Section 11.3: Review Answers

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1. The peripheral nervous system lies outside of the central nervous system. Sensory neurons carry information to the CNS, and motor neurons carry information away from the CNS. The central nervous system receives the sensory information and initiates an appropriate motor response.

2. The somatic system is largely under voluntary control, and its neurons service the head, trunk, and limbs. Its sensory neurons carry information about the external environment inward, from the receptors in the skin, tendons, and skeletal muscles. Its motor neurons carry information to the skeletal muscles.

In contrast to the somatic system, the autonomic system is under automatic, or involuntary, control. Its nerves either stimulate or inhibit the glands or the cardiac or smooth muscle. The autonomic system maintains homeostasis by adjusting the body to variations in the external and internal environments.

3. (a) Seeing the bear and cubs would likely cause a response from the sympathetic nervous system—the "fight-or-flight" response.

(b) The physiological responses to this situation would include some of the following: blood pressure increases, the heart beats faster, breathing rate increases, air passages dilate, the liver releases glucose into the blood stream, while digestion slows down, and the sphincter controlling the bladder constricts.

(c) The parasympathetic nervous system would return the body to equilibrium.

4.

Body Structures	Sympathetic Stimulation Effect	Parasympathetic Stimulation Effect
eyes	■ inhibits tears ■ dilates pupils	■ stimulates tears ■ constricts pupils
salivary glands	inhibits salivation	stimulates salivation
bronchioles	dilates air passages	constricts bronchioles
heart	increases heart rate	slows heart rate
liver	stimulates liver to release glucose	stimulates gall bladder to release bile
adrenal glands	stimulates adrenal glands to release epinephrine and norepinephrine	does not affect adrenal glands (parasympathetic nerves do not go to the adrenal glands)
kidneys	inhibits activity	does not affect kidney (parasympathetic nerves do not go to the kidneys)
stomach	inhibits activity	increases activity
pancreas	inhibits activity	increases activity
intestines	decreases activity	increases activity
bladder	inhibits urination by constricting the sphincter and relaxing the wall	stimulates urination by relaxing the sphincter and contracting the wall
genitals	causes erection of genitals	causes orgasmic contractions of the genitals

5. Depressants act on the parasympathetic nervous system to relax the body and slow the heart rate whereas stimulants do the opposite by causing the sympathetic nervous system to increase the heart rate and blood pressure. A commonly used stimulant is caffeine.