

## CORRECTIONS FOR *ICT*, 3RD EDITION (VERSION 3.1)

Here are the significant typos/thinkos you should be aware of in the first printed version of the third edition (version 3.1, as noted on the verso of the title page). I have not listed obvious minor spelling, grammatical, or punctuation errors which (if noticeable at all) will cause no problems.

Page	Line	Is	Should be
11	Thm 1 (ii)	$n \in N$	$n \in N$
44	last line	let there be an arrow between objects when the source is a subset of the target.	let there be a unique arrow $o_1 \rightarrow o_2$ if and only if $o_1 \leq o_2$ in the ordinal ordering (i.e. $o_1 = o_2$ or $o_1 \in o_2$ ).
51	l. 2	$m \times n$ matrix	$n \times m$ matrix
71	Thm. 19	$\emptyset \rightarrow D$	$\emptyset \rightarrow D$ (with $D$ non-empty)
71	5 lines later	$D - f(C)$	$D \setminus f(C)$
73	midpage	$r \circ s: S \rightarrow P$ is an identity map	$r \circ s: S \rightarrow S$ is an identity map
74	l. -2	the empty relation	the identity relation
76	midpage	Pos	Preord
79	midpage	Recall from §9.2	Recall from §9.1
90	l.16	$((m+n)^2 + m + 3n)/2$	$((m+n)^2 + 3m + n)/2$
100	midpage	Grp has all products	Grp has all binary products
102	l. 6	the <i>meet</i>	a <i>meet</i>
109	(4)	their <i>join</i>	a <i>join</i>
111	l. 8	$f_i: S \rightarrow X_i$	$f_j: S \rightarrow X_j$
112	l. -5	can't be a Cartesian product	can't be a set-sized Cartesian product
115	l.-8	$\langle\langle\pi_2, \pi_2\rangle\rangle \circ \langle\langle\rho_2, \rho_1\rangle\rangle$	$\langle\langle\pi_2, \pi_1\rangle\rangle \circ \langle\langle\rho_2, \rho_1\rangle\rangle$
115	l.-8	$o = \langle\langle\pi_1, \pi_2\rangle\rangle$	$o = \langle\langle\pi_2, \pi_1\rangle\rangle$ .
120	top diagram	$Y$ [bottom right corner]	$Y'$
124	(*), (ii), (iii)	$f \times g \circ \langle\langle j, k \rangle\rangle$	$(f \times g) \circ \langle\langle j, k \rangle\rangle$
128	l. -5	a binary set-function from $\underline{G}$ to itself	a set-function from $\underline{G} \times \underline{G}$ to $\underline{G}$ .
144	l. 5	where as in $i$ as before	where $i$ as before
148	(ii)	exponential transform	exponential transpose
152	l. 7	$ev \circ (\tilde{e}v' \circ \tilde{e}v) \times 1_B = ev$	$ev \circ ((\tilde{e}v' \circ \tilde{e}v) \times 1_B) = ev$
160	midpage	$f = (ev \circ \ulcorner f \urcorner \times 1_A) \circ \pi_A^{-1}$	$f = ev \circ (\ulcorner f \urcorner \times 1_A) \circ \pi_A^{-1}$
160	Defn. 77	exponential transform	exponential transpose
162	(2)	$(ev \circ (\ulcorner f \urcorner \times 1_A \circ \pi_A^{-1})) \circ \vec{a}$	$ev \circ (\ulcorner f \urcorner \times 1_A) \circ \pi_A^{-1} \circ \vec{a}$
171	l. 6	holds generally	holds for all arrows $d$ in $D$
173	l. 2	in $C$	in $C$

173	l. -5	in a $\mathbf{C}$	in $\mathbf{C}$
186	(d), l. 1	pushout for any corner	pushout for any wedge
203	l. 4	$(I', m': I \rightarrow Y)$ then $(I', m') \preceq (I, m)$	$(I', m': I' \rightarrow Y)$ then $(I, m) \preceq (I', m')$
203	l. 5	minimal subobject	least subobject
204	Proof, l. 2	Defn. 159*	Defn. 94
210	§24.4, l. 2	$\mathbf{Finset}$ , $\mathbf{2set}$	$\mathbf{FinSet}$ , $\mathbf{2Set}$
216	midpage	§24.2	§24.1
220	l. 6	$1 \times Y$ .	$1 \times Y$ .
232	midpage	$\langle m_1, n_1 \rangle \sim_I \langle m_2, n_1 \rangle$ iff $m_1 + n_2 = m_2 + n_2$	$\langle m_1, n_1 \rangle \sim_I \langle m_2, n_2 \rangle$ iff $m_1 + n_2 = m_2 + n_1$
238	(b)	The forgetful functors mentioned so far send distinct objects to distinct objects, and likewise for arrows.	<i>delete</i>
241	l. -8	$g \circ f \times 1_C$	$(g \circ f) \times 1_C$
243	l. -10	(at least once we have multiplied out occurrences of the identity element)	(beyond the equalities forced by the monoid axioms)
243	l. -3	null list $\emptyset$	null list $\epsilon$ [and use $\epsilon$ for the null list henceforth, thus $(\mathit{List}(X), \frown, \epsilon)$ ]
266	l. 10	$(W, Z, Y \xrightarrow{g} Z)$	$(W, Z, W \xrightarrow{g} Z)$
267	l. -7	arrow from $(A, B, f)$ and $(A', B', f')$	arrow from $(A, B, f)$ to $(A', B', f')$
272	l. 12	up from $A \cup B$	above $A$ and $B$
272	l. 13	domain/graph/source	domain/graph/codomain
273	§31.2, §31.3	$X, \mathit{Hom}_{\mathbf{C}}(A, X)$	$B, \mathit{Hom}_{\mathbf{C}}(A, B)$
292	l. 1	monic arrows from $X$	monic arrows into $X$
292	l. 9	$(\mathbf{C})(-, \Omega): \mathbf{C} \rightarrow \mathbf{Set}$	$\mathbf{C}(-, \Omega): \mathbf{C} \rightarrow \mathbf{Set}$
297	l.-1	Theorem 33.2	Theorem 154
301	midpage	there is no natural transformation $\alpha: \Delta_1 \Rightarrow F$ . ... there is no canonical way	there is in general no natural transformation $\alpha: \Delta_1 \Rightarrow F$ . ... there need be no canonical way
301	l. -7	there is no guarantee	there need be no guarantee
302	l. 4	(and sends the empty set to the empty list)	<i>delete</i>
303	midpage	[add after diagram]	where $\alpha_G$ is the canonical homomorphism from a group to its abelianization (which sends an element $g$ in $G$ to the coset $g[G, G]$ ).
307	l. -4	$\alpha: \Delta_X \rightarrow D$	$\alpha: \Delta_X \Rightarrow D$
311	l. 15	distinguished objects	distinguished elements
316	For (b)	$G(h \circ g) = Gh \circ Gg: D \rightarrow J$	$G(h \circ g) = Gh \circ Gg: GD \rightarrow GJ$
317	l. 10	where for $f_*(x) = f(x)$	where $f_*(x) = f(x)$
319	midpage	there is an identity $\mathbf{C}$ -arrow $1_X$	there is an identity arrow $1_X$
326	(a), l. 2, l. 7	$F: \bar{2} \rightarrow \mathbf{C}$	$F: \bar{2} \rightarrow \mathbf{C}$

333	Defn. 136 (2)	arrow $\alpha$ [etc.]	natural transformation $\alpha$ [etc.]
339	Proof of (3)	identity object	identity arrow
344	Thm. 185	as a full O	as a full sub-category.
347	l. -12	if $\mathcal{Y}A \cong \mathcal{Y}A$	if $\mathcal{Y}A \cong \mathcal{Y}B$
350	l. -12	$\alpha_Y(j) = \alpha_Y^e(j)$	$\alpha_Y(j) = \alpha_Y^e(j)$
354	end of proof	$\mathcal{E}_A: K \Rightarrow eval_A$	$\mathcal{E}_A: Nat(\mathbf{C}(A, -), -) \Rightarrow eval_A$
355	Thm. 192	small category	locally small category
364	l. -10	suggested template in	suggested template
364	l. -8	from $(FA, e)$ to $(FA, e')$	from $(FA, e)$ to $(FA', e')$
366	Thm. 207	$Cone(C, LimD)$	$Cone(C, D)$
366	(b) l. 3	$- \circ f \times 1_B$	$- \circ (f \times 1_B)$
366	(b) l. 4	$j \circ (f \times 1_B)$	$j \circ (f \times 1_B)$
366	(b) l. 8	$ev \circ \tilde{g} \times 1_B = g$	$ev \circ (\tilde{g} \times 1_B) = g$
372	(G2) l. 2	injection	injective
377	Thm. 216	$F \vdash G$	$F \dashv G$
387	ll. -6, -3	relation $R$ in $A \times B$	relation $R \subseteq A \times B$
391	l. 14	$FGFA \preceq FA$	$FGFA \rightarrow FA$
392	l. 1	all components	corresponding components
395	l. 6	$\varepsilon_B \circ F(Gd \circ \eta_A)$	$\varepsilon_B \circ F(Gd \circ \eta_A)$
397	l. 13	for any $d: A \rightarrow GB$ in $\mathbf{C}$ there is a unique $c: FA \rightarrow B$ for which $d = Gc \circ \eta_A$	for any $c: A \rightarrow GB$ in $\mathbf{C}$ there is a unique $d: FA \rightarrow B$ for which $c = Gd \circ \eta_A$
397	l. 15	$\varphi_{ABC} = Gc \circ \eta_A$	$\varphi_{ABd} = Gd \circ \eta_A$
398	l. 4 and l. 15	$f_2 = \pi_1 \circ u$	$f_2 = \pi_2 \circ u$
399	l. 8	by the argument for Theorem 156(3) <sup>2</sup>	<i>delete</i>
399	l. 11	Theorem 156(2)	Theorem 156
400	Proof, l. 2	$1_B$	$1_D$
401	l. -10	the function $F\eta_A: FA \rightarrow FB$	the arrow $F\eta_A: FA \rightarrow FGFA$
404	(d) l. 1	proof of our earlier	proof of half our earlier
405	[add to §44.1]		(f) What about the other half of Theorem 219? I will leave that for you to explore.
407	§44.3, l. 2	$\mathbf{Set}(A, GB)$	$\mathbf{C}(A, GB)$
407	§44.3, l. 4	functor $\mathbf{C}(A, G-): \mathbf{C} \rightarrow \mathbf{D}$	functor $\mathbf{C}(A, G-): \mathbf{D} \rightarrow \mathbf{Set}$
408	l. 8	an object $X$	a set $A$
409	diagrams, (4)	$j, Gj$ [each occurrence]	$Dj, GDj$
409	l. 4	$j: K \rightarrow L, \lambda_K = j \circ \lambda_J$	$j: J \rightarrow K, \lambda_K = Dj \circ \lambda_J$
410	diagram	$B$ [each occurrence]	$A$
410	l. 5	transform	transpose
410	(7), l. 3	$(FB, f_J)$	$(FA, f_J)$

413	Thm. 232	$F \vdash G$	$F \dashv G$
414	(M1), l.1	$F \vdash G$	$F \dashv G$
414	(M2), l. 1	$F \vdash U$	$F \dashv U$
414	(M2), l. 3	sending a set to $X$	sending a set $X$ to
414	(M2) (iii)	$\dots, x_{1m}, \dots$	$\dots, x_{1n}, \dots$
418	l. 5	all quotients	the usual kinds of quotients
422	l. 1	required products	required limits
426	l. 1	Theorem 25	Theorem 121
426	l. 2	having subobjects	having subobject classifiers
427	third diagram	$Y \rightrightarrows D$	$I \rightrightarrows D$
427	midpage	parallel arrows $j, k$	parallel arrows $j, k: I \rightarrow Y$
427	next diagram	$\Omega$	$Y$
428	midpage	$Y$ [in two diagrams]	$E$
429	midpage	[in two diagrams]	remove tails from the four arrows $f_1 \circ i, f_1 \circ i',$ etc.
445	l. -2	$\langle\langle \perp, \top \rangle\rangle,$	$\langle\langle \perp, \perp \rangle\rangle$
447	lower diagram	$i$	$k$
447	ll. -2, -1	$i: R \cup S \rightarrow I, (m' \circ i)$	$k: R \cup S \rightarrow I, (m' \circ k)$
450	(d), l. 5	$R \leftarrow R \cap S \rightarrow R$	$R \leftarrow R \cap S \rightarrow S$
450	Defn. 161, l. 3	$R \xleftarrow{i_S} R \cap S \xrightarrow{i_R} R$	$R \xleftarrow{i_R} R \cap S \xrightarrow{i_S} S$
453	Defn. 164	$s^*: S \rightarrow X$	$s^*: S^* \rightarrow X$
454	diagram (ii)	$!_S$	<i>delete</i>
461	Proof of (ii)	$i_{RS}, \chi_{i_{RS}}$	$i_{SQ}, \chi_{i_{SQ}}$
465	l.1	equalizer of $\wedge, \pi: \Omega \times \Omega$	equalizer of $\wedge$ and $\pi_1: \Omega \times \Omega \rightarrow \Omega$
466	l. 8	subsets of $X$	subobjects of $X$
467	below diagram	defining <i>false</i>	defining $\perp$
470	l. 3	$(R, r). \quad \square$	$(S, s). \quad \square$
470	Thm. 270, l. -1	Given Theorem 107, we then have the following result:	And here is an immediate corollary:
470	Thm. 270, l. 2	$R \cong S$	$(R, r) \equiv (S, s)$
471	l. 9	intial object 1	terminal object 1
471	l. 13	$(S, s: S \rightarrow X)$	$(S, s: S \rightarrow X)$