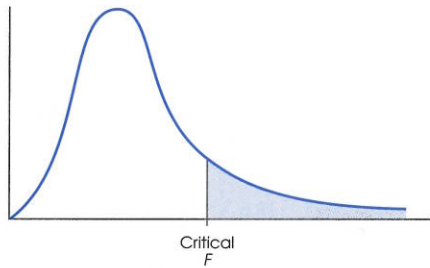


TABLE B.4 THE F DISTRIBUTION\*

\*Table entries in lightface type are critical values for the .05 level of significance. Boldface type values are for the .01 level of significance.



Degrees of Freedom: Denominator	Degrees of Freedom: Numerator															
	1	2	3	4	5	6	7	8	9	10	11	12	14	16	20	
1	161 <b>4052</b>	200 <b>4999</b>	216 <b>5403</b>	225 <b>5625</b>	230 <b>5764</b>	234 <b>5859</b>	237 <b>5928</b>	239 <b>5981</b>	241 <b>6022</b>	242 <b>6056</b>	243 <b>6082</b>	244 <b>6106</b>	245 <b>6142</b>	246 <b>6169</b>	248 <b>6208</b>	
2	18.51 <b>98.49</b>	19.00 <b>99.00</b>	19.16 <b>99.17</b>	19.25 <b>99.25</b>	19.30 <b>99.30</b>	19.33 <b>99.33</b>	19.36 <b>99.34</b>	19.37 <b>99.36</b>	19.38 <b>99.38</b>	19.39 <b>99.40</b>	19.40 <b>99.41</b>	19.41 <b>99.42</b>	19.42 <b>99.43</b>	19.43 <b>99.44</b>	19.44 <b>99.45</b>	
3	10.13 <b>34.12</b>	9.55 <b>30.92</b>	9.28 <b>29.46</b>	9.12 <b>28.71</b>	9.01 <b>28.24</b>	8.94 <b>27.91</b>	8.88 <b>27.67</b>	8.84 <b>27.49</b>	8.81 <b>27.34</b>	8.78 <b>27.23</b>	8.76 <b>27.13</b>	8.74 <b>27.05</b>	8.71 <b>26.92</b>	8.69 <b>26.83</b>	8.66 <b>26.69</b>	
4	7.71 <b>21.20</b>	6.94 <b>18.00</b>	6.59 <b>16.69</b>	6.39 <b>15.98</b>	6.26 <b>15.52</b>	6.16 <b>15.21</b>	6.09 <b>14.98</b>	6.04 <b>14.80</b>	6.00 <b>14.66</b>	5.96 <b>14.54</b>	5.93 <b>14.45</b>	5.91 <b>14.37</b>	5.87 <b>14.24</b>	5.84 <b>14.15</b>	5.80 <b>14.02</b>	
5	6.61 <b>16.26</b>	5.79 <b>13.27</b>	5.41 <b>12.06</b>	5.19 <b>11.39</b>	5.05 <b>10.97</b>	4.95 <b>10.67</b>	4.88 <b>10.45</b>	4.82 <b>10.27</b>	4.78 <b>10.15</b>	4.74 <b>10.05</b>	4.70 <b>9.96</b>	4.68 <b>9.89</b>	4.64 <b>9.77</b>	4.60 <b>9.68</b>	4.56 <b>9.55</b>	
6	5.99 <b>13.74</b>	5.14 <b>10.92</b>	4.76 <b>9.78</b>	4.53 <b>9.15</b>	4.39 <b>8.75</b>	4.28 <b>8.47</b>	4.21 <b>8.26</b>	4.15 <b>8.10</b>	4.10 <b>7.98</b>	4.06 <b>7.87</b>	4.03 <b>7.79</b>	4.00 <b>7.72</b>	3.96 <b>7.60</b>	3.92 <b>7.52</b>	3.87 <b>7.39</b>	
7	5.59 <b>12.25</b>	4.74 <b>9.55</b>	4.35 <b>8.45</b>	4.12 <b>7.85</b>	3.97 <b>7.46</b>	3.87 <b>7.19</b>	3.79 <b>7.00</b>	3.73 <b>6.84</b>	3.68 <b>6.71</b>	3.63 <b>6.62</b>	3.60 <b>6.54</b>	3.57 <b>6.47</b>	3.52 <b>6.35</b>	3.49 <b>6.27</b>	3.44 <b>6.15</b>	
8	5.32 <b>11.26</b>	4.46 <b>8.65</b>	4.07 <b>7.59</b>	3.84 <b>7.01</b>	3.69 <b>6.63</b>	3.58 <b>6.37</b>	3.50 <b>6.19</b>	3.44 <b>6.03</b>	3.39 <b>5.91</b>	3.34 <b>5.82</b>	3.31 <b>5.74</b>	3.28 <b>5.67</b>	3.23 <b>5.56</b>	3.20 <b>5.48</b>	3.15 <b>5.36</b>	
9	5.12 <b>10.56</b>	4.26 <b>8.02</b>	3.86 <b>6.99</b>	3.63 <b>6.42</b>	3.48 <b>6.06</b>	3.37 <b>5.80</b>	3.29 <b>5.62</b>	3.23 <b>5.47</b>	3.18 <b>5.35</b>	3.13 <b>5.26</b>	3.10 <b>5.18</b>	3.07 <b>5.11</b>	3.02 <b>5.00</b>	2.98 <b>4.92</b>	2.93 <b>4.80</b>	
10	4.96 <b>10.04</b>	4.10 <b>7.56</b>	3.71 <b>6.55</b>	3.48 <b>5.99</b>	3.33 <b>5.64</b>	3.22 <b>5.39</b>	3.14 <b>5.21</b>	3.07 <b>5.06</b>	3.02 <b>4.95</b>	2.97 <b>4.85</b>	2.94 <b>4.78</b>	2.91 <b>4.71</b>	2.86 <b>4.60</b>	2.82 <b>4.52</b>	2.77 <b>4.41</b>	
11	4.84 <b>9.65</b>	3.98 <b>7.20</b>	3.59 <b>6.22</b>	3.36 <b>5.67</b>	3.20 <b>5.32</b>	3.09 <b>5.07</b>	3.01 <b>4.88</b>	2.95 <b>4.74</b>	2.90 <b>4.63</b>	2.86 <b>4.54</b>	2.82 <b>4.46</b>	2.79 <b>4.40</b>	2.74 <b>4.29</b>	2.70 <b>4.21</b>	2.65 <b>4.10</b>	
12	4.75 <b>9.33</b>	3.88 <b>6.93</b>	3.49 <b>5.95</b>	3.26 <b>5.41</b>	3.11 <b>5.06</b>	3.00 <b>4.82</b>	2.92 <b>4.65</b>	2.85 <b>4.50</b>	2.80 <b>4.39</b>	2.76 <b>4.30</b>	2.72 <b>4.22</b>	2.69 <b>4.16</b>	2.64 <b>4.05</b>	2.60 <b>3.98</b>	2.54 <b>3.86</b>	
13	4.67 <b>9.07</b>	3.80 <b>6.70</b>	3.41 <b>5.74</b>	3.18 <b>5.20</b>	3.02 <b>4.86</b>	2.92 <b>4.62</b>	2.84 <b>4.44</b>	2.77 <b>4.30</b>	2.72 <b>4.19</b>	2.67 <b>4.10</b>	2.63 <b>4.02</b>	2.60 <b>3.96</b>	2.55 <b>3.85</b>	2.51 <b>3.78</b>	2.46 <b>3.67</b>	
14	4.60 <b>8.86</b>	3.74 <b>6.51</b>	3.34 <b>5.56</b>	3.11 <b>5.03</b>	2.96 <b>4.69</b>	2.85 <b>4.46</b>	2.77 <b>4.28</b>	2.70 <b>4.14</b>	2.65 <b>4.03</b>	2.60 <b>3.94</b>	2.56 <b>3.86</b>	2.53 <b>3.80</b>	2.48 <b>3.70</b>	2.44 <b>3.62</b>	2.39 <b>3.51</b>	
15	4.54 <b>8.68</b>	3.68 <b>6.36</b>	3.29 <b>5.42</b>	3.06 <b>4.89</b>	2.90 <b>4.56</b>	2.79 <b>4.32</b>	2.70 <b>4.14</b>	2.64 <b>4.00</b>	2.59 <b>3.89</b>	2.55 <b>3.80</b>	2.51 <b>3.73</b>	2.48 <b>3.67</b>	2.43 <b>3.56</b>	2.39 <b>3.48</b>	2.33 <b>3.36</b>	
16	4.49 <b>8.53</b>	3.63 <b>6.23</b>	3.24 <b>5.29</b>	3.01 <b>4.77</b>	2.85 <b>4.44</b>	2.74 <b>4.20</b>	2.66 <b>4.03</b>	2.59 <b>3.89</b>	2.54 <b>3.78</b>	2.49 <b>3.69</b>	2.45 <b>3.61</b>	2.42 <b>3.55</b>	2.37 <b>3.45</b>	2.33 <b>3.37</b>	2.28 <b>3.25</b>	
17	4.45 <b>8.40</b>	3.59 <b>6.11</b>	3.20 <b>5.18</b>	2.96 <b>4.67</b>	2.81 <b>4.34</b>	2.70 <b>4.10</b>	2.62 <b>3.93</b>	2.55 <b>3.79</b>	2.50 <b>3.68</b>	2.45 <b>3.59</b>	2.41 <b>3.52</b>	2.38 <b>3.45</b>	2.33 <b>3.35</b>	2.29 <b>3.27</b>	2.23 <b>3.16</b>	
18	4.41 <b>8.28</b>	3.55 <b>6.01</b>	3.16 <b>5.09</b>	2.93 <b>4.58</b>	2.77 <b>4.25</b>	2.66 <b>4.01</b>	2.58 <b>3.85</b>	2.51 <b>3.71</b>	2.46 <b>3.60</b>	2.41 <b>3.51</b>	2.37 <b>3.44</b>	2.34 <b>3.37</b>	2.29 <b>3.27</b>	2.25 <b>3.19</b>	2.19 <b>3.07</b>	

TABLE B.4 (continued)

Degrees of Freedom: Denominator	Degrees of Freedom: Numerator														
	1	2	3	4	5	6	7	8	9	10	11	12	14	16	20
19	4.38 <b>8.18</b>	3.52 <b>5.93</b>	3.13 <b>5.01</b>	2.90 <b>4.50</b>	2.74 <b>4.17</b>	2.63 <b>3.94</b>	2.55 <b>3.77</b>	2.48 <b>3.63</b>	2.43 <b>3.52</b>	2.38 <b>3.43</b>	2.34 <b>3.36</b>	2.31 <b>3.30</b>	2.26 <b>3.19</b>	2.21 <b>3.12</b>	2.15 <b>3.00</b>
20	4.35 <b>8.10</b>	3.49 <b>5.85</b>	3.10 <b>4.94</b>	2.87 <b>4.43</b>	2.71 <b>4.10</b>	2.60 <b>3.87</b>	2.52 <b>3.71</b>	2.45 <b>3.56</b>	2.40 <b>3.45</b>	2.35 <b>3.37</b>	2.31 <b>3.30</b>	2.28 <b>3.23</b>	2.23 <b>3.13</b>	2.18 <b>3.05</b>	2.12 <b>2.94</b>
21	4.32 <b>8.02</b>	3.47 <b>5.78</b>	3.07 <b>4.87</b>	2.84 <b>4.37</b>	2.68 <b>4.04</b>	2.57 <b>3.81</b>	2.49 <b>3.65</b>	2.42 <b>3.51</b>	2.37 <b>3.40</b>	2.32 <b>3.31</b>	2.28 <b>3.24</b>	2.25 <b>3.17</b>	2.20 <b>3.07</b>	2.15 <b>2.99</b>	2.09 <b>2.88</b>
22	4.30 <b>7.94</b>	3.44 <b>5.72</b>	3.05 <b>4.82</b>	2.82 <b>4.31</b>	2.66 <b>3.99</b>	2.55 <b>3.76</b>	2.47 <b>3.59</b>	2.40 <b>3.45</b>	2.35 <b>3.35</b>	2.30 <b>3.26</b>	2.26 <b>3.18</b>	2.23 <b>3.12</b>	2.18 <b>3.02</b>	2.13 <b>2.94</b>	2.07 <b>2.83</b>
23	4.28 <b>7.88</b>	3.42 <b>5.66</b>	3.03 <b>4.76</b>	2.80 <b>4.26</b>	2.64 <b>3.94</b>	2.53 <b>3.71</b>	2.45 <b>3.54</b>	2.38 <b>3.41</b>	2.32 <b>3.30</b>	2.28 <b>3.21</b>	2.24 <b>3.14</b>	2.20 <b>3.07</b>	2.14 <b>2.97</b>	2.10 <b>2.89</b>	2.04 <b>2.78</b>
24	4.26 <b>7.82</b>	3.40 <b>5.61</b>	3.01 <b>4.72</b>	2.78 <b>4.22</b>	2.62 <b>3.90</b>	2.51 <b>3.67</b>	2.43 <b>3.50</b>	2.36 <b>3.36</b>	2.30 <b>3.25</b>	2.26 <b>3.17</b>	2.22 <b>3.09</b>	2.18 <b>3.03</b>	2.13 <b>2.93</b>	2.09 <b>2.85</b>	2.02 <b>2.74</b>
25	4.24 <b>7.77</b>	3.38 <b>5.57</b>	2.99 <b>4.68</b>	2.76 <b>4.18</b>	2.60 <b>3.86</b>	2.49 <b>3.63</b>	2.41 <b>3.46</b>	2.34 <b>3.32</b>	2.28 <b>3.21</b>	2.24 <b>3.13</b>	2.20 <b>3.05</b>	2.16 <b>2.99</b>	2.11 <b>2.89</b>	2.06 <b>2.81</b>	2.00 <b>2.70</b>
26	4.22 <b>7.72</b>	3.37 <b>5.53</b>	2.98 <b>4.64</b>	2.74 <b>4.14</b>	2.59 <b>3.82</b>	2.47 <b>3.59</b>	2.39 <b>3.42</b>	2.32 <b>3.29</b>	2.27 <b>3.17</b>	2.22 <b>3.09</b>	2.18 <b>3.02</b>	2.15 <b>2.96</b>	2.10 <b>2.86</b>	2.05 <b>2.77</b>	1.99 <b>2.66</b>
27	4.21 <b>7.68</b>	3.35 <b>5.49</b>	2.96 <b>4.60</b>	2.73 <b>4.11</b>	2.57 <b>3.79</b>	2.46 <b>3.56</b>	2.37 <b>3.39</b>	2.30 <b>3.26</b>	2.25 <b>3.14</b>	2.20 <b>3.06</b>	2.16 <b>2.98</b>	2.13 <b>2.93</b>	2.08 <b>2.83</b>	2.03 <b>2.74</b>	1.97 <b>2.63</b>
28	4.20 <b>7.64</b>	3.34 <b>5.45</b>	2.95 <b>4.57</b>	2.71 <b>4.07</b>	2.56 <b>3.76</b>	2.44 <b>3.53</b>	2.36 <b>3.36</b>	2.29 <b>3.23</b>	2.24 <b>3.11</b>	2.19 <b>3.03</b>	2.15 <b>2.95</b>	2.12 <b>2.90</b>	2.06 <b>2.80</b>	2.02 <b>2.71</b>	1.96 <b>2.60</b>
29	4.18 <b>7.60</b>	3.33 <b>5.42</b>	2.93 <b>4.54</b>	2.70 <b>4.04</b>	2.54 <b>3.73</b>	2.43 <b>3.50</b>	2.35 <b>3.33</b>	2.28 <b>3.20</b>	2.22 <b>3.08</b>	2.18 <b>3.00</b>	2.14 <b>2.92</b>	2.10 <b>2.87</b>	2.05 <b>2.77</b>	2.00 <b>2.68</b>	1.94 <b>2.57</b>
30	4.17 <b>7.56</b>	3.32 <b>5.39</b>	2.92 <b>4.51</b>	2.69 <b>4.02</b>	2.53 <b>3.70</b>	2.42 <b>3.47</b>	2.34 <b>3.30</b>	2.27 <b>3.17</b>	2.21 <b>3.06</b>	2.16 <b>2.98</b>	2.12 <b>2.90</b>	2.09 <b>2.84</b>	2.04 <b>2.74</b>	1.99 <b>2.66</b>	1.93 <b>2.55</b>
32	4.15 <b>7.50</b>	3.30 <b>5.34</b>	2.90 <b>4.46</b>	2.67 <b>3.97</b>	2.51 <b>3.66</b>	2.40 <b>3.42</b>	2.32 <b>3.25</b>	2.25 <b>3.12</b>	2.19 <b>3.01</b>	2.14 <b>2.94</b>	2.10 <b>2.86</b>	2.07 <b>2.80</b>	2.02 <b>2.70</b>	1.97 <b>2.62</b>	1.91 <b>2.51</b>
34	4.13 <b>7.44</b>	3.28 <b>5.29</b>	2.88 <b>4.42</b>	2.65 <b>3.93</b>	2.49 <b>3.61</b>	2.38 <b>3.38</b>	2.30 <b>3.21</b>	2.23 <b>3.08</b>	2.17 <b>2.97</b>	2.12 <b>2.89</b>	2.08 <b>2.82</b>	2.05 <b>2.76</b>	2.00 <b>2.66</b>	1.95 <b>2.58</b>	1.89 <b>2.47</b>
36	4.11 <b>7.39</b>	3.26 <b>5.25</b>	2.86 <b>4.38</b>	2.63 <b>3.89</b>	2.48 <b>3.58</b>	2.36 <b>3.35</b>	2.28 <b>3.18</b>	2.21 <b>3.04</b>	2.15 <b>2.94</b>	2.10 <b>2.86</b>	2.06 <b>2.78</b>	2.03 <b>2.72</b>	1.98 <b>2.62</b>	1.93 <b>2.54</b>	1.87 <b>2.43</b>
38	4.10 <b>7.35</b>	3.25 <b>5.21</b>	2.85 <b>4.34</b>	2.62 <b>3.86</b>	2.46 <b>3.54</b>	2.35 <b>3.32</b>	2.26 <b>3.15</b>	2.19 <b>3.02</b>	2.14 <b>2.91</b>	2.09 <b>2.82</b>	2.05 <b>2.75</b>	2.02 <b>2.69</b>	1.96 <b>2.59</b>	1.92 <b>2.51</b>	1.85 <b>2.40</b>
40	4.08 <b>7.31</b>	3.23 <b>5.18</b>	2.84 <b>4.31</b>	2.61 <b>3.83</b>	2.45 <b>3.51</b>	2.34 <b>3.29</b>	2.25 <b>3.12</b>	2.18 <b>2.99</b>	2.12 <b>2.88</b>	2.07 <b>2.80</b>	2.04 <b>2.73</b>	2.00 <b>2.66</b>	1.95 <b>2.56</b>	1.90 <b>2.49</b>	1.84 <b>2.37</b>
42	4.07 <b>7.27</b>	3.22 <b>5.15</b>	2.83 <b>4.29</b>	2.59 <b>3.80</b>	2.44 <b>3.49</b>	2.32 <b>3.26</b>	2.24 <b>3.10</b>	2.17 <b>2.96</b>	2.11 <b>2.86</b>	2.06 <b>2.77</b>	2.02 <b>2.70</b>	1.99 <b>2.64</b>	1.94 <b>2.54</b>	1.89 <b>2.46</b>	1.82 <b>2.35</b>