Homework

16. If $f(x) = 3x^5 - 5x^4 + 2x - 1$, what are the x-coordinates of all points of inflection for the graph of f?

(A) -1 (B) 0 (C) 1

(D) 0 and 1 (E) -1, 0, and 1

$f'(x) = 15x^4 - 20x^3 + 2$

$f''(x) = 60x^3 - 60x^2$

$f''(x) = 60x^2(x-1) \rightarrow x = 1$

↳ no sign change

19. If $f''(x) = (x-1)(x+2)^3(x-4)^2$, then the graph of f has inflection points when $x =$

odd powers

(A) -2 only (B) 1 only (C) 1 and 4 only

(D) -2 and 1 only (E) -2, 1, and 4 only

5. $y = 5x^4 - 24x^3 + 24x^2 + 17$ is concave down for

(A) $x < 0$. (B) $x > 0$.

(C) $x < -2$ or $x > -\frac{2}{5}$. (D) $x < \frac{2}{5}$ or $x > 2$.

(E) $\frac{2}{5} < x < 2$.

$y' = 20x^3 - 72x^2 + 48x$

$y'' = 60x^2 - 144x + 48$

$y'' = 12(5x^2 - 12x + 4)$

$y'' = 12(5x - 2)(x - 2)$

	+	2/5	−	2	+
5x−2	−		+		+
x−2	−		−		+

The position of the particle traveling along a straight line is $x(t) = t^3 - 9t^2 + 15t + 3$. On the interval $t = 0$ to $t = 10$, when is the particle farthest to the left?

(A) $t = 0$ (B) $t = 1$ (C) $t = 3$

(D) $t = 5$ (E) $t = 10$

$v'(t) = 3t^2 - 18t + 15$

$v'(t) = 3(t^2 - 6t + 5)$

$v'(t) = 3(t-5)(t-1)$

right, left, 5 right

	+	−	+
t−5	−	−	+
t−1	−	+	+

Ep: $X(0) = 3$

$X(10) = 253$

$X(5) = -22$

farthest left at $t = 5$