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XI MIPA 3
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1.) $\lim_{x \to 2} 3x^2+5 = 3(2)^2+5 = 17$

2.) $\lim_{x \to 2} \frac{x^2-5x+6}{x^2-4} = \frac{2x-5}{2x} = \frac{2(2)-5}{2(2)} = -\frac{1}{4}$

3.) $\lim_{x \to 4} 10x = 10(4) = 40$

4.) $\lim_{x \to 6} 4x^2+7 = 4(6)^2+7 = 151$

5.) $\lim_{x \to 4} \frac{\sqrt{x}-2}{x^2-16} = \lim_{x \to 4} \frac{x^{\frac{1}{2}}-2}{x^2-16} = \lim_{x \to 4} \frac{\frac{1}{2}x^{-\frac{1}{2}}}{2x} = \lim_{x \to 4} \frac{\frac{1}{2}(4)^{-\frac{1}{2}}}{2(4)} = \lim_{x \to 4} \frac{\frac{1}{4}}{8} = \frac{1}{32}$

6.) $\lim_{x \to \infty} \frac{3x^4+2x^3-5x+4}{2x^4-5x^2+1} = \frac{3}{2}$

7.) $\lim_{x \to \infty} \frac{3x^4+2x^3+x}{4x^2+1} = \infty$

8.) $\lim_{x \to \infty} (\sqrt{9x^2+3x} - \sqrt{9x^2-5x}) = \frac{3+5}{2\sqrt{9}} = \frac{8}{6} = \frac{4}{3}$

9.) $\lim_{x \to \infty} (\sqrt{x(4x+5)} - \sqrt{4x^2-3}) = \sqrt{4x^2+5x} - \sqrt{4x^2-3}$
$= \frac{5-0}{2\sqrt{4}} = \frac{5}{4}$

10.) $\lim_{x \to \infty} (\sqrt{x+1} - \sqrt{x+2}) = 0$

11.) Tentukan turunan dari $f(x) = 6\sqrt{x^3}$
$\hookrightarrow f(x) = 6x^{\frac{3}{2}}$
$f'(x) = 9x^{\frac{1}{2}} = 9\sqrt{x}$

12.) Ten. turunan dari $f(x) = (x^2+7x+3)(x+5)$
$\hookrightarrow F(x) = 4x^3+13x^2+22x+15$
$F'(x) = 12x^2+26x+22$

13.) Tentukan turunan dari $F(x) = 5(2x^2+4x)$
$\hookrightarrow F(x) = 10x^2+20x$
$F'(x) = 20x+20$

14.) Tentukan turunan dari $F(x) = (2x+3)(5x+4)$
$\hookrightarrow f(x) = 10x^2+23x+12$
$f'(x) = 20x+23$

15.) Tentukan turunan dari $F(x) = (2x^3+5x+3)(x+2)$
$\hookrightarrow f(x) = 2x^4+4x^3+5x^2+13x+6$
$f'(x) = 8x^3+12x^2+10x+13$

16.) Interval x yang membuat kurva fungsi $f(x) = x^3 - 6x^2 + 9x + 2$ selalu turun adalah

↳ $f'(x) = 3x^2 - 12x + 9$

$f'(x) < 0$

$3x^2 - 12x + 9 < 0$

$x^2 - 4x + 3 < 0$ → $(x-3)(x-1) \leq 0$

$x = 3 \quad x = 1$

$\therefore 1 < x < 3$ → Interval x

17.) Interval x yang membuat kurva fungsi $f(x) = 2x^3 - 9x^2 + 12x$ selalu naik adalah

↳ $f'(x) = 6x^2 - 18x + 12$

$f'(x) > 0$

$6x^2 - 18x + 12 > 0$

$x^2 - 3x + 2 > 0$ → $(x-2)(x-1) > 0$

$x = 2 \quad x = 1$

$\therefore x < 1 \cup x > 2$

18.) Tentukan nilai stasioner dari fungsi $f(x) = x^2 + 6x + 5$

↳ $f'(x) = 2x + 6$

$f'(x) = 0$

$2x + 6 = 0$ → $2x = -6$, $x = -3$

$f(-3) = (-3)^2 + 6(-3) + 5$

$= 9 - 18 + 5$

$= -4$

19.) Ten. Nilai stasioner dari fungsi $f(x) = x^2 + 2x + 9$

↳ $f'(x) = 2x + 2$

$f(x) = 0$

$2x + 2 = 0$ → $2x = -2$, $x = -1$

$f(-1) = (-1)^2 + 2(-1) + 9$

$= 1 - 2 + 9$

$= 8$

20.) Ten. titik belok dari $y = 2x^3 - 3x^2 + 4x + 2$

$6y' = 6x^2 - 6x + 4$

$y'' = 12x - 6$

$m = 12x$

$12x = 12$, $x = 1$ → $y = 2(1)^3 - 3(1)^2 + 4(1) + 2$

$= 2 - 3 + 4 + 2$

$= 5$

$(1, 5)$