

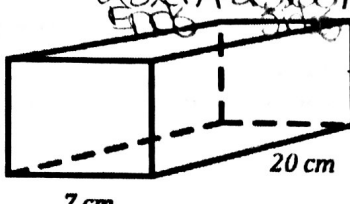
Name \_\_\_\_\_ Period \_\_\_\_\_ Date \_\_\_\_\_

**READY**

Topic: Calculating volume, surface area and solving right triangles

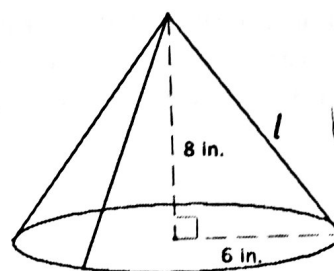
Find the indicated values for the geometric figures below.

1. Volume:  $V = l \cdot w \cdot h = 20(7)(5) = 700 \text{ cm}^3$   
 Surface Area:  $2(5)(7) + 2(5)(20) + 2(7)(20) = 70 + 200 + 280 = 550 \text{ cm}^2$



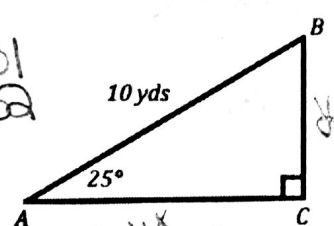
rectangular prism

2. Volume:  $V = \frac{1}{3}bh$   $V = \frac{1}{3}\pi r^2 \cdot h = 301.5929 \text{ in}^3$   
 Surface Area:  $S_A = \pi r(l+r) = 301.5929 \text{ in}^2$   
 where  $l$  is the lateral height.

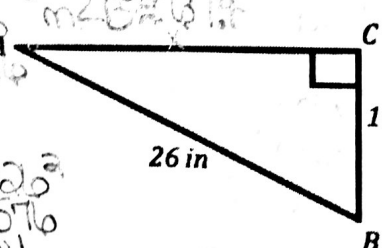


right cone


3. Solve the right triangle.  
 $\angle B = 65^\circ$   
 $AC = 9.0631$   
 $BC = 4.2212$   
 $10 \text{ yds}$   
 $25^\circ$



4. Solve the right triangle.  
 $\angle B = 65^\circ$   
 $\angle A = 25^\circ$   
 $AC = 24$   
 $10^2 + x^2 = 26^2$   
 $x^2 = 576$   
 $x = 24$

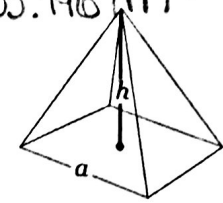


5. Volume:  $V = \frac{4}{3}\pi r^3 = 2.5992 \times 10^{11} \text{ miles}^3$   
 Surface area:  $S_A = 4\pi r^2 = 191,916,274.3 \text{ miles}^2$   
 $r \approx 3959 \text{ miles}$



sphere  
This is the radius of the earth.

6. Volume:  $V = a^2 \frac{h}{3} = 2,592,100 \text{ m}^3$   
 Surface area:  $S_A = a^2 + 2a \sqrt{\frac{a^2}{4} + h^2} = 138,753.7967 \text{ m}^2$   
 $h = 147 \text{ m}$   
 $a = 230 \text{ m}$



right square pyramid  
These are the dimensions of the great pyramid of Giza.

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SET  
Topic: Solving rational equations

Solve each equation. Identify extraneous solutions. *On separate paper*

7.  $x + \frac{2}{x} = 3$

8.  $\frac{x}{2} - \frac{1}{3x} = \frac{1}{6}$

9.  $2x + \frac{3}{x+2} = 1$

10.  $\frac{2}{x^2-2x} - \frac{1}{x-2} = 1$

11.  $3x - \frac{1}{2x-1} = 4$

12.  $\frac{2x}{x^2+3x} - \frac{2}{x+3} = \frac{2}{x}$

Topic: Using work and rate relationships to solve problems

13. Channing takes twice as long as Dakota to complete a school project. It takes them 15 hours to complete the project together. How long would it take each student to complete the project if he works alone?

*Let x = amt of time it takes Dakota to complete project alone  
2x = amt of time it takes Channing to complete project alone*

*Equation:  $\frac{15}{x} + \frac{15}{2x} = 1$   
 $\frac{30}{2x} + \frac{15}{2x} = 1$   
 $45 = 2x$   
 $22.5 = x$*

*Answer: I would take Dakota 22.5 hrs and Channing 45 hrs*

14. A print shop can print the MVP math book in 24 minutes if both of their print machines are working together to do the job. If a print machine is working alone, the job takes longer.

Machine A can print the book 20 minutes faster than machine B. How long does it take each machine to print the book?

*Let x = # of min. for Machine A to print book alone  
x+20 = # of min. for Machine B*

*Equation:  $\frac{24}{x} + \frac{24}{x+20} = 1$   
 $\frac{24(x+20) + 24x}{x(x+20)} = 1$   
 $24x + 480 + 24x = x(x+20)$*

*Answer: It would take Machine A 40 min & Machine B 60 min to print the MVP math book*

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*48x + 480 = x(x+20)  
48x + 480 = x^2 + 20x  
0 = x^2 - 28x - 480  
0 = (x-40)(x+12)  
x = 40    x = -12 Extraneous*

**MVP** mathematics vision project

$$\begin{aligned}
 \text{L) 7) } x + \frac{2}{x} &= 3 \\
 \frac{x^2}{x} + \frac{2}{x} &= 3 \\
 \cancel{x} \cdot \frac{x^2+2}{x} &= 3 \cdot x \\
 x^2+2 &= 3x \\
 x^2-3x+2 &= 0 \\
 (x-2)(x-1) &= 0 \\
 x=2, x=1
 \end{aligned}$$

$$\begin{aligned}
 8) \frac{x}{2} - \frac{1}{3x} &= \frac{1}{6} \\
 \frac{x \cdot 3x}{6x} - \frac{1 \cdot 2}{6x} &= \frac{1}{6} \\
 \cancel{6x} \cdot \frac{3x^2-2}{6x} &= \frac{1}{6} \cdot \cancel{6x} \\
 3x^2-2 &= x \\
 3x^2-x-2 &= 0 \\
 (3x+2)(x-1) &= 0 \\
 x = -\frac{2}{3}, x=1
 \end{aligned}$$

$$\begin{aligned}
 9) 2x + \frac{3}{x+2} &= 1 \\
 \frac{2x(x+2)}{x+2} + \frac{3}{x+2} &= 1 \\
 \cancel{x+2} \cdot \frac{2x^2+4x+3}{x+2} &= 1 \cdot \cancel{x+2} \\
 2x^2+4x+3 &= x+2 \\
 2x^2+3x+1 &= 0 \\
 (2x+1)(x+1) &= 0 \\
 x = -\frac{1}{2}, x=-1
 \end{aligned}$$

$$\begin{aligned}
 10) \frac{2}{x(x-2)} - \frac{1 \cdot x}{x(x-2)} &= 1 \\
 \cancel{x(x-2)} \cdot \frac{2-x}{x(x-2)} &= 1 \cdot \cancel{x(x-2)} \\
 2-x &= x^2-2x \\
 0 &= x^2-x-2 \\
 0 &= (x-2)(x+1) \\
 x=2, x=-1 \\
 \text{Extraneous}
 \end{aligned}$$

$$\begin{aligned}
 11) 3x - \frac{1}{2x-1} &= 4 \\
 \frac{3x(2x-1)}{2x-1} - \frac{1}{2x-1} &= 4 \\
 \cancel{2x-1} \cdot \frac{6x^2-3x-1}{2x-1} &= 4 \cdot \cancel{(2x-1)} \\
 6x^2-3x-1 &= 8x-4 \\
 6x^2-11x+3 &= 0 \\
 (2x-3)(3x-1) &= 0 \\
 x = \frac{3}{2}, x = \frac{1}{3}
 \end{aligned}$$

$$\begin{aligned}
 12) \frac{2x}{x^2+3x} - \frac{2}{x+3} &= \frac{2}{x} \\
 \frac{2x}{x(x+3)} - \frac{2x}{x(x+3)} &= \frac{2}{x} \\
 \frac{2x-2x}{x(x+3)} &= \frac{2}{x} \\
 x \cdot 0 &= \frac{2}{x} \cdot x \\
 0 &\neq 2 \\
 \text{No solution}
 \end{aligned}$$

15. The problem in #14 generates an extraneous solution, even though neither solution makes a denominator equal zero. What is another reason for having an extraneous solution?

In a real world situation, if you get a solution that does not make sense in the context of the problem (e.g. negative amount of time), then that solution is extraneous.

GO

Topic: Simplifying rational expressions

(10 - 11) Reduce to simplest form. (12 - 15) Perform the indicated operations. Reduce each of your answers to its simplest form. (Assume all denominators  $\neq 0$ )

16.

$$\frac{x^2 + 8x + 12}{x^2 + 3x - 18}$$

$$= \frac{(x+2)(x+6)}{(x+6)(x-3)}$$

$$= \frac{x+2}{x-3}$$

17.

$$\frac{x^2 - 3x - 40}{x^2 - 11x + 24}$$

$$= \frac{(x-8)(x+5)}{(x-3)(x-3)}$$

$$= \frac{x+5}{x-3}$$

18.

$$\frac{x+2}{x-3} + \frac{x+3}{2x-6}$$

$$= \frac{2(x+2)}{2(x-3)} + \frac{x+3}{2(x-3)}$$

$$= \frac{2x+4+x+3}{2(x-3)}$$

$$= \frac{3x+7}{2(x-3)}$$

19.

$$\frac{x^2 + 5x - 36}{(x-4)} \cdot \frac{3(x+2)}{x+9}$$

$$= \frac{(x+9)(x-4)}{(x-4)} \cdot \frac{3(x+2)}{x+9}$$

$$= 3(x+2)$$

20.

$$\frac{4}{x^2 - 4} - \frac{1}{x - 2}$$

$$= \frac{4}{(x+2)(x-2)} - \frac{1(x+2)}{(x+2)(x-2)}$$

$$= \frac{4 - (x+2)}{(x+2)(x-2)} = \frac{-x+2}{(x+2)(x-2)}$$

$$= \frac{-1(x-2)}{(x+2)(x-2)} = \frac{-1}{x+2}$$

21.

$$\frac{x^2 - 2x - 3}{x+1} \div \frac{x-3}{5}$$

$$= \frac{(x-3)(x+1)}{x+1} \cdot \frac{5}{x-3}$$

$$= 5$$

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