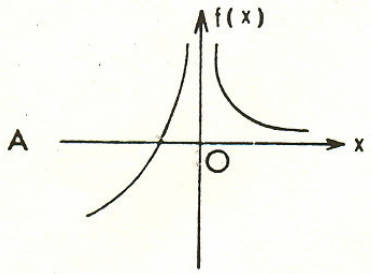
1. Which of the functions graphed below satisfies the conditions

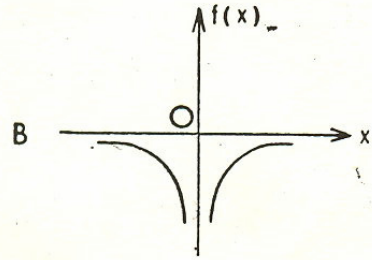
$f^1(x) <$ , $x < 0$
$f^1(x) <$ , $x < 0$

Where $x \varepsilon R$, where $R$ is the set of real numbers and $x \neq 0$?

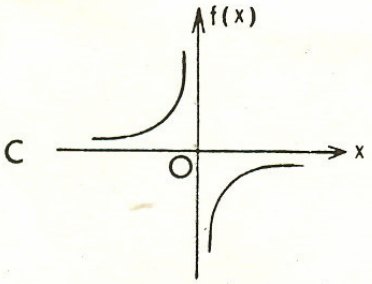
A



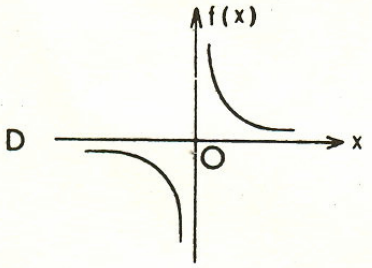

B



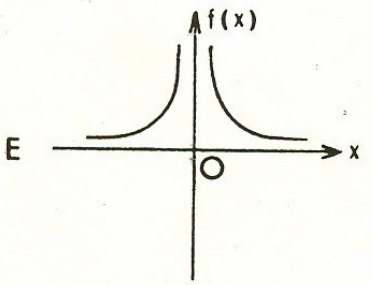

C



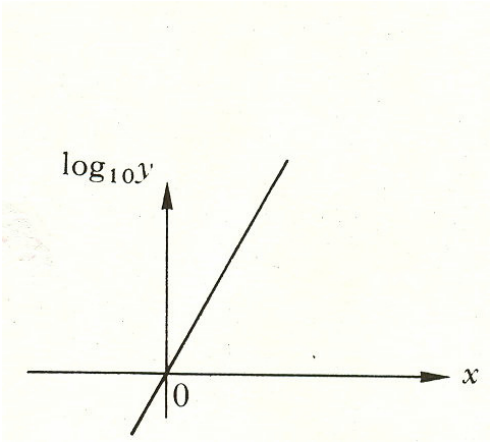

D




E




2.




When $\log_{10} y$ is plotted against $x$, the resulting graph is a straight line through the origin with gradient 2. $y$ equals

A $10^2x$
B $10^{2x}$
C $x^{100}$
D $10^{(x2)}$
E $(2x)^{10}$

3. $a = \begin{pmatrix} \frac{6}{7} \\ -\frac{3}{7} \\ x \end{pmatrix}$ is a unit vector. Which of the following could be the value of $x$?

(1) $-\frac{10}{7}$

(2) $-\frac{2}{7}$

(3) $\frac{2}{7}$

(4) $\frac{4}{7}$

A (1), (2) and (3) only
B (1) and (4) only
C (2) and (3) only
D (4) only
E Some either response, or combination of the responses

4. The solution of the equation $\sqrt{3} \sin x^\circ = -\cos x^\circ$ where $0 \leq x \leq 270$ is

A 0
B 120
C 150
D 210
E 240

5. Given that $f(x) = \cos\left(\frac{\pi}{6} - x\right)$, then $f'\left(\frac{\pi}{6}\right)$ equals

A $-\frac{\sqrt{3}}{2}$
B $-\frac{1}{2}$
C 0
D $\frac{1}{2}$
E $\frac{\sqrt{3}}{2}$

6. The graph of $f: x \to \cos(x + k)^\circ$ crosses the $x$-axis with a negative gradient when $x = 40$. The value of $k$ could be

A 50
B 130
C 140
D 220
E 230

7. Given that $f(x) = 2\cos(3 - 4x)$, then $f'(x)$ equals

A $2\sin(3 - 4x)$
B $-2\sin(3 - 4x)$
C $6\sin(3 - 4x)$
D $-8\sin(3 - 4x)$
E $8\sin(3 - 4x)$

8. Given that $k$ is a constant of integration, then $\int \sin 5x \, dx$ equals

A $-\cos 5x + k$
B $-\frac{1}{5}\cos 5x + k$
C $\frac{1}{5}\sin 5x + k$
D $\frac{1}{5\int}\sin 5x + k$
E $\cos 5x + k$

9. $\int_0^{\pi} (1 + \cos x)\, dx$ equals

A 0
B 1
C 3
D $\pi$
E 4

10. O is the origin,
P the point (-1, 0,3) and
Q the point (0, -3, 1). The cosine of angle POQ equals.

A 0·4
B 0·3
C 0
D -0·1
E -0·4