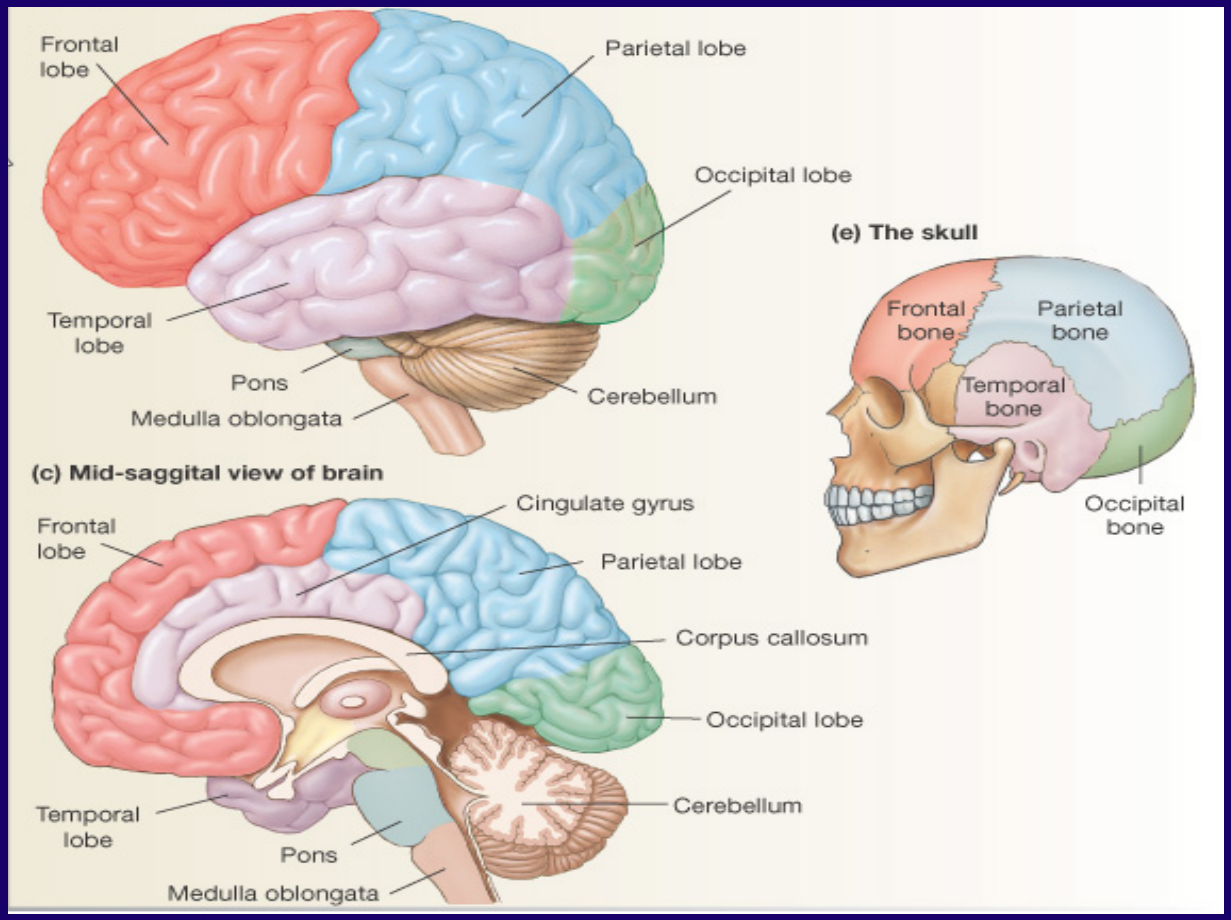
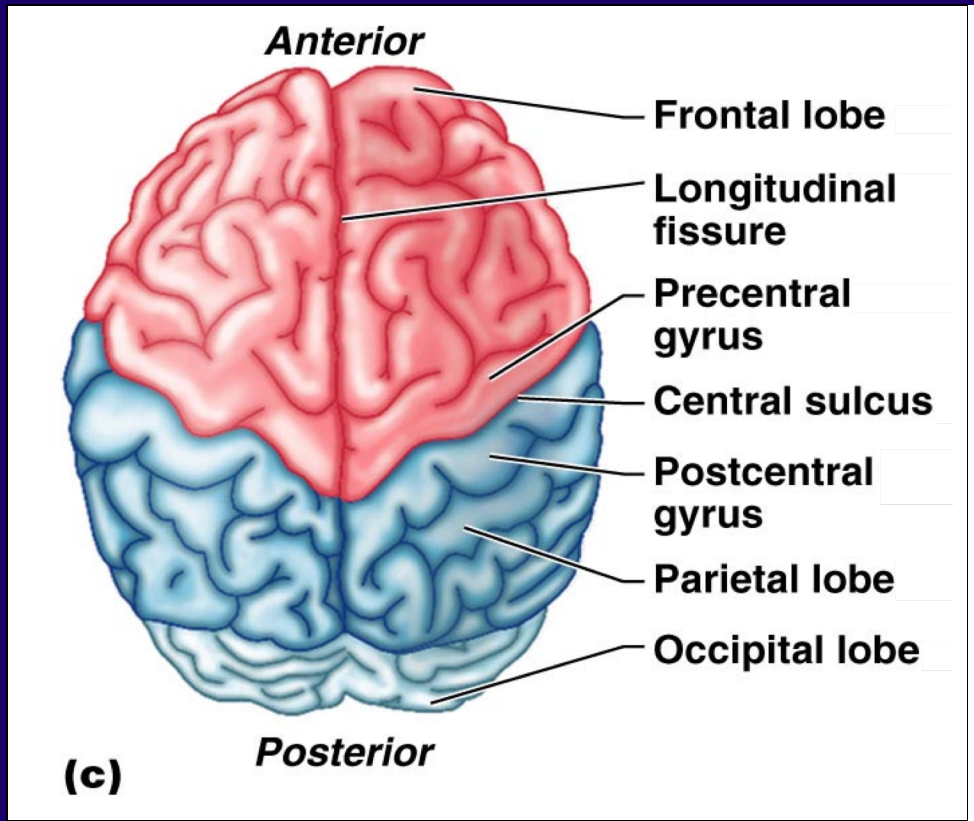
The Cerebral Hemispheres

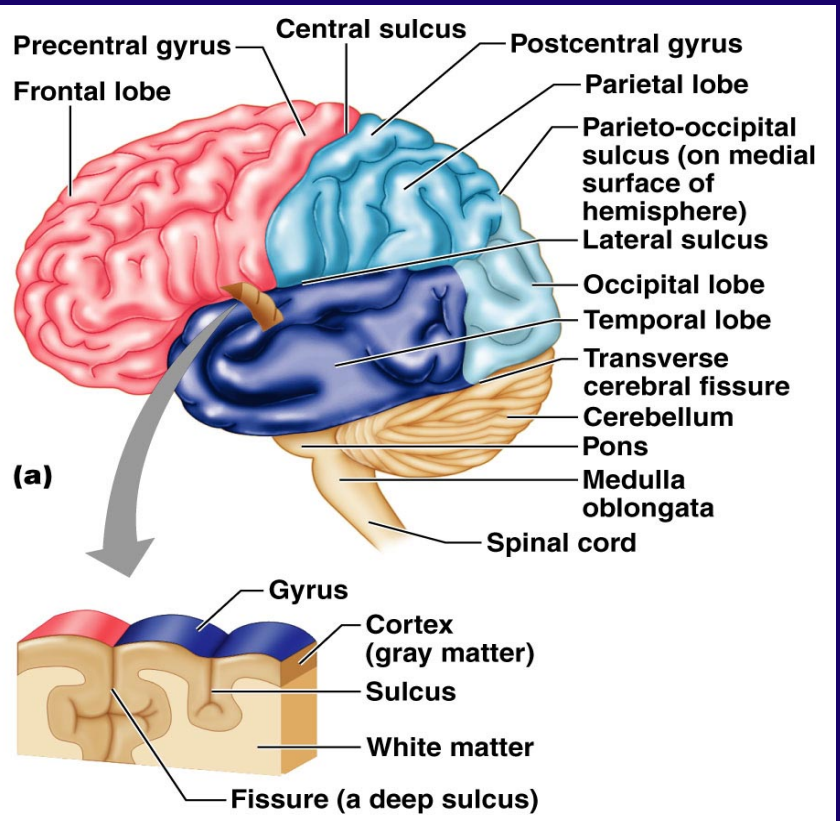
- Lobes are named for the skull bones overlying them
  - **Frontal**
  - **Parietal**
  - **Temporal**
  - **Occipital**



The Cerebral Hemispheres

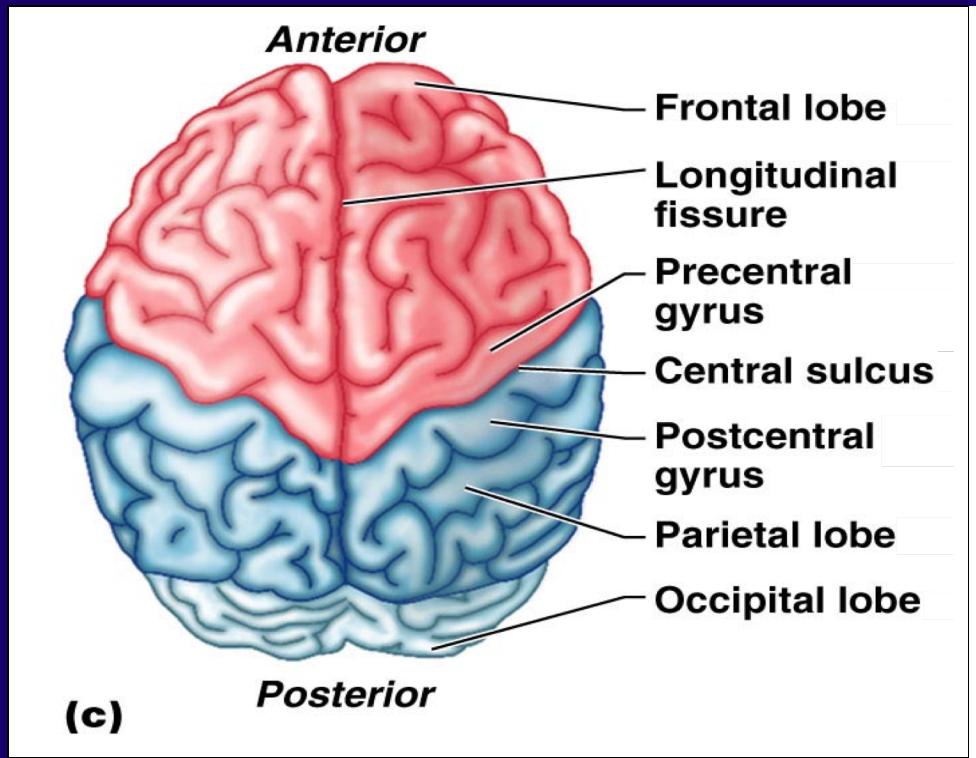
- **Fissures** – deep grooves, which separate major regions of the brain
  - **Transverse fissure** – separates cerebrum and cerebellum
  - **Longitudinal fissure** – separates cerebral hemispheres
- Sulci - grooves on the surface of the cerebral hemispheres
- Gyri - twisted ridges between sulci
- Prominent gyri and sulci are similar in all people

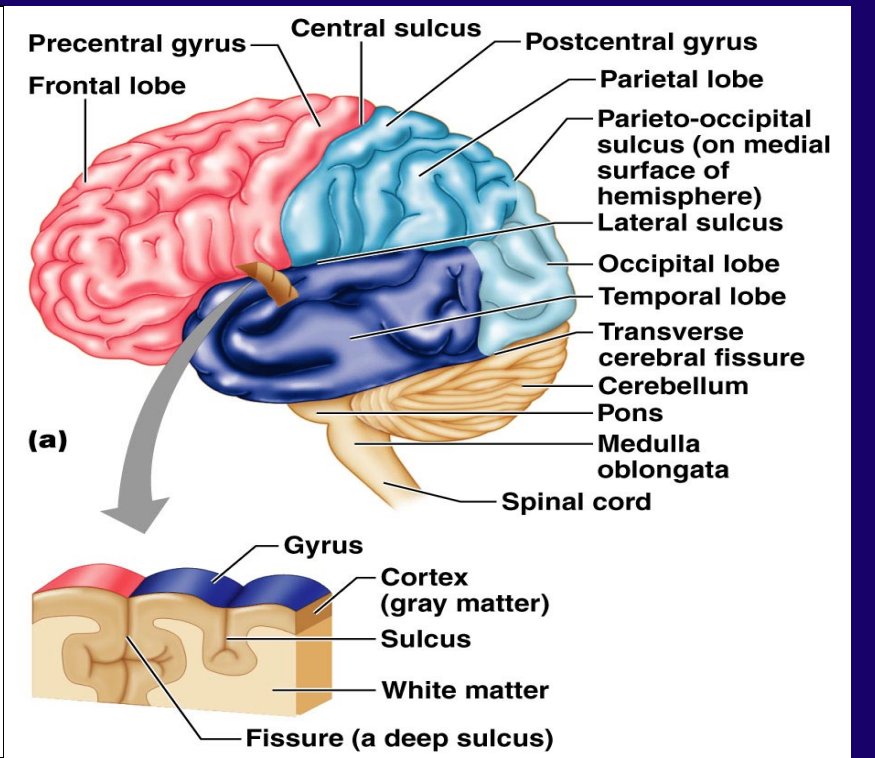




The Cerebral Hemispheres

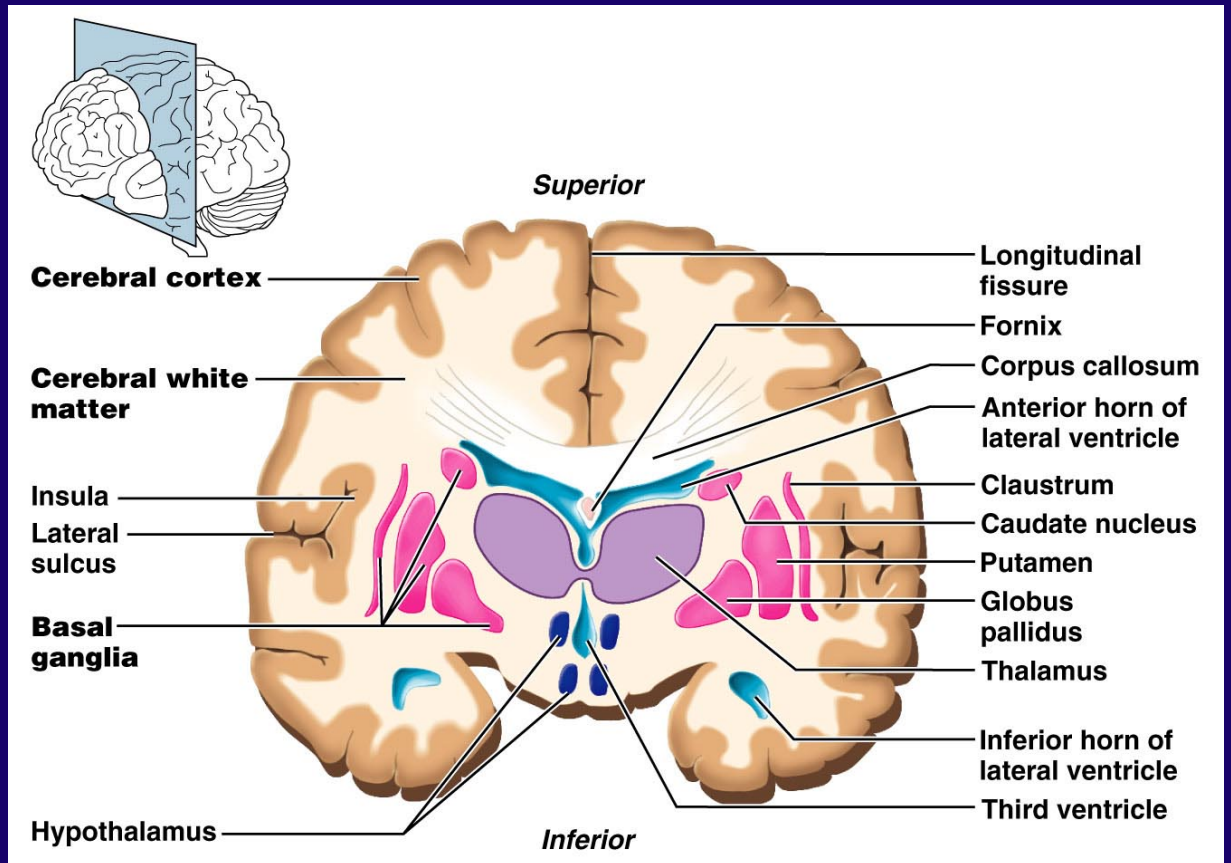
- **Central sulcus** separates frontal and parietal lobes
- Bordered by two gyri
  - **Precentral gyrus**
  - **Postcentral gyrus**
- **Parieto-occipital sulcus** - separates the occipital from the parietal lobe
- **Lateral sulcus** - separates temporal lobe from parietal and frontal lobes
- Deeper sulci divide cerebrum into lobes



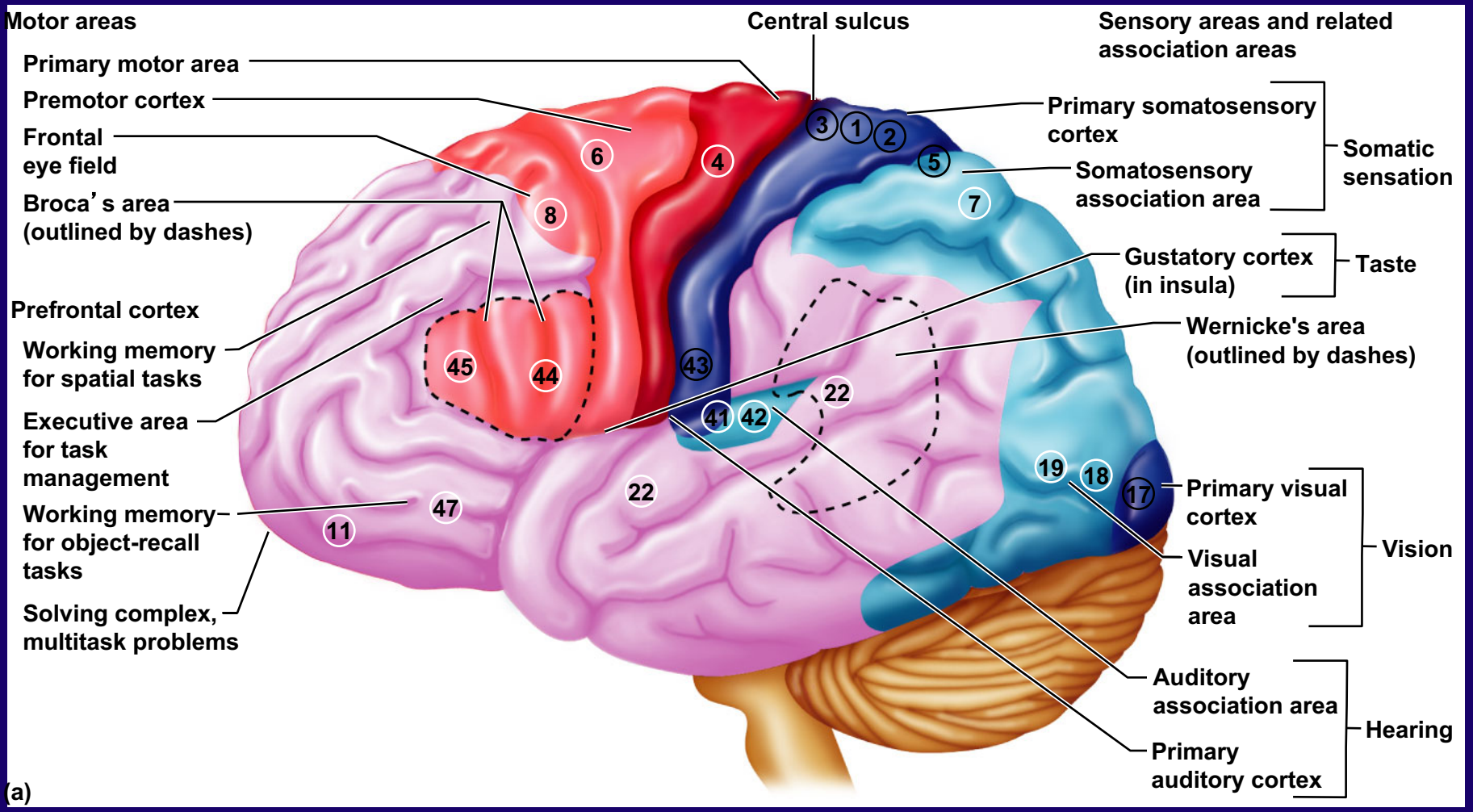


The Cerebral Cortex

- Home of our conscious mind
- Composed of gray matter - neuronal cell bodies, dendrites, and short axons
- Folds in cortex – ***triples its size***
- Approximately 40% of brain's mass

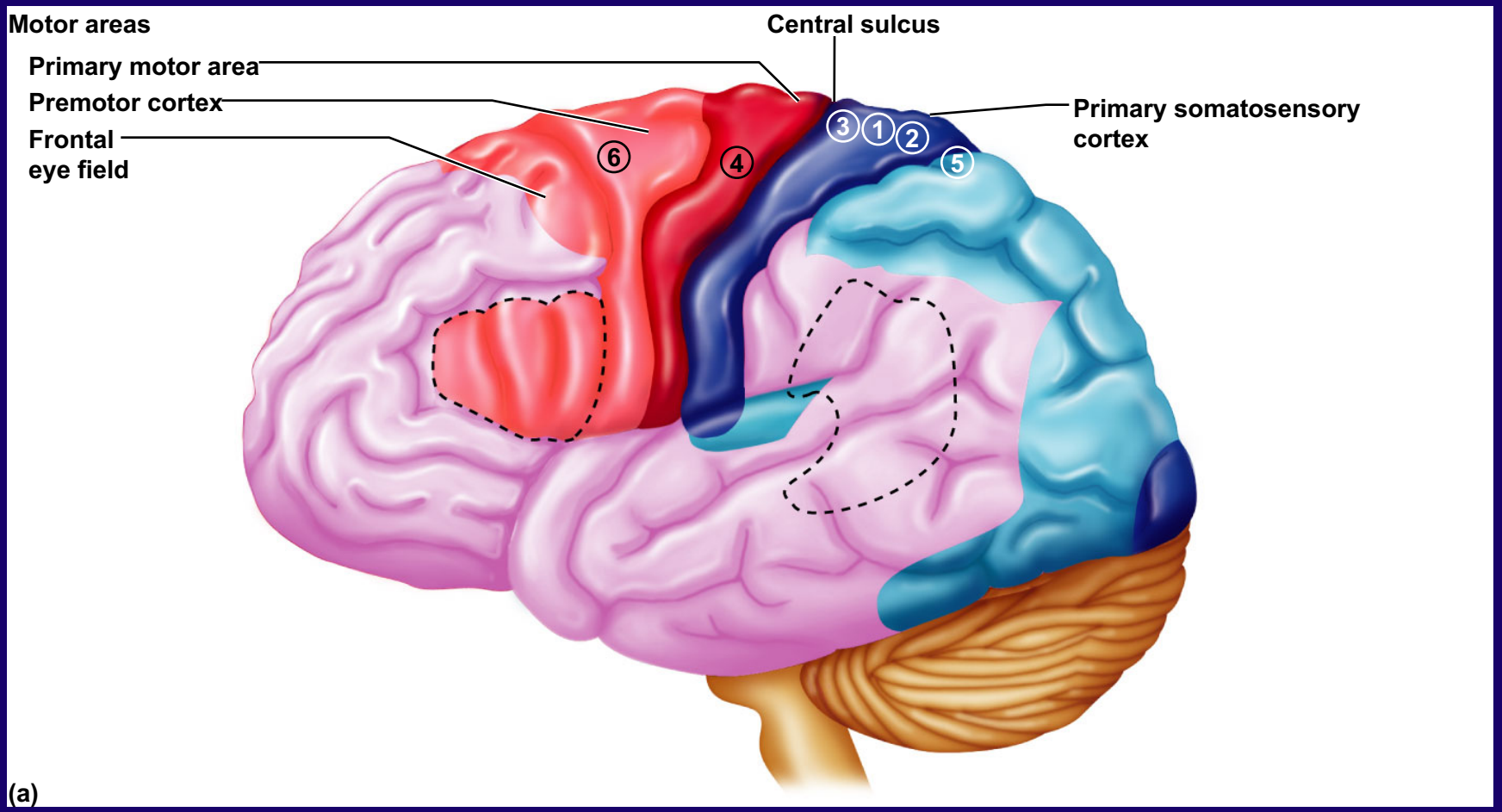


Functional Areas Of The Cerebral Cortex



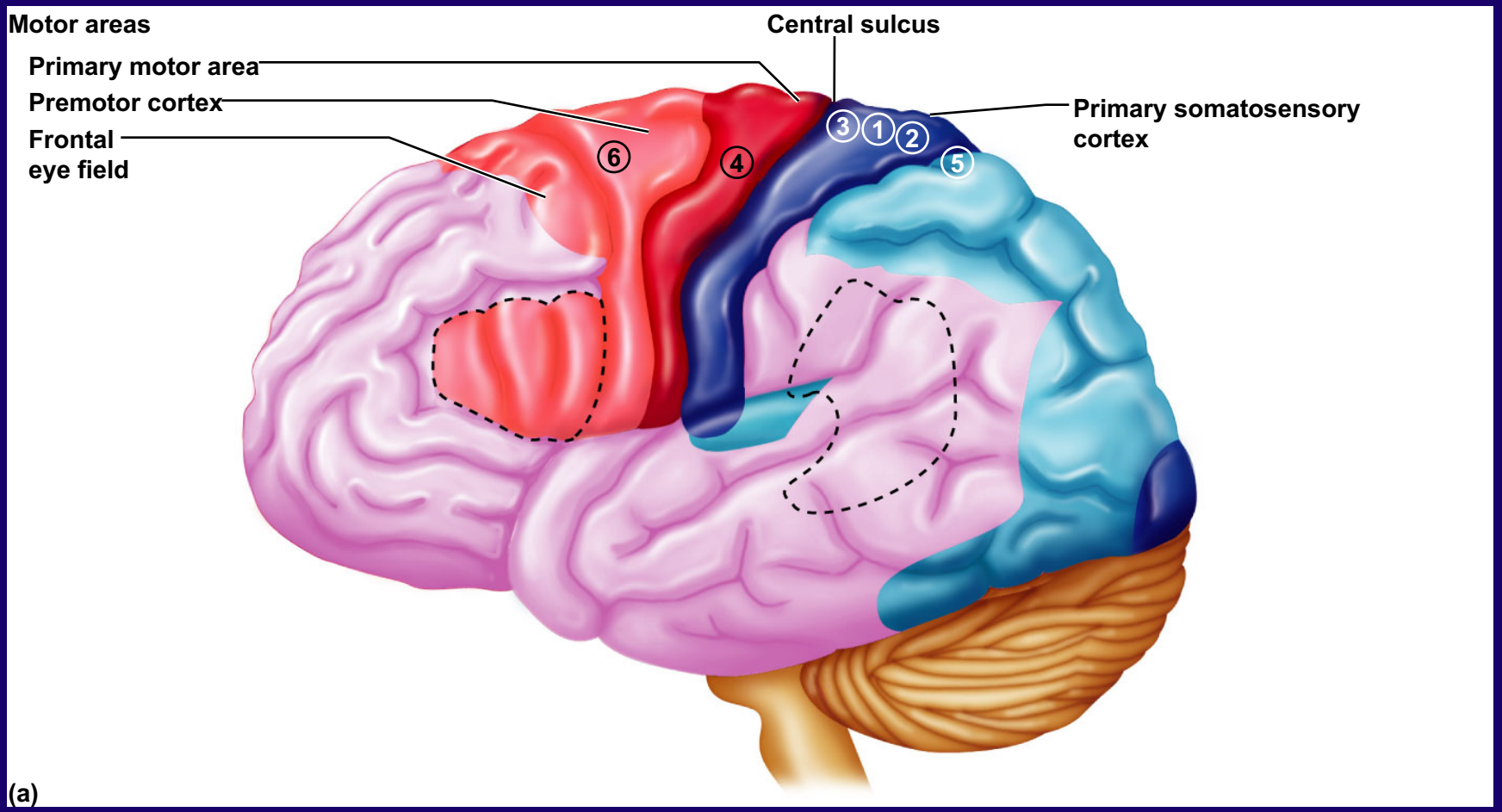
1. Primary Motor Cortex

- Responsible for the voluntary movement of skeletal muscles.
- Located in **precentral gyrus**



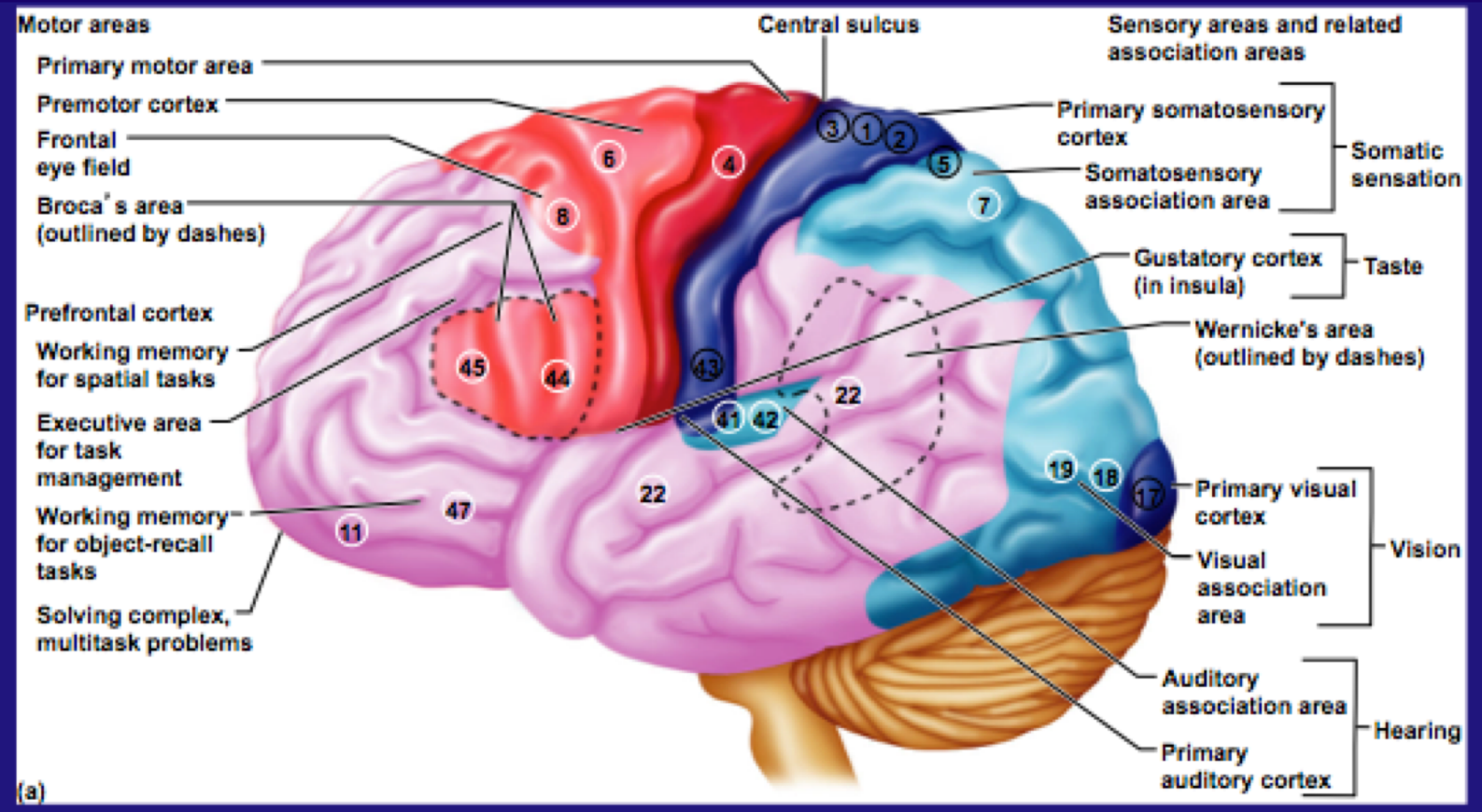
2. Premotor Area

- Integrates sensory and motor information to perform actions.



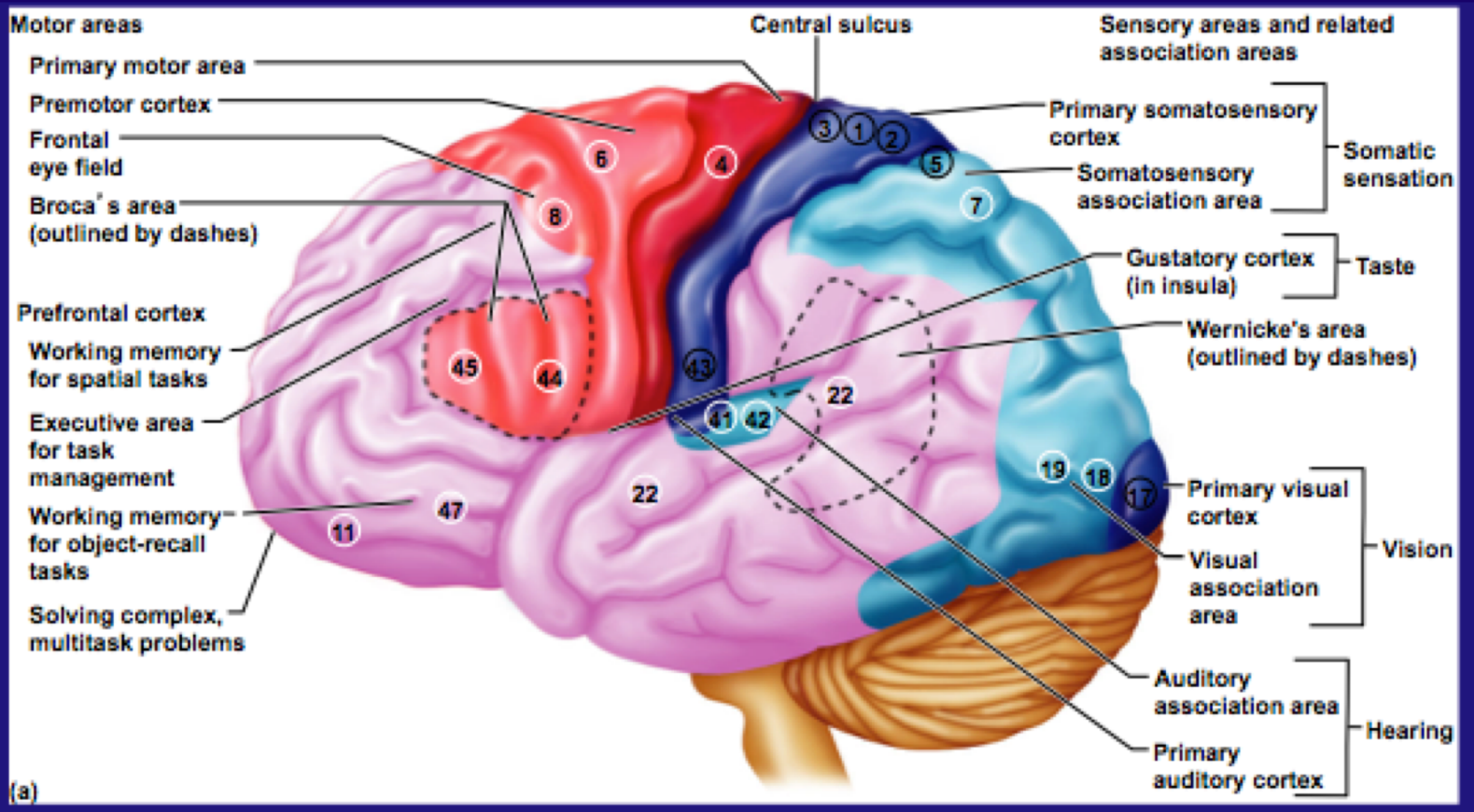
3. Broca's Area

- Responsible for the formation of language/speech.



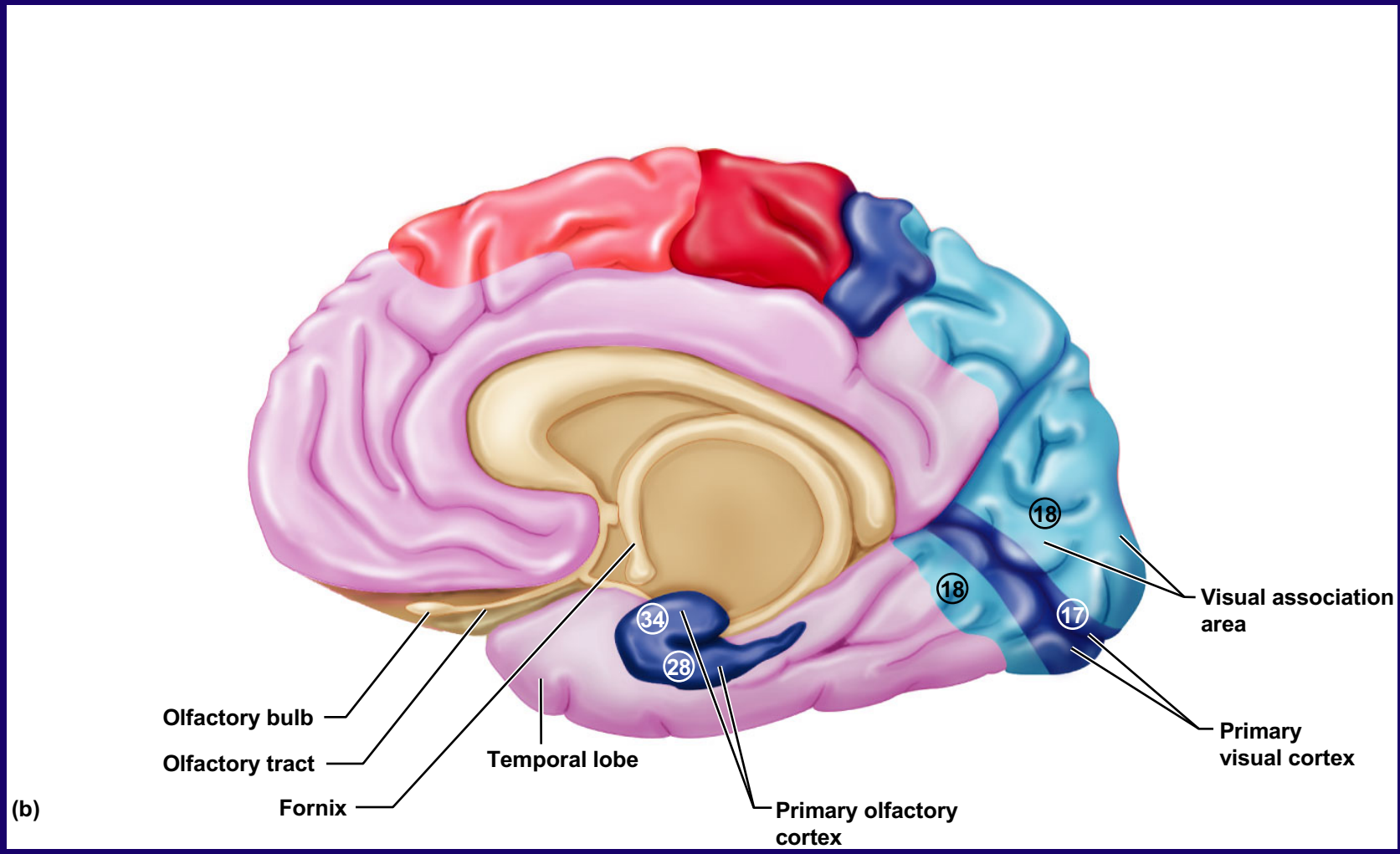
4. Prefrontal Area

- Problem solving, decision making, and complex thoughts. The origins of a person's personality.



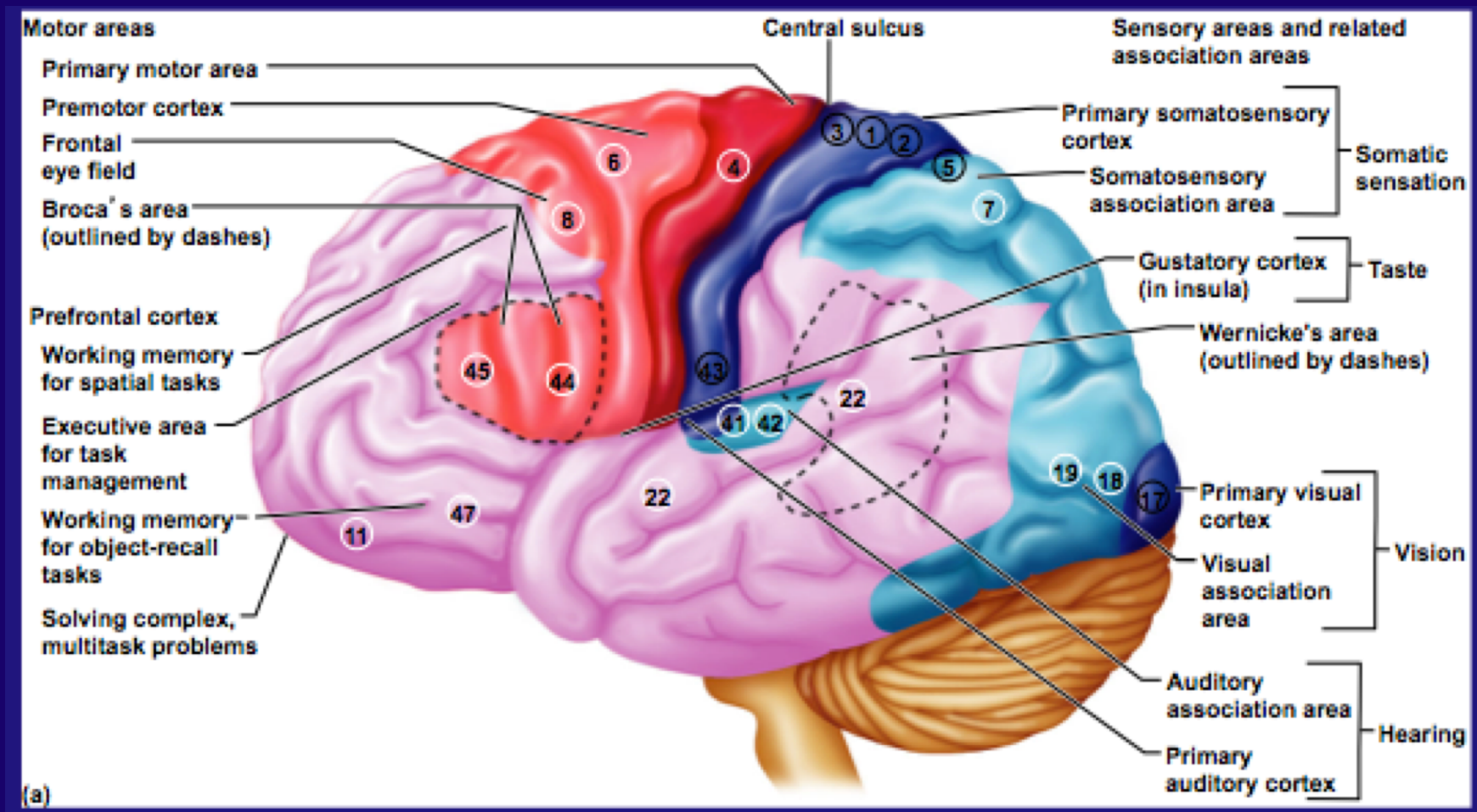
5. Olfactory Cortex

- Olfactory nerves transmit impulses to the olfactory cortex
- Provides conscious awareness of smells
- Lies on the *medial aspect* of the temporal lobe



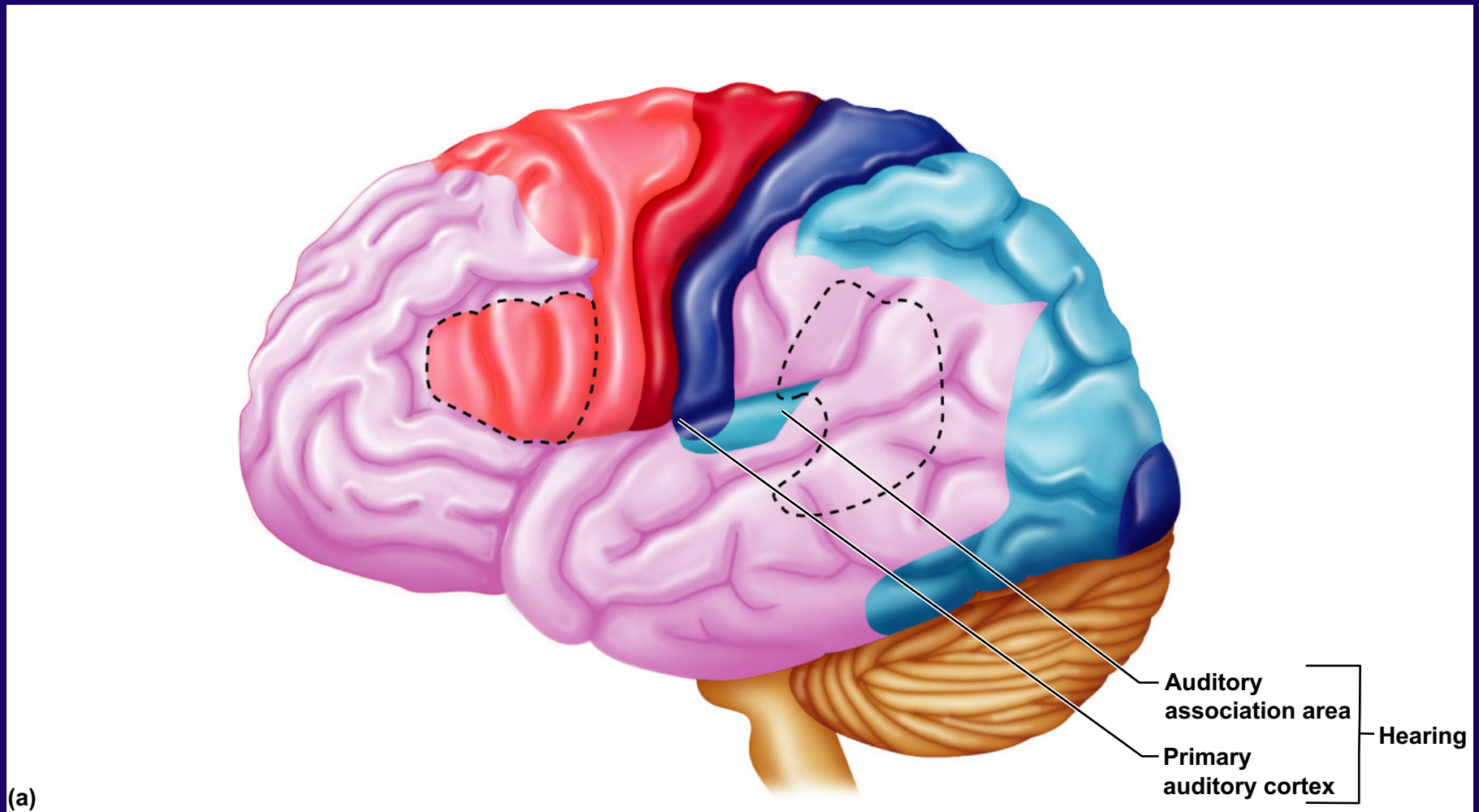
6. Auditory Association Area

- Complex processing of auditory information.



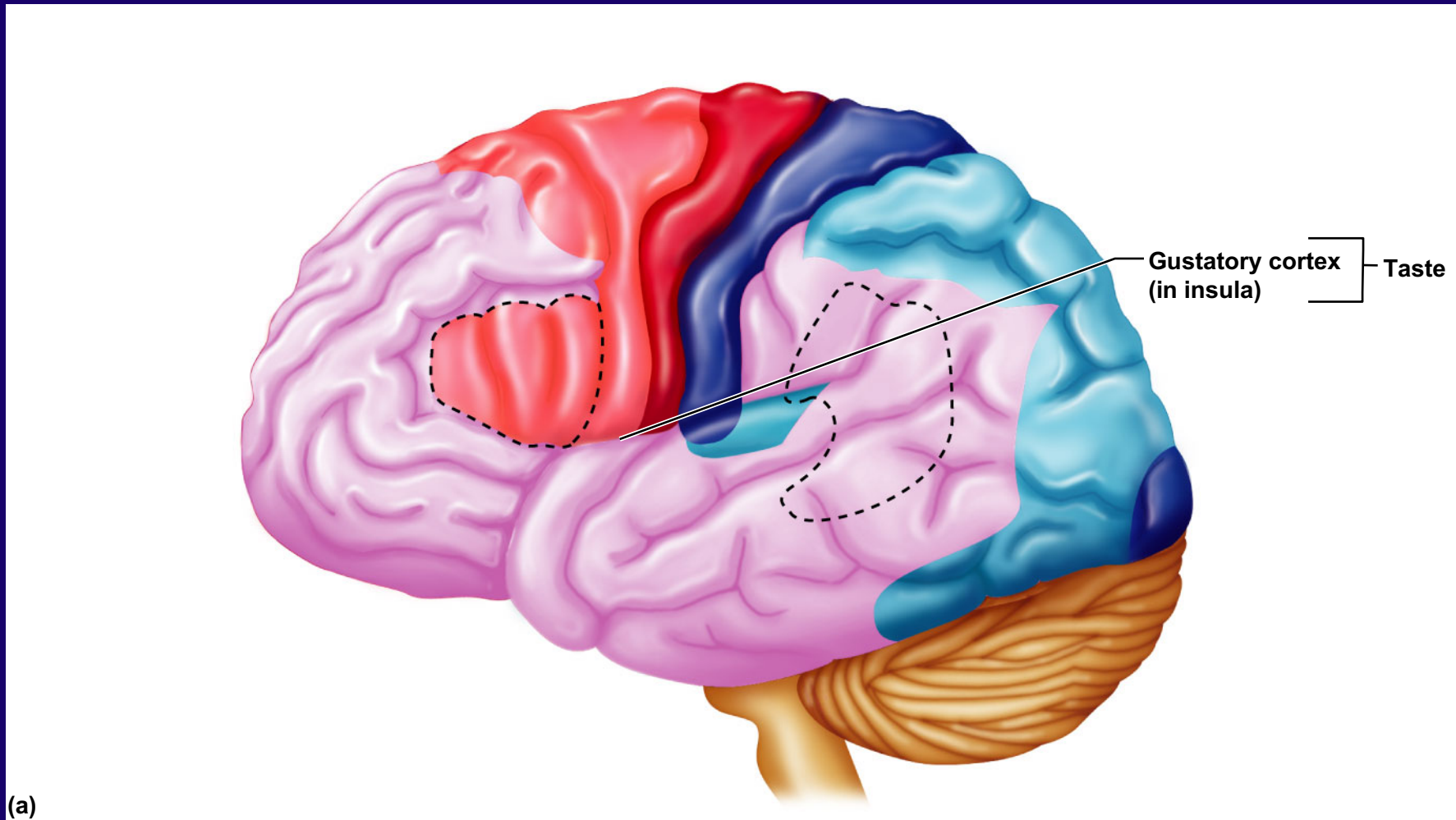
7. Auditory Cortex

- **Located at s**uperior edge of the temporal lobe
- Receives auditory information (pitch, tone, sound quality, loudness).
- Impulses transmitted to primary auditory cortex



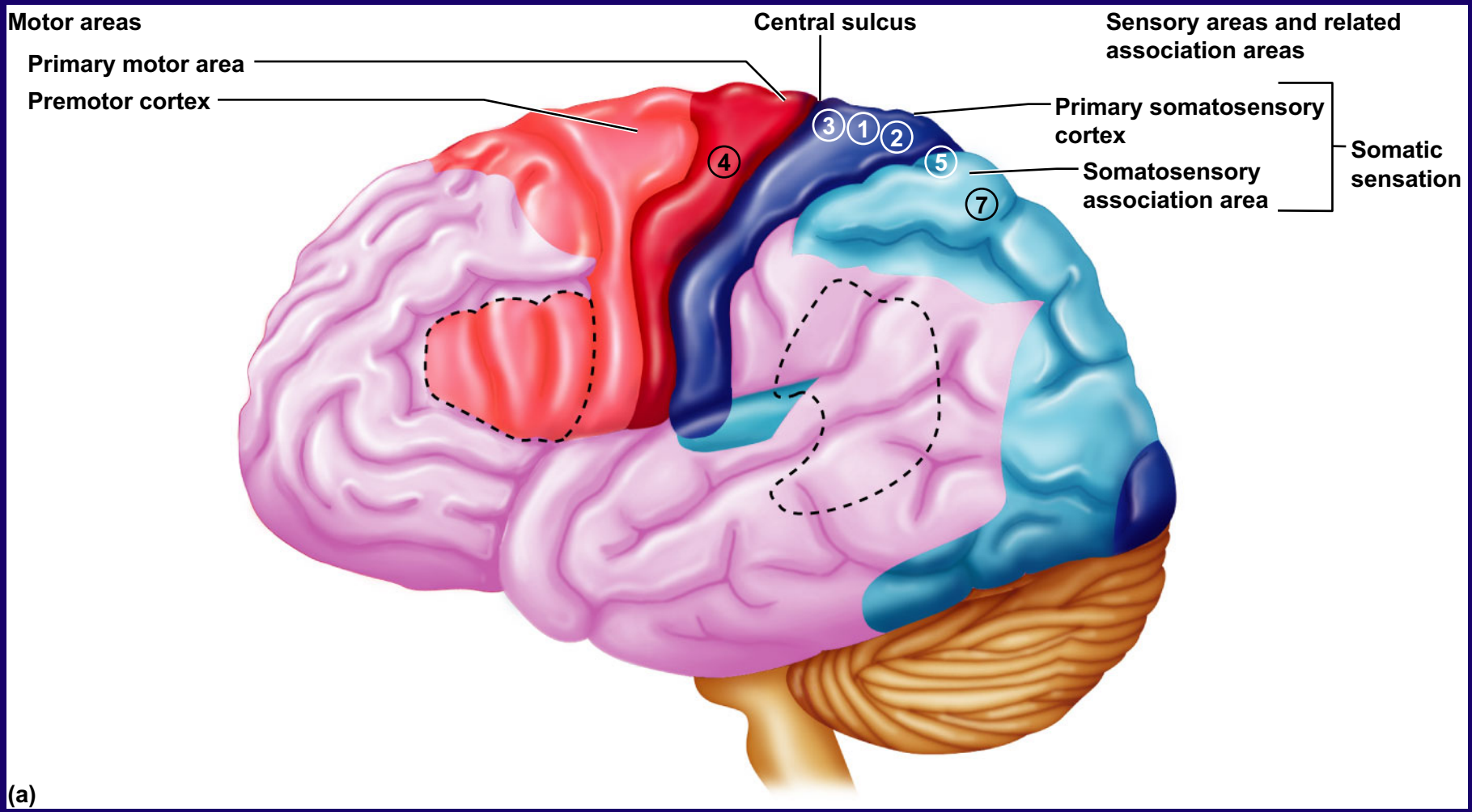
8. Gustatory Cortex

- Involved in the conscious awareness of taste stimuli
- Located on the "roof" of the **lateral sulcus**



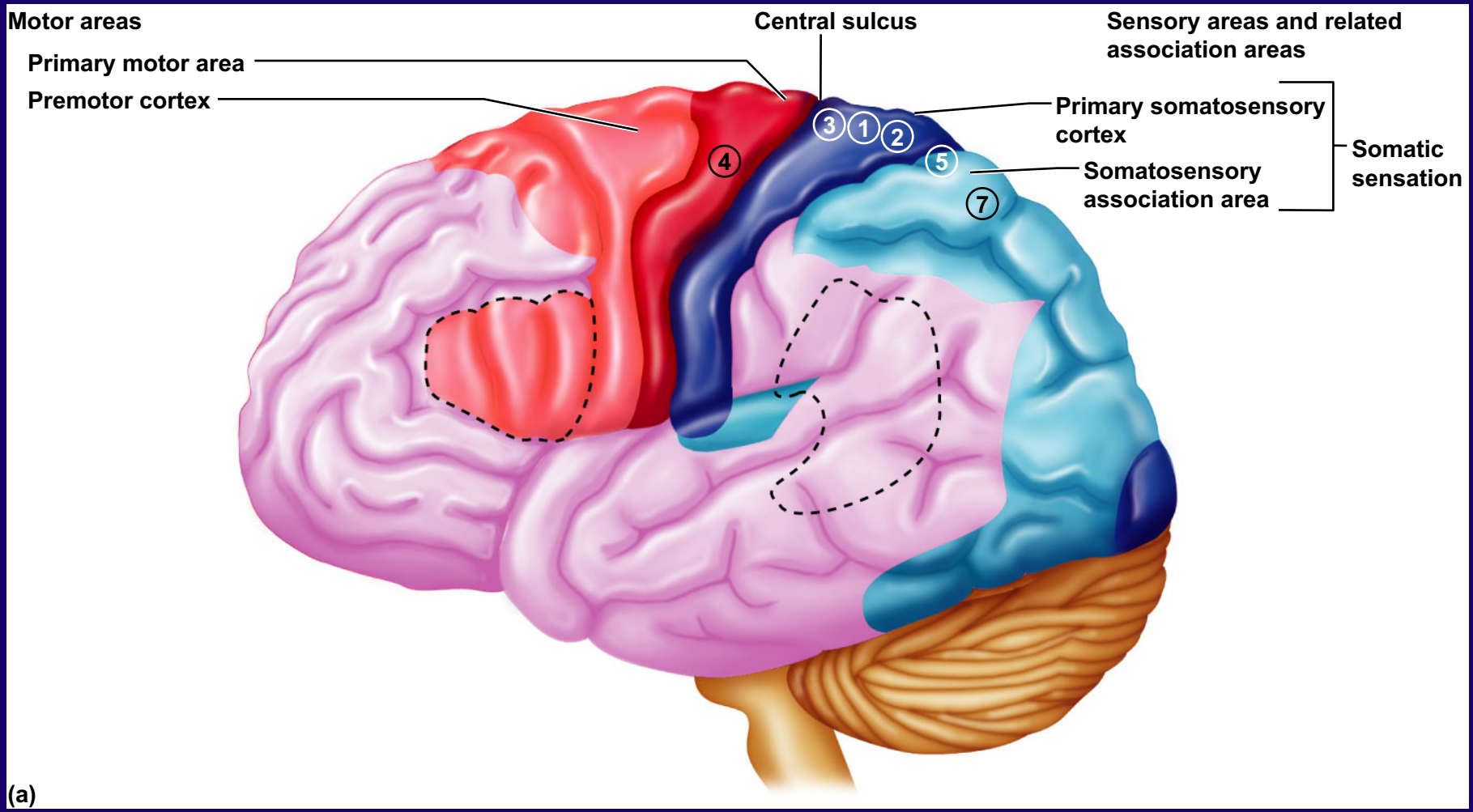
9. Primary Somatosensory Cortex

- Located along the **postcentral gyrus**
- Receives tactile information (pain, pressure, touch) from the body to create a perceptual and positional map of the body.



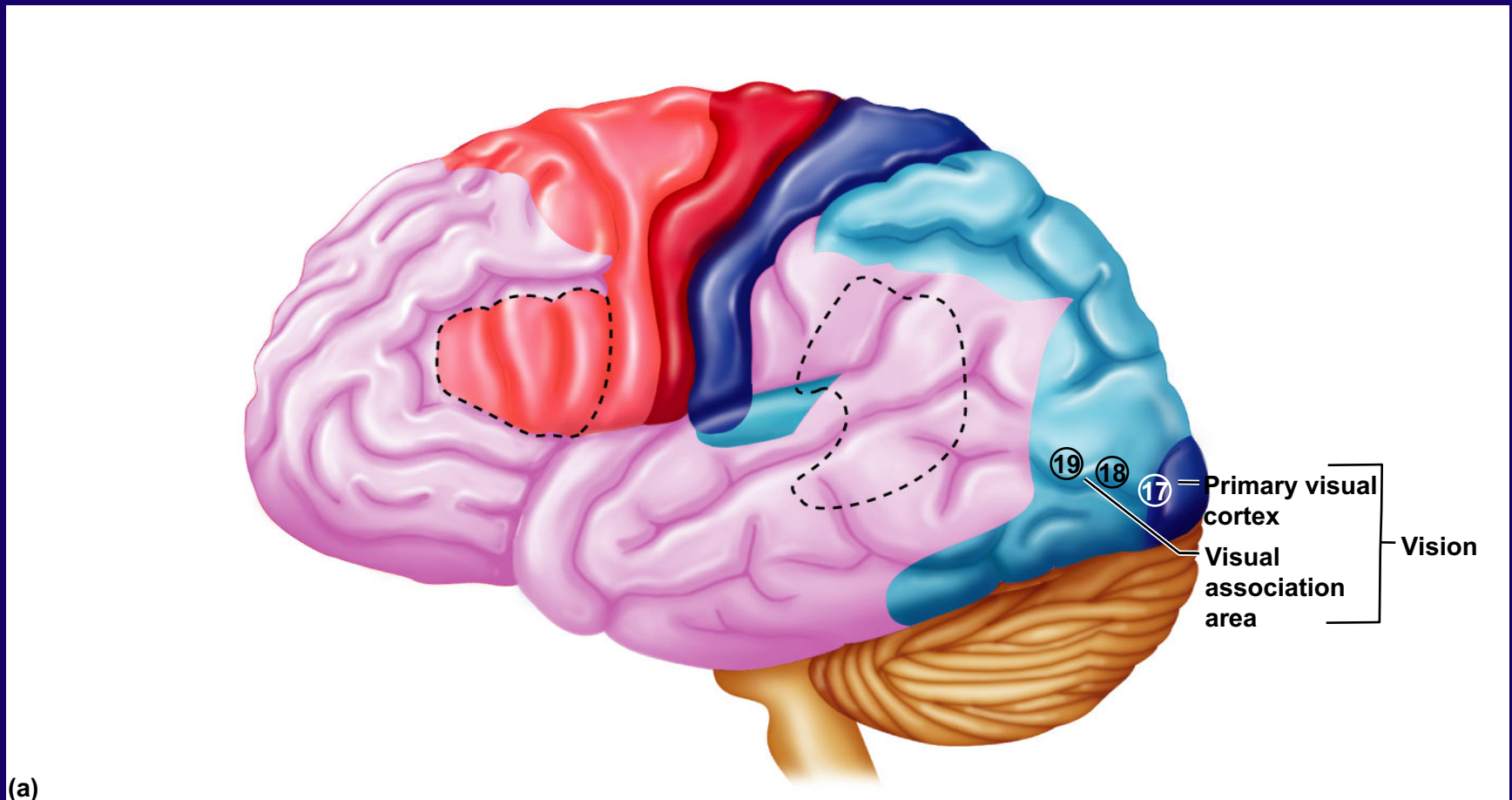
10. Sensory Association Area

- Processes multisensory information.



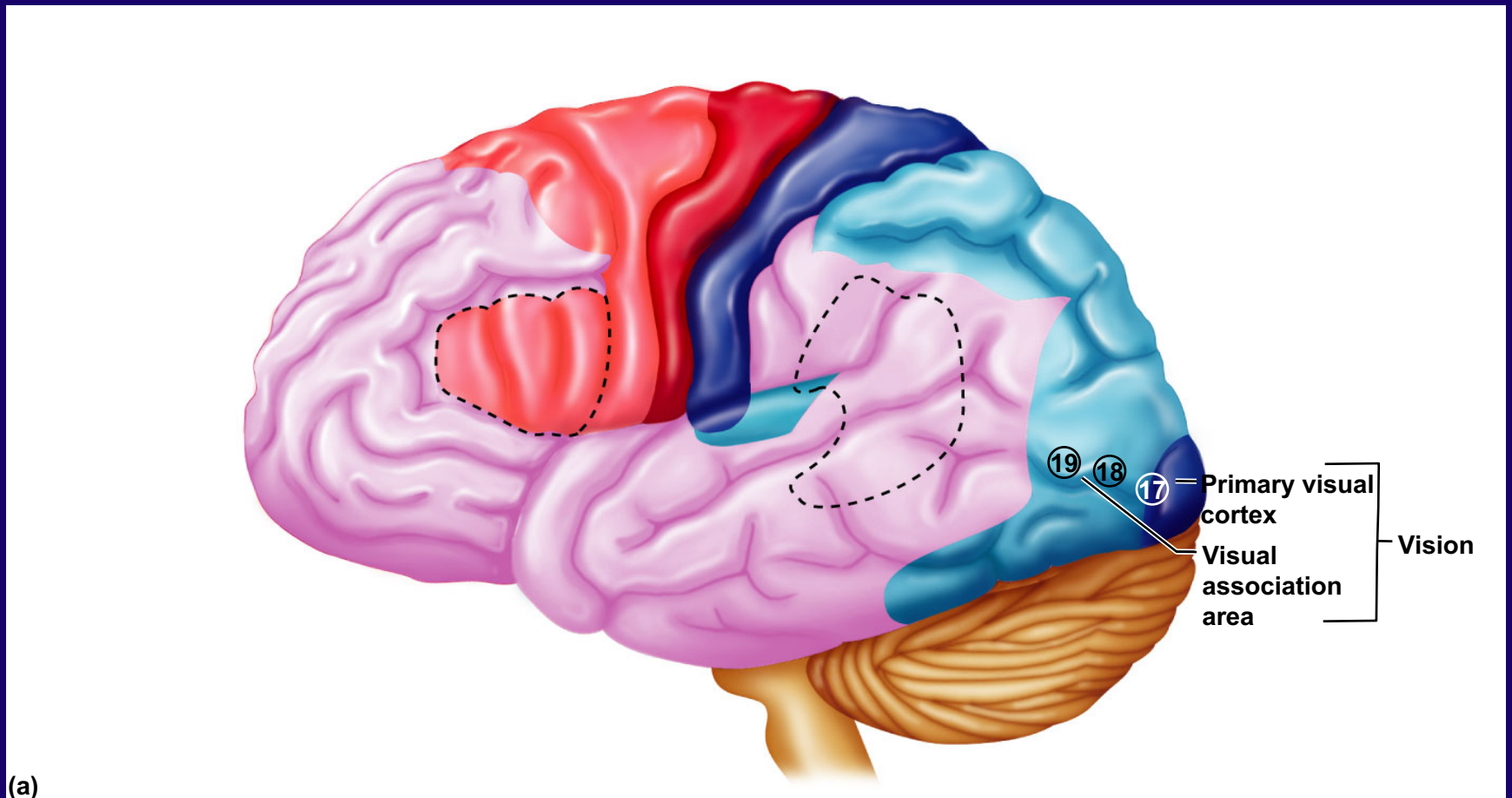
11. Visual Association

- On medial part of the occipital lobe
- Receives visual information that originates on the **retina**
- First of a series of areas processing visual input
- Receives visual information (color, light, movement).



12. Visual Cortex

- On medial part of the occipital lobe
- Vision is the largest of all sensory areas
- Complex processing of visual information.



13. Wernicke's Area

- Responsible for the interpretation of language/speech.
- Located close to the auditory cortex. This area appears to be uniquely important for the comprehension of speech Damage to the temporal lobe may result in a language disorder known as Wernicke aphasia causing difficulty understanding language.