Convergent and Bounded Sequence- Answer Key

- 1. Find the bounds of the sequence $a_n =$
- 6. Does the sequence $a_n = \frac{(-2)^{n-1}}{n^2}$ converge? Why? Yes, since $\lim_{n\to\infty} |a_n| = 0$.
- 2. Find the bounds of the sequence $a_n =$ $3n^2 - n$.

The sequence is unbounded above and the lower bound is 2.

- 7. Does the sequence $a_n = \frac{an^2-2}{b^2n-n^2}$ converge? Why? Yes, since $\lim_{n\to\infty} a_n = -a$.
- 3. Does the sequence $a_n = \frac{3}{n^2}$ converge? Why? Yes, because the sequence in decreasing and bounded above by 3.
- 8. Does the sequence $a_n = (-2)^{n-1}$ converge? Why? No, since $\lim_{n\to\infty} |a_n|$ does not exist.
- 4. Does the sequence $a_n = \frac{n+1}{n^2}$ converge? Yes, because the sequence in decreasing
 - and bounded above by 2.
- 9. Does the sequence $a_n = \frac{\cos n}{n}$ converge? Yes, since $\frac{-1}{n} \le \frac{\cos n}{n} \le \frac{1}{n}$ and by sandwich theorem $\lim_{n\to\infty} a_n = 0$.
- 5. Does the sequence $a_n = \left(\frac{e^n}{n}\right)^2$ converge? Why? No, since $\lim_{n\to\infty} a_n = \infty$.
- 10. Does the sequence $a_n = \frac{n}{\ln n}$ converge? Why? No since $\lim_{n\to\infty} a_n = \infty$.

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