3.4: Real zeroes of Polynomials

1. According to Descartes rule of signs, $P(x) = x^6 + 3x^5 + x^3 - x - 1$ has a total of either:

   A) two or four real zeros

   B) four or six real zeros

   C) two or four or six real zeros

   D) one or five real zeros

   E) one or three or five real zeros

2. The number of all the x-intercept(s) of the graph of the polynomial function $P(x) = x^5 + x^4 - 2x^3 - 2x^2 + x + 1$, is:

   A) 2

   B) 1

   C) 3

   D) 4

   E) 0

3. The number of all possible rational zeros of $p(x) = 4x^5 + 4x^4 - 37x^3 - 37x^2 + 9x + 9$ is

A) 18

B) 16

C) 14

D) 20

E) 12

4. If $p(x) = x^6 + x^4 - 5x^3 + 5x - 6$, using Descartes' Rule of Sign, if M is the maximum possible number of positive real zeros of $p(x)$, and N is the minimum possible number of negative real zeros of $p(x)$, $M + N =$

A) 4

B) 2

C) 3

D) 6

E) 8

5. If $f(x)$ is a polynomial of degree 3 with real coefficients and having zeroes $-3,1,4$ and $f(2) = 30$, then $f(x) =$

A) $-3x^3 + 6x^2 + 33x - 36$

B) $-3x^3 - 2x^2 - 11x + 12$

C) $-x^3 + 2x^2 + 11x - 12$

D) $x^3 - 2x^2 - 11x + 12$

E) $3x^3 - 6x^2 - 33x + 36$

6. The number of rational zeros of the polynomial $f(x) = 2x^4 - x^3 + 7x^2 - 4x - 4$ is:

A) 2

B) 0

C) 1

D) 4

E) 3

7. The Polynomial $p(x) = 8x^3 + 8x^2 - 4x - 1$ has:

A) one rational and two irrational zeros.

B) two rational and one irrational zeros

C) three irrational zeros.

D) three rational zeros.

E) no real zeros.

8. The number of rational zeros of the polynomial $p(x) = 2x^4 - 4x^3 + 3x^2 + 9x$

A) 4

B) 1

C) 0

D) 2

E) 3

9. If A and B are the distinct rational zeros of the polynomial $p(x) = x^3 - 2x^2 - 4x + 8$ then $A + B =$

A) 4

B) 0

C) -4

D) -2

E) 2

10. If x_1 is the largest real zero of $p(x) = 2x^3 + 7x^2 + 2x - 3$, then the value of $12x_1 + 5$ is equal to

A) 11

B) $-7/2$

C) $-9/2$

D) 41

E) 17