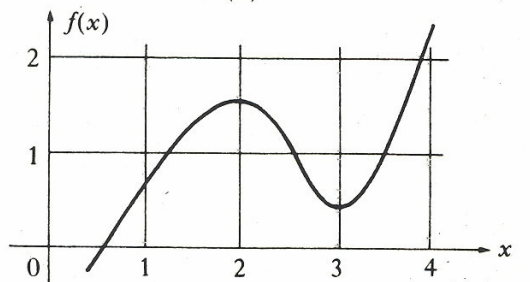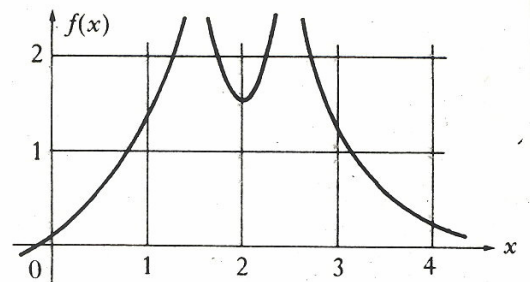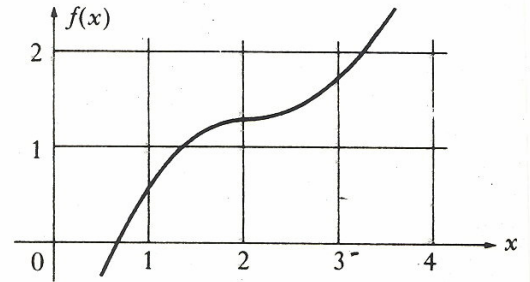   C $x < 1$ only
   D $-1 < x < 1$ only

8.   Which of the following sketches is most likely to show the graph of $y = \cos 2x°$ for $0 \le x \le 360$?

A

B

C

D

9.   Which of the graphs (i), (ii), (iii) could be that of a function f such that $f'(1) > 0$, $f'(3) > 0$ and $f'(2) = 0$?

(i)

(ii)

(iii)

A   (i) only
B   (ii) only
C   (iii) only
D   (i), (ii) and (iii)

10.   The image of the curve $y = \cos x$ under a half-turn about the origin is

A $y = \cos x$
B $y = \cos (-x)$
C $y = -\cos x$
D $y = \sin x$