calculus
§1.1, 1.2 p.56 (2-44 evens)

Korpi
Period 11

(2) Line through $(-1,2)$, slope $= -\frac{1}{2}$

$y-2=(-\frac{1}{2})(x+1)$

$y=-\frac{1}{2}x-\frac{1}{2}+2$

$\boxed{y=-\frac{1}{2}x+\frac{3}{2}}$

(4) line through $(-3,6), (1,-2)$

$m=\frac{6--2}{-3-1}=\frac{8}{-4}=-2$

$y-6=(-2)(x+3)$

$y=-2x-6+6$

$\boxed{y=-2x}$

(6) line through $(3,3), (-2,5)$

$m=\frac{5-3}{-2-3}=\frac{2}{-5}=-\frac{2}{5}$

$y-3=(-\frac{2}{5})(x-3)$

$y=-\frac{2}{5}x+\frac{6}{5}+3$

$\boxed{y=-\frac{2}{5}x+\frac{21}{5}}$

(8) line through $(3,1)$ and parallel to $2x-y=-2$

$y=2x+2 \rightarrow m=2$

so $y-1=(2)(x-3)$

$y=2x-6+1$

$\boxed{y=2x-5}$

(10) line through $(-2,-3)$, perp. to $3x-5y=1$

$-5y=-3x+1 \rightarrow y=\frac{3}{5}-\frac{1}{5}$

$m=\frac{3}{5}$, $m_{\perp}=-\frac{5}{3}$

So $y+3=(-\frac{5}{3})(x+2)$

$y=-\frac{5}{3}x-\frac{10}{3}-3$

$\boxed{y=-\frac{5}{3}x-\frac{19}{3}}$

(12) Line with x-int of 3, y-int of -5

*using intercept form

$\frac{x}{a}+\frac{y}{b}=1$

$\frac{x}{3}+\frac{y}{-5}=1$, mult by 15

$\frac{15x}{3}+\frac{15y}{-5}=15$

$5x-3y=15$

$-3y=-5x+15$

$\boxed{y=\frac{5}{3}x-5}$

(14) Line through $(4,-2)$, x-int of -3 $(-3,0)$

$m=\frac{-2}{4--3}=-\frac{2}{7}$

$y+2=(-\frac{2}{7})(x-4)$

$y=-\frac{2}{7}x+\frac{8}{7}-2$

$\boxed{y=-\frac{2}{7}x-\frac{6}{7}}$

(16) $y=x^{2/5}$

Test: $f(-x)=?$

$f(-x)=(-x)^{2/5}=((-x)^2)^{1/5}$

$=(x^2)^{1/5}=x^{2/5}=f(x)$

so it is an Even function with y-axis symmetry

(18) $y=e^{-x^2}$

$f(-x)=e^{-(-x)^2}=e^{-x^2}=f(x)$

→ Even function, y-axis symmetry

(20) $y=x^5-x^3-x$

$f(-x)=(-x)^5-(-x)^3-(-x)$

$=-x^5+x^3+x$

$=-(x^5-x^3-x)$

$=-f(x)$

so Odd function with origin symmetry

(22) $y=\sec x \tan x$

$f(-x)=\sec(-x)\tan(-x)$

$=(\sec x)(-\tan x)$

$=-\sec x \tan x$

$=-f(x)$

Odd function with origin symmetry

(24) $y=1-\sin x$

$f(-x)=1-\sin(-x)$

$=1--\sin x$

$=1+\sin x$

$\neq f(x)$ or $-f(x)$

so Neither/No symmetry

(26) $y=\sqrt{x^4-1}$

$f(-x)=\sqrt{(-x)^4-1}$

$=\sqrt{x^4-1}$

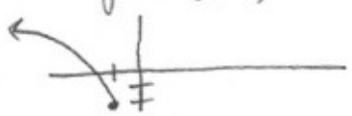
$=f(x)$

Even function with y-axis symmetry

(28) $y=-2+\sqrt{1-x}$

$y=\sqrt{-x+1}-2$

$y=\sqrt{-(x-1)}-2$



D: $\{x \mid x \leq -1\}$ or $(-\infty,-1]$

R: $\{y \mid y \geq -2\}$ or $[-2,\infty)$

(30) $y=3^{2-x}+1$

$y=3^{-x+2}+1$

$y=3^{-(x-2)}+1$

D: $\mathbb{R}$

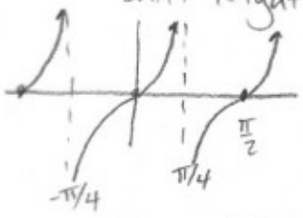
R: $\{y \mid y>1\}$ or $(1,\infty)$

(32) $y = \tan(2x - \pi)$

$y = \tan\left(2\left(x - \frac{\pi}{2}\right)\right)$

Period $= \frac{\pi}{B} = \frac{\pi}{2}$

Shift Right $\frac{\pi}{2}$



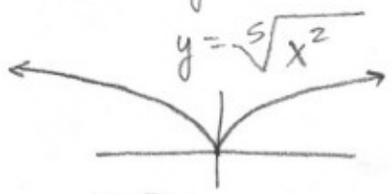
D: $\{x \mid x \neq \frac{\pi}{4} + \frac{\pi}{2}n\}$

R: $\mathbb{R}$

hard to list as intervals

(34) $y = x^{2/5}$

$y = \sqrt[5]{x^2}$



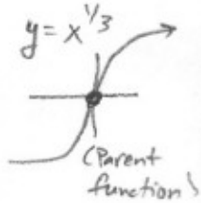
D: $\mathbb{R}$

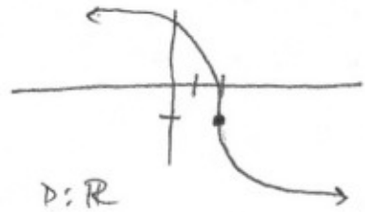
R: $\{y \mid y \geq 0\}$ or $[0, \infty)$

(36) $y = -1 + \sqrt[3]{2 - x}$

$y = \sqrt[3]{-(x-2)} - 1$

x-axis reflect; rt. 2; down 1

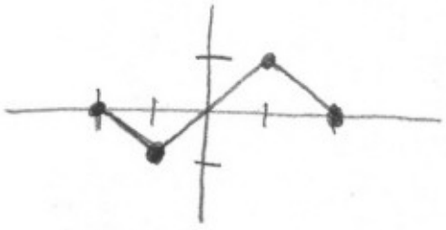




D: $\mathbb{R}$

R: $\mathbb{R}$

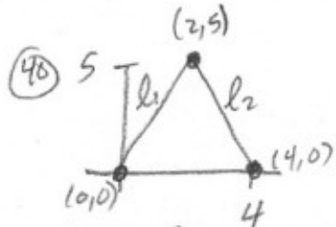
(38) $y = \begin{cases} -x-2, & -2 \leq x \leq -1 \\ x, & -1 < x \leq 1 \\ -x+2, & 1 < x \leq 2 \end{cases}$



D: $\{x \mid -2 \leq x \leq 2\}$ or $[-2, 2]$

R: $\{y \mid -1 \leq y \leq 1\}$ or $[-1, 1]$

(40)



l_1: $m = \frac{5}{2}$, $b = 0$

$y = \frac{5}{2}x$

l_2: $m = -\frac{5}{2}$, $b = 10$

$y = -\frac{5}{2}x + 10$

$y = \begin{cases} \frac{5}{2}x, & 0 \leq x < 2^* \\ -\frac{5}{2}x + 10, & 2^* \leq x \leq 4 \end{cases}$

* either graph can "get" $x = 2$, but not both

(42) $f(x) = 2 - x$, $g(x) = \sqrt[3]{x+1}$

(a) $(f \circ g)(-1) = f(g(-1))$

$= f(0) = \boxed{2}$

(b) $(g \circ f)(2) = g(f(2)) = g(0) = \boxed{1}$

(c) $(f \circ f)(x) = f(f(x)) = f(2 - x)$

$= 2 - (2 - x)$

$= 2 - 2 + x$

$= \boxed{x}$

(d) $(g \circ g)(x) = g(g(x)) = g\left(\sqrt[3]{x+1}\right)$

$= \boxed{\sqrt[3]{(\sqrt[3]{x+1}) + 1}}$

(44) $f(x) = \sqrt{x}$, $g(x) = \sqrt{1 - x}$

(a) $(f \circ g)(x) = f(g(x)) = f(\sqrt{1-x})$

$= \sqrt{(\sqrt{1-x})}$

(b) Domain: $1 - x \geq 0 \rightarrow x \leq 1$

D: $\{x \mid x \leq 1\}$

(c) R: $\{y \mid y \geq 0\}$

(a) $(g \circ f)(x) = g(f(x)) = g(\sqrt{x})$

$= \sqrt{1 - (\sqrt{x})}$

(b) Domain: $x \geq 0$, $1 - \sqrt{x} \geq 0$, $\sqrt{x} \leq 1$, $x \leq 1$

D: $\{x \mid 0 \leq x \leq 1\}$ or $[0, 1]$

R: $\{y \mid 0 \leq y \leq 1\}$ or $[0, 1]$

— Korpi