Lista 10

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ANALIZA MATEMATYCZNA

LISTA ZADAŃ 10

12.12.2022

1. Wyznacz pewnych ekstremów asymptot. Sporządzamy funkcje:

(a) $f(x) = \sqrt{x+2}$, (b) $f(x) = \frac{1}{x^2+1}$, (c) $f(x) = \log(x+4)$.

2. Znajdź punkty przegięcia i przedziały wypukłości funkcji danych wzorami:

(a) $x^4 - 6x^3 + 12x + 4$, (b) $x^5 - x^4 - 20$, (c) $\frac{x^2}{x-1}$, (d) $\frac{x^2}{x^2+3}$, (e) $\sqrt{x^2+1}$, (f) $x^2 \cdot e^x$, (g) $\frac{x}{\sqrt{x^2+1}}$.

3. Znajdź punkt przecięcia stycznej do wykresu funkcji $f(x) = x^3$ w punkcie $(2, 8)$ z osią OX.

4. Znajdź punkt przecięcia stycznej do wykresu funkcji $f(x) = e^x$ w punkcie $(0, 1)$ z osią OX.

5. Znajdź punkty przecięcia stycznych do wykresu funkcji $f(x) = x^2$ odpowiednio w punktach $(-1, 1)$ i $(2, 4)$.

6. Dla funkcji $f(x)$ ze podk. $f(x)$ dane jest wzorem:

(a) $x^2 + 2x$, (b) $\sqrt{x}$, $m, n \in \mathbb{N}$, (c) x^n, $n \in \mathbb{N}$,

(d) $3, 4x^{-10}$, (e) $1 - 2x$, (f) $\left(\frac{1-x}{1+x}\right)^2$,

(g) $(\sqrt{x}+1)(x-\sqrt{x}+1)$, (h) $\frac{\sqrt{x}-\sqrt{x^3}+x^2}{x}$, (i) $(x+1)^n$,

(j) $\frac{x^{n-1}+1}{x-1}$, (k) $\frac{x\sqrt{x}+\sqrt{x}}{x+1}$, (l) $\frac{x^n}{x+1}$.

7. Znaleźć taką funkcję F, żeby $F'(x)$ było równe:

(a) $\frac{1}{x^2+1}$, (b) $\frac{1}{\sqrt{1-x^2}}$, (c) $\frac{1}{x}$.

8. Dla funkcji f dane wzorem:

(a) $F''(x) = x^2 + 1$, $F'(0) = 2$, $F(0) = 3$,

(b) $F''(x) = \frac{1}{x^2}$, $F'(2) = 3$, $F(3) = 5$,

(c) $F''(x) = \cos x$, $F'(0) = F'(\pi) = F(0) = 0$,

(d) $F''(x) = \frac{1}{x^3}$, $F'(1) = F'(-1) = 1$, $F(-1) = 3$.

9. Dla funkcji $f(x)$ ze podk. $f(x)$ dane jest wzorem:

(a) e^{7x}, (b) $\sin(x)$, (c) $\cos(x)$, (d) $\sin(2x)$, (e) $\cos(3x)$, (f) $\sin(5x)$, (g) $\cos(7x)$, (h) e^{-x}, (i) e^{2x}, (j) e^{5x}, (k) $\frac{1}{x^2}$, (l) $\frac{1}{x^3}$, (m) $\frac{1}{x^4}$, (n) $\frac{1}{\sqrt{x}}$, (o) $\frac{1}{\sqrt[3]{x}}$, (p) $\frac{1}{\sqrt[4]{x}}$, (q) $\frac{1}{x^2+1}$, (r) $\frac{1}{x^2+4}$, (s) $\frac{1}{x^2+9}$, (t) $\frac{1}{x^2+16}$, (u) $\frac{1}{\sqrt{1-x^2}}$, (v) $\frac{1}{\sqrt{4-x^2}}$, (w) $\frac{1}{\sqrt{9-x^2}}$, (x) $\frac{1}{\sqrt{16-x^2}}$, (y) $\frac{1}{\sqrt{x^2+1}}$, (z) $\frac{1}{\sqrt{x^2+4}}$, (aa) $\frac{1}{\sqrt{x^2+9}}$, (ab) $\frac{1}{\sqrt{x^2+16}}$, (ac) $\frac{1}{\sqrt{1-x^2}}$, (ad) $\frac{1}{\sqrt{4-x^2}}$, (ae) $\frac{1}{\sqrt{9-x^2}}$, (af) $\frac{1}{\sqrt{16-x^2}}$, (ag) $\frac{1}{\sqrt{x^2+1}}$, (ah) $\frac{1}{\sqrt{x^2+4}}$, (ai) $\frac{1}{\sqrt{x^2+9}}$, (aj) $\frac{1}{\sqrt{x^2+16}}$, (ak) $\frac{1}{\sqrt{1-x^2}}$, (al) $\frac{1}{\sqrt{4-x^2}}$, (am) $\frac{1}{\sqrt{9-x^2}}$, (an) $\frac{1}{\sqrt{16-x^2}}$, 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(qo) $\frac{1}{\sqrt{x^2+1}}$, (qp) $\frac{1}{\sqrt{x^2+4}}$, (qq) $\frac{1}{\sqrt{x^2+9}}$, (qr) $\frac{1}{\sqrt{x^2+16}}$, (qs) $\frac{1}{\sqrt{1-x^2}}$, (qt) $\frac{1}{\sqrt{4-x^2}}$, (qu) $\frac{1}{\sqrt{9-x^2}}$, (qv) $\frac{1}{\sqrt{16-x^2}}$, (qw) $\frac{1}{\sqrt{x^2+1}}$, (qx) $\frac{1}{\sqrt{x^2+4}}$, (qy) $\frac{1}{\sqrt{x^2+9}}$, (qz) $\frac{1}{\sqrt{x^2+16}}$, (ra) $\frac{1}{\sqrt{1-x^2}}$, (rb) $\frac{1}{\sqrt{4-x^2}}$, (rc) $\frac{1}{\sqrt{9-x^2}}$, (rd) $\frac{1}{\sqrt{16-x^2}}$, (re) $\frac{1}{\sqrt{x^2+1}}$, (rf) $\frac{1}{\sqrt{x^2+4}}$, (rg) $\frac{1}{\sqrt{x^2+9}}$, (rh) $\frac{1}{\sqrt{x^2+16}}$, (ri) $\frac{1}{\sqrt{1-x^2}}$, (rj) $\frac{1}{\sqrt{4-x^2}}$, (rk) $\frac{1}{\sqrt{9-x^2}}$, (rl) $\frac{1}{\sqrt{16-x^2}}$, (rm) $\frac{1}{\sqrt{x^2+1}}$, (rn) $\frac{1}{\sqrt{x^2+4}}$, (ro) $\frac{1}{\sqrt{x^2+9}}$, (rp) $\frac{1}{\sqrt{x^2+16}}$, (rq) $\frac{1}{\sqrt{1-x^2}}$, (rr) $\frac{1}{\sqrt{4-x^2}}$, (rs) $\frac{1}{\sqrt{9-x^2}}$, (rt) $\frac{1}{\sqrt{16-x^2}}$, (ru) $\frac{1}{\sqrt{x^2+1}}$, (rv) $\frac{1}{\sqrt{x^2+4}}$, (rw) $\frac{1}{\sqrt{x^2+9}}$, (rx) $\frac{1}{\sqrt{x^2+16}}$, (ry) $\frac{1}{\sqrt{1-x^2}}$, (rz) $\frac{1}{\sqrt{4-x^2}}$, (sa) $\frac{1}{\sqrt{9-x^2}}$, (sb) $\frac{1}{\sqrt{16-x^2}}$, (sc) $\frac{1}{\sqrt{x^2+1}}$, (sd) $\frac{1}{\sqrt{x^2+4}}$, (se) $\frac{1}{\sqrt{x^2+9}}$, (sf) $\frac{1}{\sqrt{x^2+16}}$, (sg) $\frac{1}{\sqrt{1-x^2}}$, (sh) $\frac{1}{\sqrt{4-x^2}}$, (si) $\frac{1}{\sqrt{9-x^2}}$, (sj) $\frac{1}{\sqrt{16-x^2}}$, (sk) $\frac{1}{\sqrt{x^2+1}}$, (sl) $\frac{1}{\sqrt{x^2+4}}$, (sm) $\frac{1}{\sqrt{x^2+9}}$, (sn) $\frac{1}{\sqrt{x^2+16}}$, (so) $\frac{1}{\sqrt{1-x^2}}$, (sp) $\frac{1}{\sqrt{4-x^2}}$, (sq) $\frac{1}{\sqrt{9-x^2}}$, (sr) $\frac{1}{\sqrt{16-x^2}}$, (ss) $\frac{1}{\sqrt{x^2+1}}$, (st) $\frac{1}{\sqrt{x^2+4}}$, (su) $\frac{1}{\sqrt{x^2+9}}$, (sv) $\frac{1}{\sqrt{x^2+16}}$, (sw) $\frac{1}{\sqrt{1-x^2}}$, (sx) $\frac{1}{\sqrt{4-x^2}}$, (sy) $\frac{1}{\sqrt{9-x^2}}$, (sz) $\frac{1}{\sqrt{16-x^2}}$, (ta) $\frac{1}{\sqrt{x^2+1}}$, (tb) $\frac{1}{\sqrt{x^2+4}}$, (tc) $\frac{1}{\sqrt{x^2+9}}$, (td) $\frac{1}{\sqrt{x^2+16}}$, (te) $\frac{1}{\sqrt{1-x^2}}$, (tf) $\frac{1}{\sqrt{4-x^2}}$, (tg) $\frac{1}{\sqrt{9-x^2}}$, (th) $\frac{1}{\sqrt{16-x^2}}$, (ti) $\frac{1}{\sqrt{x^2+1}}$, (tj) $\frac{1}{\sqrt{x^2+4}}$, (tk) $\frac{1}{\sqrt{x^2+9}}$, (tl) $\frac{1}{\sqrt{x^2+16}}$, (tm) $\frac{1}{\sqrt{1-x^2}}$, (tn) $\frac{1}{\sqrt{4-x^2}}$, (to) $\frac{1}{\sqrt{9-x^2}}$, (tp) $\frac{1}{\sqrt{16-x^2}}$, (tq) $\frac{1}{\sqrt{x^2+1}}$, (tr) $\frac{1}{\sqrt{x^2+4}}$, (ts) $\frac{1}{\sqrt{x^2+9}}$, (tt) $\frac{1}{\sqrt{x^2+16}}$, (tu) $\frac{1}{\sqrt{1-x^2}}$, (tv) $\frac{1}{\sqrt{4-x^2}}$, (tw) $\frac{1}{\sqrt{9-x^2}}$, (tx) $\frac{1}{\sqrt{16-x^2}}$, (ty) $\frac{1}{\sqrt{x^2+1}}$, (tz) $\frac{1}{\sqrt{x^2+4}}$, (ua) $\frac{1}{\sqrt{x^2+9}}$, (ub) $\frac{1}{\sqrt{x^2+16}}$, (uc) $\frac{1}{\sqrt{1-x^2}}$, (ud) $\frac{1}{\sqrt{4-x^2}}$, (ue) $\frac{1}{\sqrt{9-x^2}}$, (uf) $\frac{1}{\sqrt{16-x^2}}$, (ug) $\frac{1}{\sqrt{x^2+1}}$, (uh) $\frac{1}{\sqrt{x^2+4}}$, (ui) $\frac{1}{\sqrt{x^2+9}}$, (uj) $\frac{1}{\sqrt{x^2+16}}$, (uk) $\frac{1}{\sqrt{1-x^2}}$, (ul) $\frac{1}{\sqrt{4-x^2}}$, (um) $\frac{1}{\sqrt{9-x^2}}$, (