

12.3

18

$$V = \pi r^2 h$$

wide

$$V = \pi (2r)^2 \left(\frac{1}{2}h\right)$$

$$V = 4\pi r^2 \left(\frac{1}{2}h\right)$$
$$V = 2\pi r^2 h$$

tall

$$V = \pi r^2 h$$

$$V = \pi r^2 h$$

* Wide one holds 2x as much as tall

19

$$V_{\text{cone}} = \frac{1}{3}\pi r^2 h$$

$$V_{\text{cyl}} = \pi r^2 h$$

* Same r + h → 1:3 ratio

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$$V_{\text{cyl}} = \pi r^2 h$$
$$V = \pi (6)^2 \cdot 18$$
$$V = 648\pi$$

$$648\pi = \frac{1}{3}\pi \cdot 9^2 h$$
$$648\pi = 27\pi h$$

$24 = h$

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$$V = \pi (6)^2 \cdot 200 - \pi (5)^2 \cdot 200$$

$$V = 2260\pi \rightarrow \boxed{6908 \text{ cm}^3}$$

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$$V = \frac{1}{3}\pi r^2 h$$
$$V = \frac{1}{3}\pi (2.6)^2 (6.28)$$

$$\left(\frac{5.2}{2}\right)^2 + h^2 = 6.8^2$$
$$h \approx 6.28$$

$$V \approx 44.4 \text{ m}^3$$

$$\frac{44.4}{1.8} \approx \boxed{25 \text{ min}}$$

$$\begin{aligned} (24) \quad V &= \pi r^2 \cdot h + \pi \cdot 8^2 h \\ V &= 30\pi h + 64\pi h \\ V &= 100\pi h \end{aligned}$$

$$100\pi h = \pi r^2 h$$

$$\begin{aligned} 100 &= r^2 \\ 10 &= r \\ \text{cm} & \end{aligned}$$

$$(25) \quad 40\pi = 2\pi r \cdot 8 + 2\pi r^2$$

$$40\pi = 16\pi r + 2\pi r^2$$

$$20 = 8r + r^2$$

$$r^2 + 8r - 20 = 0$$

$$(r + 10)(r - 2) = 0$$

$$\boxed{r = 2}$$

$$(26) \quad 90\pi = 2\pi r \cdot 12 + 2\pi r^2$$

$$45 = 12r + r^2$$

$$r^2 + 12r - 45 = 0$$

$$(r + 15)(r - 3) = 0$$

$$\boxed{r = 3}$$