B.5 Student's *t* Distribution

| Confidence interval | Left-tailed test | Right-tailed test | Two-tailed test |

<table>
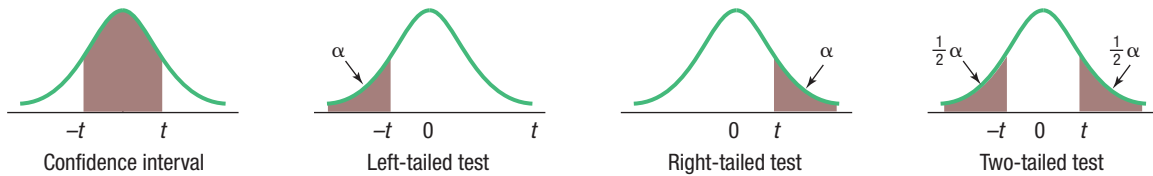<tr><th colspan="7">Confidence Intervals, <i>c</i></th></tr>
<tr><th>df</th><th>80%</th><th>90%</th><th>95%</th><th>98%</th><th>99%</th><th>99.9%</th></tr>
<tr><th></th><th colspan="6">Level of Significance for One-Tailed Test, α</th></tr>
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<tr><th></th><th>0.20</th><th>0.10</th><th>0.05</th><th>0.02</th><th>0.01</th><th>0.001</th></tr>
<tr><td>1</td><td>3.078</td><td>6.314</td><td>12.706</td><td>31.821</td><td>63.657</td><td>636.619</td></tr>
<tr><td>2</td><td>1.886</td><td>2.920</td><td>4.303</td><td>6.965</td><td>9.925</td><td>31.599</td></tr>
<tr><td>3</td><td>1.638</td><td>2.353</td><td>3.182</td><td>4.541</td><td>5.841</td><td>12.924</td></tr>
<tr><td>4</td><td>1.533</td><td>2.132</td><td>2.776</td><td>3.747</td><td>4.604</td><td>8.610</td></tr>
<tr><td>5</td><td>1.476</td><td>2.015</td><td>2.571</td><td>3.365</td><td>4.032</td><td>6.869</td></tr>
<tr><td>6</td><td>1.440</td><td>1.943</td><td>2.447</td><td>3.143</td><td>3.707</td><td>5.959</td></tr>
<tr><td>7</td><td>1.415</td><td>1.895</td><td>2.365</td><td>2.998</td><td>3.499</td><td>5.408</td></tr>
<tr><td>8</td><td>1.397</td><td>1.860</td><td>2.306</td><td>2.896</td><td>3.355</td><td>5.041</td></tr>
<tr><td>9</td><td>1.383</td><td>1.833</td><td>2.262</td><td>2.821</td><td>3.250</td><td>4.781</td></tr>
<tr><td>10</td><td>1.372</td><td>1.812</td><td>2.228</td><td>2.764</td><td>3.169</td><td>4.587</td></tr>
<tr><td>11</td><td>1.363</td><td>1.796</td><td>2.201</td><td>2.718</td><td>3.106</td><td>4.437</td></tr>
<tr><td>12</td><td>1.356</td><td>1.782</td><td>2.179</td><td>2.681</td><td>3.055</td><td>4.318</td></tr>
<tr><td>13</td><td>1.350</td><td>1.771</td><td>2.160</td><td>2.650</td><td>3.012</td><td>4.221</td></tr>
<tr><td>14</td><td>1.345</td><td>1.761</td><td>2.145</td><td>2.624</td><td>2.977</td><td>4.140</td></tr>
<tr><td>15</td><td>1.341</td><td>1.753</td><td>2.131</td><td>2.602</td><td>2.947</td><td>4.073</td></tr>
<tr><td>16</td><td>1.337</td><td>1.746</td><td>2.120</td><td>2.583</td><td>2.921</td><td>4.015</td></tr>
<tr><td>17</td><td>1.333</td><td>1.740</td><td>2.110</td><td>2.567</td><td>2.898</td><td>3.965</td></tr>
<tr><td>18</td><td>1.330</td><td>1.734</td><td>2.101</td><td>2.552</td><td>2.878</td><td>3.922</td></tr>
<tr><td>19</td><td>1.328</td><td>1.729</td><td>2.093</td><td>2.539</td><td>2.861</td><td>3.883</td></tr>
<tr><td>20</td><td>1.325</td><td>1.725</td><td>2.086</td><td>2.528</td><td>2.845</td><td>3.850</td></tr>
<tr><td>21</td><td>1.323</td><td>1.721</td><td>2.080</td><td>2.518</td><td>2.831</td><td>3.819</td></tr>
<tr><td>22</td><td>1.321</td><td>1.717</td><td>2.074</td><td>2.508</td><td>2.819</td><td>3.792</td></tr>
<tr><td>23</td><td>1.319</td><td>1.714</td><td>2.069</td><td>2.500</td><td>2.807</td><td>3.768</td></tr>
<tr><td>24</td><td>1.318</td><td>1.711</td><td>2.064</td><td>2.492</td><td>2.797</td><td>3.745</td></tr>
<tr><td>25</td><td>1.316</td><td>1.708</td><td>2.060</td><td>2.485</td><td>2.787</td><td>3.725</td></tr>
<tr><td>26</td><td>1.315</td><td>1.706</td><td>2.056</td><td>2.479</td><td>2.779</td><td>3.707</td></tr>
<tr><td>27</td><td>1.314</td><td>1.703</td><td>2.052</td><td>2.473</td><td>2.771</td><td>3.690</td></tr>
<tr><td>28</td><td>1.313</td><td>1.701</td><td>2.048</td><td>2.467</td><td>2.763</td><td>3.674</td></tr>
<tr><td>29</td><td>1.311</td><td>1.699</td><td>2.045</td><td>2.462</td><td>2.756</td><td>3.659</td></tr>
<tr><td>30</td><td>1.310</td><td>1.697</td><td>2.042</td><td>2.457</td><td>2.750</td><td>3.646</td></tr>
<tr><td>31</td><td>1.309</td><td>1.696</td><td>2.040</td><td>2.453</td><td>2.744</td><td>3.633</td></tr>
<tr><td>32</td><td>1.309</td><td>1.694</td><td>2.037</td><td>2.449</td><td>2.738</td><td>3.622</td></tr>
<tr><td>33</td><td>1.308</td><td>1.692</td><td>2.035</td><td>2.445</td><td>2.733</td><td>3.611</td></tr>
<tr><td>34</td><td>1.307</td><td>1.691</td><td>2.032</td><td>2.441</td><td>2.728</td><td>3.601</td></tr>
<tr><td>35</td><td>1.306</td><td>1.690</td><td>2.030</td><td>2.438</td><td>2.724</td><td>3.591</td></tr>
</table>

<table>
<tr><th colspan="7">Confidence Intervals, <i>c</i></th></tr>
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<tr><th></th><th>0.20</th><th>0.10</th><th>0.05</th><th>0.02</th><th>0.01</th><th>0.001</th></tr>
<tr><td>36</td><td>1.306</td><td>1.688</td><td>2.028</td><td>2.434</td><td>2.719</td><td>3.582</td></tr>
<tr><td>37</td><td>1.305</td><td>1.687</td><td>2.026</td><td>2.431</td><td>2.715</td><td>3.574</td></tr>
<tr><td>38</td><td>1.304</td><td>1.686</td><td>2.024</td><td>2.429</td><td>2.712</td><td>3.566</td></tr>
<tr><td>39</td><td>1.304</td><td>1.685</td><td>2.023</td><td>2.426</td><td>2.708</td><td>3.558</td></tr>
<tr><td>40</td><td>1.303</td><td>1.684</td><td>2.021</td><td>2.423</td><td>2.704</td><td>3.551</td></tr>
<tr><td>41</td><td>1.303</td><td>1.683</td><td>2.020</td><td>2.421</td><td>2.701</td><td>3.544</td></tr>
<tr><td>42</td><td>1.302</td><td>1.682</td><td>2.018</td><td>2.418</td><td>2.698</td><td>3.538</td></tr>
<tr><td>43</td><td>1.302</td><td>1.681</td><td>2.017</td><td>2.416</td><td>2.695</td><td>3.532</td></tr>
<tr><td>44</td><td>1.301</td><td>1.680</td><td>2.015</td><td>2.414</td><td>2.692</td><td>3.526</td></tr>
<tr><td>45</td><td>1.301</td><td>1.679</td><td>2.014</td><td>2.412</td><td>2.690</td><td>3.520</td></tr>
<tr><td>46</td><td>1.300</td><td>1.679</td><td>2.013</td><td>2.410</td><td>2.687</td><td>3.515</td></tr>
<tr><td>47</td><td>1.300</td><td>1.678</td><td>2.012</td><td>2.408</td><td>2.685</td><td>3.510</td></tr>
<tr><td>48</td><td>1.299</td><td>1.677</td><td>2.011</td><td>2.407</td><td>2.682</td><td>3.505</td></tr>
<tr><td>49</td><td>1.299</td><td>1.677</td><td>2.010</td><td>2.405</td><td>2.680</td><td>3.500</td></tr>
<tr><td>50</td><td>1.299</td><td>1.676</td><td>2.009</td><td>2.403</td><td>2.678</td><td>3.496</td></tr>
<tr><td>51</td><td>1.298</td><td>1.675</td><td>2.008</td><td>2.402</td><td>2.676</td><td>3.492</td></tr>
<tr><td>52</td><td>1.298</td><td>1.675</td><td>2.007</td><td>2.400</td><td>2.674</td><td>3.488</td></tr>
<tr><td>53</td><td>1.298</td><td>1.674</td><td>2.006</td><td>2.399</td><td>2.672</td><td>3.484</td></tr>
<tr><td>54</td><td>1.297</td><td>1.674</td><td>2.005</td><td>2.397</td><td>2.670</td><td>3.480</td></tr>
<tr><td>55</td><td>1.297</td><td>1.673</td><td>2.004</td><td>2.396</td><td>2.668</td><td>3.476</td></tr>
<tr><td>56</td><td>1.297</td><td>1.673</td><td>2.003</td><td>2.395</td><td>2.667</td><td>3.473</td></tr>
<tr><td>57</td><td>1.297</td><td>1.672</td><td>2.002</td><td>2.394</td><td>2.665</td><td>3.470</td></tr>
<tr><td>58</td><td>1.296</td><td>1.672</td><td>2.002</td><td>2.392</td><td>2.663</td><td>3.466</td></tr>
<tr><td>59</td><td>1.296</td><td>1.671</td><td>2.001</td><td>2.391</td><td>2.662</td><td>3.463</td></tr>
<tr><td>60</td><td>1.296</td><td>1.671</td><td>2.000</td><td>2.390</td><td>2.660</td><td>3.460</td></tr>
<tr><td>61</td><td>1.296</td><td>1.670</td><td>2.000</td><td>2.389</td><td>2.659</td><td>3.457</td></tr>
<tr><td>62</td><td>1.295</td><td>1.670</td><td>1.999</td><td>2.388</td><td>2.657</td><td>3.454</td></tr>
<tr><td>63</td><td>1.295</td><td>1.669</td><td>1.998</td><td>2.387</td><td>2.656</td><td>3.452</td></tr>
<tr><td>64</td><td>1.295</td><td>1.669</td><td>1.998</td><td>2.386</td><td>2.655</td><td>3.449</td></tr>
<tr><td>65</td><td>1.295</td><td>1.669</td><td>1.997</td><td>2.385</td><td>2.654</td><td>3.447</td></tr>
<tr><td>66</td><td>1.295</td><td>1.668</td><td>1.997</td><td>2.384</td><td>2.652</td><td>3.444</td></tr>
<tr><td>67</td><td>1.294</td><td>1.668</td><td>1.996</td><td>2.383</td><td>2.651</td><td>3.442</td></tr>
<tr><td>68</td><td>1.294</td><td>1.668</td><td>1.995</td><td>2.382</td><td>2.650</td><td>3.439</td></tr>
<tr><td>69</td><td>1.294</td><td>1.667</td><td>1.995</td><td>2.382</td><td>2.649</td><td>3.437</td></tr>
<tr><td>70</td><td>1.294</td><td>1.667</td><td>1.994</td><td>2.381</td><td>2.648</td><td>3.435</td></tr>
</table>

(continued)

B.5 Student's *t* Distribution (*concluded*)

	Confidence Intervals, *c*					
	80%	**90%**	**95%**	**98%**	**99%**	**99.9%**
	Level of Significance for One-Tailed Test, α					
df	**0.10**	**0.05**	**0.025**	**0.01**	**0.005**	**0.0005**
	Level of Significance for Two-Tailed Test, α					
	0.20	**0.10**	**0.05**	**0.02**	**0.01**	**0.001**
71	1.294	1.667	1.994	2.380	2.647	3.433
72	1.293	1.666	1.993	2.379	2.646	3.431
73	1.293	1.666	1.993	2.379	2.645	3.429
74	1.293	1.666	1.993	2.378	2.644	3.427
75	1.293	1.665	1.992	2.377	2.643	3.425
76	1.293	1.665	1.992	2.376	2.642	3.423
77	1.293	1.665	1.991	2.376	2.641	3.421
78	1.292	1.665	1.991	2.375	2.640	3.420
79	1.292	1.664	1.990	2.374	2.640	3.418
80	1.292	1.664	1.990	2.374	2.639	3.416
81	1.292	1.664	1.990	2.373	2.638	3.415
82	1.292	1.664	1.989	2.373	2.637	3.413
83	1.292	1.663	1.989	2.372	2.636	3.412
84	1.292	1.663	1.989	2.372	2.636	3.410
85	1.292	1.663	1.988	2.371	2.635	3.409
86	1.291	1.663	1.988	2.370	2.634	3.407
87	1.291	1.663	1.988	2.370	2.634	3.406
88	1.291	1.662	1.987	2.369	2.633	3.405

	Confidence Intervals, *c*					
	80%	**90%**	**95%**	**98%**	**99%**	**99.9%**
	Level of Significance for One-Tailed Test, α					
df	**0.10**	**0.05**	**0.025**	**0.01**	**0.005**	**0.0005**
	Level of Significance for Two-Tailed Test, α					
	0.20	**0.10**	**0.05**	**0.02**	**0.01**	**0.001**
89	1.291	1.662	1.987	2.369	2.632	3.403
90	1.291	1.662	1.987	2.368	2.632	3.402
91	1.291	1.662	1.986	2.368	2.631	3.401
92	1.291	1.662	1.986	2.368	2.630	3.399
93	1.291	1.661	1.986	2.367	2.630	3.398
94	1.291	1.661	1.986	2.367	2.629	3.397
95	1.291	1.661	1.985	2.366	2.629	3.396
96	1.290	1.661	1.985	2.366	2.628	3.395
97	1.290	1.661	1.985	2.365	2.627	3.394
98	1.290	1.661	1.984	2.365	2.627	3.393
99	1.290	1.660	1.984	2.365	2.626	3.392
100	1.290	1.660	1.984	2.364	2.626	3.390
120	1.289	1.658	1.980	2.358	2.617	3.373
140	1.288	1.656	1.977	2.353	2.611	3.361
160	1.287	1.654	1.975	2.350	2.607	3.352
180	1.286	1.653	1.973	2.347	2.603	3.345
200	1.286	1.653	1.972	2.345	2.601	3.340
∞	1.282	1.645	1.960	2.326	2.576	3.291