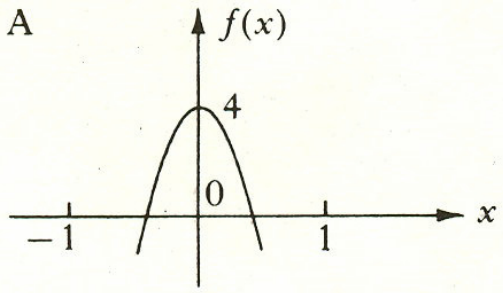
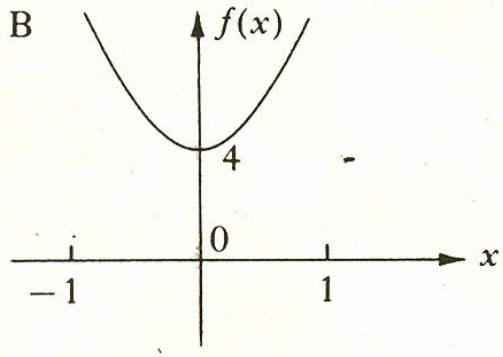
1. Which graph is most likely to be the graph of $f(x) = 3x^2 - 2x + 4$.

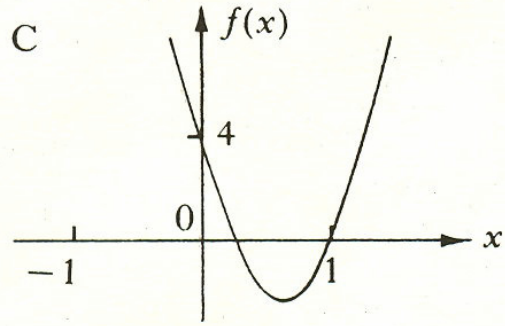
A



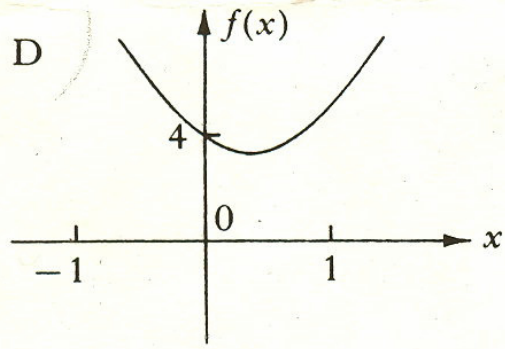
B



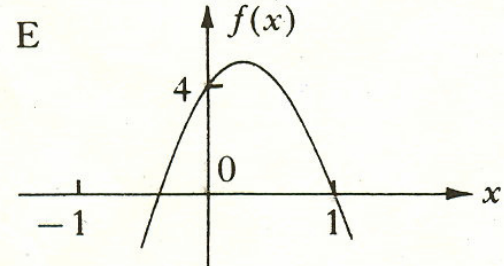
C



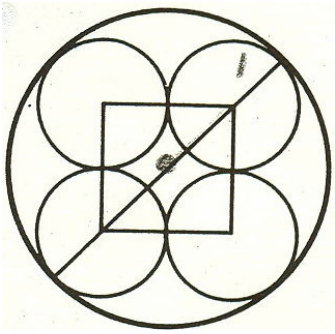
D



E



2.



Four circles, each of unit radius, are placed touching each other as shown. The radius of the circumscribing circle is

A $1 + \sqrt{2}$
B $2\sqrt{2}$
C $2 + \sqrt{2}$
D $1 + 2\sqrt{2}$
E $2 + 2\sqrt{2}$

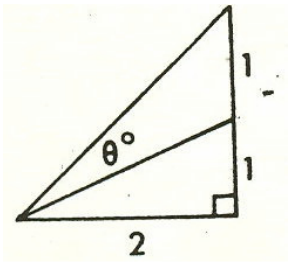
3. Given that k is a constant of integration $\int \frac{dx}{x^4}$ equals

A $-\quad + k$
B $\frac{1}{3x^3} + k$
C $-\frac{3}{x^3} + k$
D $-\frac{3}{3x^3} + k$
E $\frac{1}{5x^5} + k$
$\frac{5}{x^5}$

4. Which of the following is/are factors of: $2x^3 - 11x^2 - 23x + 14$?

[1] $2x - 1$
[2] $x - 3$
[3] $x + 7$
A (1) only
B (2) only
C (3) only
D (1) and (3) only
E none of (1), (2) and (3)

5.



tan $\theta°$

A tan 15°

B tan $22\frac{1}{2}°$

C $\frac{1}{2}$

D $\frac{1}{\sqrt{5}}$

E $\frac{1}{3}$

6. The image of the circle $x^2 + y^2 = 1$ after reflection in the line $x + y = 1$ is

A $(x + 1)^2 + (y + 1)^2 = 1$
B $(x - 1)^2 + (y - 1)^2 = 1$
C $x^2 + y^2 = 2$
D $x^2 + y^2 = 1$
E $(x - 1)^2 + (y - 1)^2 = 3$

7. In which quadrant(s) can a point on the circumference of the circle $(x - 4)^2 + (y + 3)^2 = 5$ lie?

A The second only
B The fourth only
C The first, second and third only
D The first, third and fourth only
E Any quadrant

8. Given that $f(x) = x^n - 1$, where n is a positive integer, then $x + 1$ is a factor of $f(x)$ for

A All values of n
B No value of n
C All even values of n only
D All odd values of n only
E $n = 2$ only

9. Two **non-congruent** triangles PQR and LMN are equal in area and are such that PQ = LM and PR = LN.

Angle P must equal

A 180° - angle L
B 90° - angle L
C 90° + angle L
D angle L
E angle L - 90°

10. $\int_1^2 x^4\,dx$ equals

A 32

B 28

C 15

D $\frac{31}{4}$

E $\frac{31}{5}$

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