Linear Equations

.1 Solve for real numbers.

1) $8(3x-5)-5(2x-8)=20+4x$;
2) $x-4[x-2(x+6)]=5x+3$;
3) $(8-3x)^2+(5-4x)^2-6=(9-5x)^2+20x-4$;
4) $3(x+1)^2+(x-4)^3=101+(x-3)^3$;

.2 Solve over the given sets.

1) $2(x+3)-3\left(\frac{1}{4}x+2\right)=\frac{x+11}{8}$ $x\in(-3;1\rangle$;

2) $\frac{5x-11}{2}-\frac{5x+3}{5}=\frac{50-22x}{10}$ $x\in\mathbb{N}$;

3) $x-\frac{1-1{,}5x}{4}=\frac{20-2{,}5x}{30}+2$ $x\in\mathbb{Z}$;

.3 Solve for real numbers.

1) $\frac{12}{1-9x^2}=\frac{1-3x}{1+3x}+\frac{1+3x}{3x-1}$;

2) $\frac{12x^2+30x-21}{16x^2-9}=\frac{3x-7}{3-4x}+\frac{6x+5}{4x+3}$;

3) $\frac{2x-5}{3x-4}-\frac{4x-5}{6x-1}=0$;

4) $\frac{x+1}{x-1}+\frac{2}{x+2}-1=\frac{6}{x^2+x-2}$;

5) $\frac{3+4x}{x^2+x}-1=\frac{3}{x}-\frac{x}{x+1}$;

6) $\frac{5}{2x-3}-\frac{3x-8}{4x-6}=\frac{7}{9}-\frac{6x-1}{10x-15}$;

7) $\frac{3}{x-3}+\frac{5}{x-5}-\frac{34}{x^2-8x+15}=0$;

8) $\frac{11+3x}{x+3}-\frac{5x}{x-4}+\frac{x}{x^2-x-12}+2=0$;

1) -1; 2) 3; 3) -15; 4) $\emptyset$; 5) $\mathbb{R}\setminus\{0,-1\}$; 6) 6; 7) 8; 8) -4;

1) $\emptyset$; 2) 3; 3) 2

1) 2; 2) $\emptyset$; 3) $\frac{1}{3}$; 4) 5

In Exercises 5–16, solve for the indicated variable.

5. *Area of a Triangle*
Solve for h: $A=\frac{1}{2}bh$ $h=\frac{2A}{b}$

6. *Perimeter of a Rectangle*
Solve for L: $P=2L+2W$ $L=\frac{P-2W}{2}$

7. *Volume of a Rectangular Prism*
Solve for L: $V=LWH$ $L=\frac{V}{WH}$

8. *Volume of a Circular Cylinder*
Solve for h: $V=\pi r^2h$ $h=\frac{V}{\pi r^2}$

9. *Markup*
Solve for C: $S=C+rC$ $C=\frac{S}{1+r}$

10. *Discount*
Solve for L: $S=L-rL$ $L=\frac{S}{1-r}$

11. *Investment at Simple Interest*
Solve for r: $A=P+Prt$ $r=\frac{A-P}{Pt}$

12. *Investment at Compound Interest*
Solve for P: $A=P(1+r)^t$ $P=\frac{A}{(1+r)^t}$

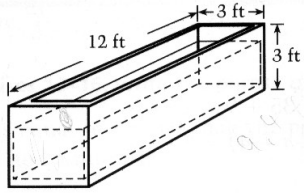
13. *Area of a Trapezoid*
Solve for b_1: $A=\frac{1}{2}h(b_1+b_2)$ $b_1=\frac{2A}{h}-b_2$

14. *Sum of a Geometric Sequence*
Solve for r: $S=\frac{rL-a}{r-1}$ $r=\frac{S-a}{S-L}$

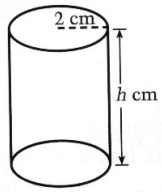
15. *Last Term of an Arithmetic Sequence*
Solve for n: $L=a+(n-1)d$ $n=\frac{L-a}{d}+1$

16. *Conversion from Fahrenheit to Celsius*
Solve for F: $C=\frac{5}{9}(F-32)$ $F=\frac{9}{5}C+32$

17. *Depth of a Water Trough* A water trough in the shape of a rectangular prism is 12 feet long and 3 feet wide. The trough has 9.4 cubic feet of water. How deep is the water in the trough?



18. *Height of a Circular Cylinder* The volume of a circular cylinder is 48π cubic centimeters. The radius of the cylinder is 2 centimeters. What is the height of the cylinder?



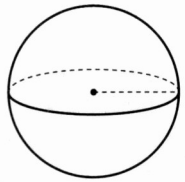
19. *Solids* Match the formulas to the solids. Then solve for the indicated variable.

2. $V=\frac{1}{3}b^2h$ Solve for b

3. $V=\frac{1}{3}\pi r^2h$ Solve for r

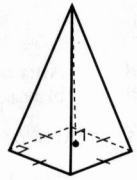
4. $V=\frac{4}{3}\pi r^3$ for r

a. Sphere



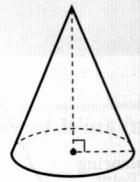
$r=\sqrt[3]{\frac{3V}{4\pi}}$

b. Pyramid



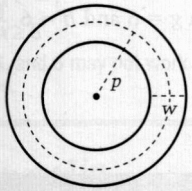
$b=\sqrt{\frac{3V}{h}}$

c. Cone

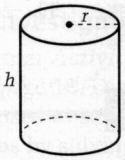


$r=\sqrt{\frac{3V}{\pi h}}$

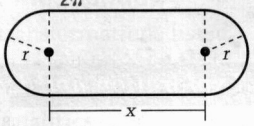
21. Area of a circular ring: $A=2\pi pw$. Solve for p. Find p given $A=22$ cm^2 and $w=2$ cm.



22. Surface area of a cylinder: $S=2\pi rh+2\pi r^2$. Solve for h. Find h given $S=105$ in.^{2} and $r=3$ in.



23. Perimeter of a pond: $P=2\pi r+2x$. Solve for r. Find r if $P=75$ ft and $x=20$ ft.



21. $p=\frac{A}{2\pi w}$; $\approx$1.8 cm

22. $h=\frac{S-2\pi r^2}{2\pi r}$; $\approx$2.6 in.

$r=\frac{P-2x}{2\pi}$; $\approx$5.6 ft