Surface area and volume of pyramids, cones and spheres: 10 practice questions

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Name: _____ Date: _____

Attempt all questions and show your working. Suggested time: 15 to 20 minutes. Use the π key on your calculator unless a question says otherwise, and round answers to two decimal places where needed.

Section A: Consolidating (Questions 1-4)

Question 1

A right pyramid has a square base with sides of 6 cm and a perpendicular height of 10 cm. Find its volume.

Question 2

A right cone has a radius of 3 cm and a perpendicular height of 7 cm. Find its volume.

Question 3

Find the volume of a sphere with a radius of 6 cm.

Question 4

Find the surface area of a sphere with a radius of 5 cm.

Section B: Standard (Questions 5-10)

Question 5

A right pyramid has a square base with sides of 10 cm and a perpendicular height of 12 cm.

(a) Find the slant height of each triangular face (the height of the triangle, measured from the middle of a base edge to the apex).

(b) Find the total surface area of the pyramid.

(c) Find the volume of the pyramid.

Question 6

A solid right cone has a radius of 5 cm and a perpendicular height of 12 cm.

(a) Find the slant height.

(b) Find the curved surface area.

(c) Find the total surface area.

(d) Find the volume.

Question 7

A solid hemisphere (half a sphere) has a radius of 9 cm.

(a) Find its total surface area, including the flat circular face.

(b) Find its volume.

Question 8

(a) A sphere has a volume of 36π cm³. Find its radius.

(b) A sphere has a surface area of 196π cm². Find its radius.

Question 9

A right pyramid has a rectangular base 18 cm long and 10 cm wide. Its apex is 12 cm directly above the centre of the base.

(a) Find the slant height of the two triangular faces that sit on the 10 cm edges.

(b) Find the slant height of the two triangular faces that sit on the 18 cm edges.

(c) Find the total surface area of the pyramid.

(d) Find the volume of the pyramid.

Question 10

A cone has a radius of 5 cm and a volume of 150π cm³. Find its perpendicular height.

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Question 1

Answer: 120 cm^3 (⅓ × 36 × 10)

Question 2

Answer: 65.97 cm^3 (exact 21π)

Question 3

Answer: 904.78 cm^3 (exact 288π)

Question 4

Answer: 314.16 cm^2 (exact 100π)

Question 5

Answer: (a) 13 cm ($\sqrt{(12^2 + 5^2)}$) (b) 360 cm^2 (100 + 4 × ½ × 10 × 13) (c) 400 cm^3

Question 6

Answer: (a) 13 cm (b) 204.20 cm^2 (exact 65π) (c) 282.74 cm^2 (exact 90π) (d) 314.16 cm^3 (exact 100π)

Question 7

Answer: (a) 763.41 cm^2 ($2\pi r^2 + \pi r^2 = 243\pi$) (b) 1526.81 cm^3 (exact 486π)

Question 8

Answer: (a) 3 cm ($4/3r^3 = 36$, $r^3 = 27$) (b) 7 cm ($4r^2 = 196$)

Question 9

Answer: (a) 15 cm ($\sqrt{(12^2 + 9^2)}$) (b) 13 cm ($\sqrt{(12^2 + 5^2)}$) (c) 564 cm^2 (180 + 2 × 75 + 2 × 117) (d) 720 cm^3

Question 10

Answer: 18 cm (⅓ × 25 × h = 150)