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10) a) $f(x) = -x^2$; $f(x) = -2x^2 + 1$

b) $f(x) = x^4$; $f(x) = x^4 - 1$

c) $f(x) = \sin x$; $f(x) = \cos x$

d) $f(x) = x$; $f(x) = x^3$

e) $f(x) = -x^2 - 1$; $f(x) = -2x^2 - 5$

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2) a) $(-\infty | -2]$ Reku (konkav)

$(-2 | 1]$ Liku (konvex)

$(1 | 4]$ Reku (konkav)

$(4 | \infty)$ Liku (konvex)

b) $(-\infty | 0]$ Liku

$(0 | 2]$ Reku

$(2 | \infty)$ Liku

c) $(-\infty | 2]$ Liku

$(2 | 4]$ Reku

$(4 | 6]$ Liku

$(6 | 8]$ Reku

$(8 | \infty)$ Liku

3) aufg.	WP	Klassen
$f(x) = -x^2 + 2x + 4$	-	Reku
$f(x) = x^3 - x$	$P_{w_1}(0 0)$	ReLiKu
$f(x) = x^3 + 6x$	$P_{w_1}(0 0)$	ReLiKu
$f(x) = x^4 + x^2$	-	Liku
$f(x) = x^4 - 6x^2$	$P_{w_1}(-1 5); P_{w_2}(1 5)$	LiReku / ReLiKu
$f(x) = \frac{1}{3}x^6 - 20x^2$	$P_{w_1}(-\sqrt{2} -37 3); P_{w_2}(\sqrt{2} -37 3)$	LiReku / ReLiKu
$f(x) = x^5 - x^4 + x^3$	$P_{w_1}(0 0)$	ReLiKu
$f(x) = x^3(\frac{1}{20}x^2 + \frac{1}{4}x + 3)$	$P_{w_1}(-2 -\frac{3}{15}); P_{w_2}(-1 -\frac{3}{15})$	$P_{w_3}(0 0)$ ReLiKu / LiReku / ReLiKu
$f(x) = \frac{3}{10}x^5 - 4x^3 + 10$	$P_{w_1}(-2 32 4); P_{w_2}(2 -12 4)$	$P_{w_3}(0 10)$ ReLiKu / LiReku / ReLiKu

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a) $f(x) = x^3 - 6x^2 + 20$

$$f'(x) = 3x^2 - 12x$$

$$f''(x) = 6x - 12$$

uB: $f''(x) = 0 = 6x - 12 \leadsto x_w = 2$

hB: $f'''(x) = 6 > 0 \leadsto$ Relikum bei $P_w(2|4)$

$$f'(2) = -12 \leadsto y = -12x + u$$

$$P_w \rightarrow 4 = -12 \cdot 2 + u \leadsto u = 28$$

$$\leadsto \underline{\underline{y = -12x + 28}}$$

e) $f(x) = x + \sin x$ $J(0|2\pi)$

$$f'(x) = 1 + \cos x$$

$$f''(x) = -\sin x$$

uB: $f''(x) = 0 = -\sin x \leadsto x_{w1} = 0; x_{w2} = \pi; x_{w3} = 2\pi$
 $\leadsto 0 = \sin x$

$$f'''(x) = -\cos x$$

h. B.: $f'''(0) = -1 < 0 \leadsto$ LiReku bei $P_{w1}(0|0)$

$$f'''(\pi) = 1 > 0 \leadsto$$
 Relikum bei $P_{w2}(\pi|\pi)$

$$f'''(2\pi) = -1 < 0 \leadsto$$
 LiReku bei $P_{w3}(2\pi|2\pi)$

$$f'(0) = 2 \leadsto y = 2x + u$$

$$P_{w1} \rightarrow 0 = 2 \cdot 0 + u \leadsto u = 0$$

$$\leadsto \underline{\underline{y = 2x}}$$

$$f'(\pi) = 0 \leadsto y = 0x + u$$

$$P_{w2} \rightarrow \pi = 0 \cdot \pi + u \leadsto u = \pi$$

$$\leadsto \underline{\underline{y = \pi}}$$

$$f'(2\pi) = 2$$

$$\leadsto y = 2x + u$$

$$P_{w3} \rightarrow 2\pi = 2 \cdot 2\pi + u \leadsto u = -2\pi$$

$$\leadsto \underline{\underline{y = 2x - 2\pi}}$$