

EASA part 66 module 1 - Math Practice Geometry

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Areas

$$\text{square} = a^2$$

$$\text{rectangle} = ab$$

$$\text{parallelogram} = bh$$

$$\text{trapezoid} = h/2 (b_1 + b_2)$$

π is 3.14... but sometimes you can even use 3 for calculation

$$\text{circle} = \pi r^2$$

$$\text{ellipse} = \pi r_1 r_2$$

$$\text{triangle} = (1/2) b h$$

$$\text{equilateral triangle} = (1/4)\sqrt{3} a^2$$

$$\text{triangle given SAS} = (1/2) a b \sin C$$

$$\text{triangle Pythagoras} = c^2 = a^2 + b^2$$

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Volumes

$$\text{cube} = a^3$$

$$\text{rectangular prism} = a b c$$

$$\text{irregular prism} = b h$$

$$\text{cylinder} = b h = \pi r^2 h$$

$$\text{pyramid} = (1/3) b h$$

$$\text{cone} = (1/3) b h = 1/3 \pi r^2 h$$

$$\text{sphere} = (4/3) \pi r^3$$

$$\text{ellipsoid} = (4/3) \pi r_1 r_2 r_3$$

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Surface Area

$$\text{cube} = 6 a^2$$

$$\text{cone} = \text{base} + \text{coat} = \pi r^2 + \pi r l$$

prism:

$$(\text{lateral area}) = \text{perimeter}(b) L$$

$$(\text{total area}) = \text{perimeter}(b) L + 2b$$

$$\text{sphere} = 4 \pi r^2$$

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The examples below are by no means in your exam. They are just as a final math practice!

Example:

The diameter of a piston is 5 inches. What is the circumference of the piston?

$$\text{As the circumference } C = \pi d = 3.14 \times 5 = \mathbf{15.7 \text{ inches}}$$

Example:

The diameter of a bore is 5 inches. What is the surface?

$$\text{As the area of a circle is } \pi r^2$$

$$\text{and the diameter } d = 2 \times \text{radius } r$$

$$3.14 \times 2.5 \times 2.5 = \mathbf{19.625 \text{ square inches}}$$

Example:

A cylinder has a diameter of 12cm and is 16cm high. What is the volume of the cylinder?

$$V = \pi r^2 h - \text{as diameter } d = 2 \times \text{radius } r = 6\text{cm}$$

$$V = 3.14 \times 6 \times 6 \times 16 = \mathbf{1808.64\text{cm}^2} \text{ or } \mathbf{18.0864\text{dm}^2}$$

What is the surface of the same cylinder?

$$SA = 2 \pi r^2 + 2 \pi r h = 2 \times 3.14 \times 6 \times 6 + 2 \times 3.14 \times 6 \times 16 = 226.08 + 602.88 = \mathbf{828.96\text{cm}^2}$$

A square has a side of 2cm and has a diagonal of ? cm?

The diagonal of a square divides it in two equal triangles.

By using the old Pythagoras = $c^2 = a^2 + b^2$,

we find out that $c^2 = 2 \times 2 + 2 \times 2 = 8$

$$c = \sqrt{8} = \mathbf{2.828\text{cm}}$$

Example:

Calculate the **surface of a tube** with an outer radius of 10cm and an inner radius of 5cm.

$$\text{You calculate first the outer area of the circle} = \pi r^2 = 3.14 \times (10\text{cm})^2 = 3.14 \times 10 \times 10 = 314\text{cm}^2$$

minus the inner circle

$$3.14 \times (5\text{cm})^2 = 3.14 \times 5 \times 5 = 78.5\text{cm}^2$$

$$\text{equals } 314 - 78.5 = \mathbf{235.5\text{cm}^2}$$

Example:

You want to **build a tent** with a round floor of 10m² and 2.40m high. **How many square meter of canvas** do we need?

We already know the floor with 10m²

Circle area $A = \pi r^2$ We must find out the radius **r** to be able to calculate the the circumference.

We transpose the circle formula

$$A = 3.14 r^2 \text{ to } A/3.14 = r^2$$

You forgot how to do it? See **Recall your Math!**

We find out **r** by extracting the root = $\sqrt{A/3.14} = r$

$$\sqrt{10\text{m}^2/3.14} = r = 1.78\text{m}$$

As we know now the radius **r** = 1.78m, the base

and the height is 2.4m, we must do a triangular calculation to find out the length of the side **l**.

By using the old Pythagoras = $c^2 = a^2 + b^2$,

we find out that

$$c^2 = 1.78 \times 1.78 + 2.4 \times 2.4 = 3.1684 + 5.76 = 8.9284$$

$$c = \sqrt{8.9284} = \mathbf{2.99}$$

The formula for the coat is

$$\pi r l = 3.14 \times 1.78 \times 2.99 = \mathbf{16.72\text{m}^2}$$

$$\text{Total canvas is} = \text{base of } 10\text{m}^2 + \text{coat of } 16.72\text{m}^2 = \mathbf{26.72\text{m}^2}$$

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