Math 10 — Unit 3 Quick Check

Mr. Merrick · October 9, 2025

A. Multiple Choice

1. Which is closest to the thickness of a standard credit card?

(A) 0.76 mm (B) 0.076 mm (C) 7.6 mm (D) 76 μm

2. Convert 3.25 km to inches (use 1 in = 2.54 cm).

(A) 1.28×10^5 in (B) 1.02×10^5 in (C) 3.25×10^4 in (D) 8.53×10^3 in

3. The area of a circle with diameter 2.00 in expressed in cm^2 is closest to

(A) 3.14 cm^2 (B) 20.3 cm^2 (C) 10.2 cm^2 (D) 6.45 cm^2

4. Convert 2.4 m^2 into cm^2.

(A) 240 cm^2 (B) 24,000 cm^2 (C) 2400 cm^2 (D) 240,000 cm^2

5. A rectangular box measures 12 in $\times$ 8 in $\times$ 5 in. Its volume in litres is closest to

(A) 7.9 L (B) 3.9 L (C) 4.9 L (D) 7.0 L

6. Which metric unit is most reasonable to measure the thickness of a human hair?

(A) Millimetre (B) Micrometre (C) Nanometre (D) Centimetre

7. Convert 1 mile^2 into km^2 (1 mi = 1.609 km).

(A) 1.61 km^2 (B) 2.59 km^2 (C) 3.22 km^2 (D) 1.00 km^2

8. The lateral surface area of a cylinder of radius $r = 3$ and height $h = 10$ is

(A) 30π (B) 60π (C) 90π (D) 120π

9. The volume of a cone of radius r and height $3r$ is

(A) πr^3 (B) $3\pi r^3$ (C) $\frac{1}{3}\pi r^3$ (D) πr^2

10. A sphere has volume 36π. Its surface area is

(A) 36π (B) 48π (C) 81π (D) 144π

11. A measurement recorded as 12.30 cm was made with a ruler marked in millimetres. How many significant figures does it have, and to what precision is it recorded?

(A) 3 s.f.; nearest 0.1 cm (B) 4 s.f.; nearest 0.01 cm (C) 4 s.f.; nearest 0.1 cm (D) 5 s.f.; nearest 0.01 cm

12. Which unit would be most appropriate for the *area* of a classroom floor?

(A) mm^2 (B) cm^2 (C) m^2 (D) km^2

C. Written Response

Show your work and include units.

1. Convert 45 km/h to m/s.

2. A cylinder has radius 7.5 cm and height 20 cm. Find its total surface area.

3. The volume of a sphere is 288π cm^3. Find its radius.

4. Convert 15 ft^3 into litres. (Use 1 ft = 0.3048 m, 1 m^3 = 1000 L).

5. A pyramid has square base 12 m and height 15 m. Find its volume.

6. A cylindrical water tank of diameter 3.6 m and height 4.5 m is filled to 80% of capacity. Find the volume of water in litres.

7. A wooden beam is cut into a square prism 20 cm long with diagonal cross-section 10 cm. Find its volume.

8. The Great Pyramid of Giza has base length 230 m and original height 146 m. Approximate its volume in cubic kilometres.

9. A steel sphere of radius 5 cm is melted and recast into cylindrical rods of radius 0.5 cm and length 20 cm. How many rods can be made?

10. A cube of edge x cm has the same surface area as a sphere of radius $r = 6$ cm. Find x.

11. A cone and a hemisphere share the same base radius r and equal volumes. Find the ratio of the cone's height h to r.

12. A right circular cylinder of radius 40 cm and length 1.5 m lies on its side and is filled to half its depth. Derive a formula (in terms of r, L, θ) for the volume of liquid, and then evaluate numerically.

13. A decorative garden light consists of a hemisphere (radius 9 cm) mounted on a right circular cylinder (radius 9 cm, height 18 cm). Find the total exterior surface area (exclude the join) and the total volume.

14. The area of an irregular garden bed is estimated by decomposing it into a 6.0 m $\times$ 4.0 m rectangle and a semicircle of diameter 6.0 m. State the area to an appropriate number of significant figures and comment on the effect of measurement precision on your result.