Unit 6 – Solving Equations

Solving Simple Equations

1. Solve the equations for each variable.

All

a) $a + 2 = 7$

b) $x + 4 = -1.5$

c) $y - 5 = 9$

d) $a - 7 = -5$

e) $x + (-8) = -1$

f) $a + (-11) = -24$

g) $a + (-23) = -24$

All

h) $-7 = 4 + a$

Most

i) $5 = a + (-13)$

j) $x + 5 = -9 + 6$

2. Solve the equations for each variable.

a) $4x = 24$

b) $2q = -48$

c) $-6x = -18$

All

d) $-a = 5$

e) $\frac{x}{3} = 12$

f) $\frac{-m}{2} = 4$

g) $\frac{x}{-8} = -2$

h) $\frac{1}{2}x = 13$

i) $\frac{-1}{5}q = -9$

j) $\frac{-x}{8} = -3$

Most

k) $\frac{-m}{7} = 4$

l) $\frac{2}{3}x = 4$

m) $\frac{2}{5}a = -2$

n) $-\frac{5}{3}x = 10$

3. Solve the equations for each variable.

All

a) $3x + 2 = 8$

b) $6m - 7 = 5$

c) $4x - 3 = -15$

h) $8a - 9 = 11 - 12$

i) $3 - 2y = 16 - 9$

j) $-4 - 5 = 6x + 3$

Most

d) $2y + 5 = 19$

e) $2x + 2.8 = 1.4$

k) $6x - 5 = 4x - 17$

l) $5 - 3x = 8x - 17$

Few

f) $1.4x - 2.9 = 1.3$

g) $4m + 5 = 6 - 9$

m) $8 + 4x = -8x - 16$

n) $2x + 1 = 3x - 3 - 5x$

All

4. Brittany paid \$49.95 to rent a car for a day, plus \$0.15 for each kilometer she drove. The total rental cost before taxes, was \$75.75. How far did Brittany drive that day?

Most

5. The cost of a large pizza is \$14.85 plus \$1.45 for every extra topping. How many toppings are on a pizza that costs \$23.55?

Few

6. Tony was hired as a sales person in an electronics store. He is paid \$500 per week, plus 6% commission on the total values of his sales. During one week Tony earned \$740.84. What was the total value of his sales that week?

7. The temperature in Whitehorse, Yukon was 10^0C and was falling by 1.7 ^{0}C per hour. How many hours Did it take for the temperature to reach -15 ^{0}C? Answer to the nearest hundredth of an hour.

Answers

1a) $a=5$	1b) $x=-5.5$	1c) $y=14$	1d) $a=2$
1e) $x=7$	1f) $a=-13$	1g) $a=-1$	1h) $a=-11$
1i) $a=18$	1j) $x=-8$		
2a) $x=6$	2b) $q=-24$	2c) $x=3$	2d) $a=-5$
2e) $x=36$	2f) $m=-8$	2g) $x=16$	2h) $x=26$
2i) $q=45$	2j) $x=24$	2k) $m=-14$	2l) $x=6$
2m) $a=-5$	2n) $x=-6$		
3a) $x=2$	3b) $m=2$	3c) $x=-3$	3d) $y=7$
3e) $x=-0.7$	3f) $x=3$	3g) $m=-2$	3h) $a=1$
3i) $y=-2$	3j) $x=-2$	3k) $x=-6$	3l) $x=2$
3m) $x=-2$	3n) $x=-1$		
4. 172 km.	5. six toppings	6. \$4014.00	7. 14.71 hours.

Equations in the form ax + b = cx and ax + b = cx + d

1. Solve the equations for each variable. When answers are fractions, answer in lowest terms.

All

a) $3x + 5x = 32$

b) $6a + 3a = -18$

c) $4y - 7y = 21$

d) $5b + 2b = 13 + 15$

e) $-2x - 5x = 14$

f) $5x - 9x = 18$

g) $-15 - 5 = x - 6x$

h) $-7 + 4 = 15a - 9a$

2. Solve the equations for each variable. When answers are fractions, answer in lowest terms.

Most

a) $6x + 7 = 5x - 2$

b) $0.4x - 13.2 = 2.1 - 1.3x$

c) $3x - 8 = 5 - 6x + 8$

Few

d) $17 = 25 + 4x - 20 - 7x$

e) $1 - 9x - 8 = 13 - 2x + 1$

f) $4.1m + 15.6 - 1.7m = 6.1m - 2.9$

g) $11 - 4x - 3 = 6x + 23 - 2x$

h) $-8a - 14 + 2a = -a + 6 - 6a$

Answers

1a) $x = 4$ 1b) $a = -2$ 1c) $y = -7$ 1d) $b = 4$

1e) $x = -2$ 1f) $x = -\frac{9}{2}, -4\frac{1}{2}$ 1g) $x = 4$ 1h) $a = -\frac{1}{2}$

2a) $x = -9$ 2b) $x = 9$ 2c) $x = \frac{7}{3}, 2\frac{1}{3}$ 2d) $x = -4$

2e) $x = -3$ 2f) $x = 5$ 2g) $x = -\frac{15}{8}, -1\frac{7}{8}$ 2h) $a = 20$

Equations in the form $a(x + b) = c$ and $a(bx + c) = d(ex + f)$

1. Solve the equations for each variable. When answers are fractions, answer in lowest terms.

All

a) $2(x-4) = 26$

b) $6(2+x) = 30$

c) $-4(a-3) = 12$

d) $-5(1-b) = 15$

e) $-8 = 3(m-4)$

f) $-24 = -6(x-1)$

g) $6 - 2x = 2(x+3) - 5$

h) $7(3-x) + 11 = 4x - 1$

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2. Solve the equations for each variable. When answers are fractions, answer in lowest terms.

Most

a) $4(2x-3) = 6(3x+1)$

b) $2(-4x+3) = -2(3x-1)$

c) $-2(-4x+7) = 3(2x+5)$

Few

d) $6(8a+11) = 9(3a-23)$

e) $4(-2x-6) - 2(-3x+3) = 13x$

f) $-2 = 5(x-2) - 3(4-5x)$

g) $3(x-4) - (2x-9) = 1$

h) $5(1.4x + 3) + 3(2 - 2.1x) = 7$

Answers

1a) $x = 17$ 1b) $x = 3$ 1c) $a = 0$ 1d) $b = 4$

1e) $x = \frac{4}{3}, 1\frac{1}{3}$ 1f) $x = 5$ 1g) $x = \frac{5}{4}, 1\frac{1}{4}$ 1h) $x = 3$

2a) $x = -\frac{9}{5}, -1\frac{4}{5}$ 2b) $x = 2$ 2c) $x = \frac{29}{2}, 14\frac{1}{2}$ 2d) $a = -13$

2e) $x = -2$ 2f) $x = 1$ 2g) $x = 4$ 2h) $x = -20$

Solving Equations in the form $\frac{x}{a} + c = b$ *and* $\frac{a}{x} = b$

1. Solve the equations for each variable.

All

a) $3x + \frac{1}{2} = \frac{2}{5}$

b) $\frac{4}{7} + 2x = -\frac{1}{2}$

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

d) $-\frac{2}{5} = 3a$

e) $\frac{x}{6} = \frac{4}{3}x - 4$

Most

f) $\frac{3}{4}x + 6 = \frac{7x}{2} - 3$

Most

g) $2.7 - \frac{x}{1.8} = 4.3$

h) $\frac{a}{7.3} + 5.2 = 4.8$

Few

i) $\frac{x}{6} = -\frac{7}{8}$

j) $\frac{1-y}{3} = \frac{6}{7}$

k) $\frac{n-4}{5} = -\frac{3}{4}$

l) $\frac{6}{5} = \frac{1}{3}(x-3)$

2. Solve the equations for each variable.

All

a) $\frac{1}{5}(x+2) = \frac{1}{3}(x-1)$

b) $\frac{3}{4}(x-5) = \frac{1}{2}(x+7)$

c) $\frac{1}{6}(2x+1) = \frac{1}{5}(2-3x)$

d) $\frac{3}{2}(3x-2) + \frac{1}{4}(6x-5) = \frac{3}{4}$

Most

e) $\frac{5}{8}(2x-1) = \frac{3}{4}(x+3) - \frac{3}{8}x$

f) $\frac{4}{5}x = \frac{3}{10}(4-2x) + \frac{2}{5}(3x-5)$

g) $\frac{1}{3}(3x-1) - \frac{5}{6}(x-1) = \frac{1}{3}x$

Few

h) $\frac{4}{3}(5x-2) - \frac{2}{3}(4x-3) = 2$

i) $\frac{7}{8}(x-2) = -\frac{1}{4}(2x+3)$

All

j) $\frac{6}{x} = 8$

k) $\frac{9}{-m} = 5$

Most

l) $\frac{14.3}{a} = 2.2$

m) $\frac{7}{4a} = 5$

Few

n) $\frac{4}{x} - \frac{5}{x} = 5$

Most

3. An electronics store is selling cell phone cases at 30% off the regular price. If the sale price is $15.99, what is the regular price of the phone cases?

All

4. The diameter, d, of a circle is related to the circumference, C, by the formula $\frac{C}{d} = \pi$. Determine the diameter of a circle with a circumference of 24.5 cm. Answer to the nearest hundredth of a cm.

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5. A score of 34 on a Math Send-In Assignment results in a mark of 68%. What would the score if a student Achieved 100%?

Few

6. The area of a trapezoid can be found using the formula $A = \frac{1}{2}(a + b) \times h$, where h is the height and a and b are the lengths if the two parallel sides. Determine the value of h when $A = 32.4\ \text{cm}^2$, $b = 4.5$ cm, and $a = 6.8$ cm. Answer to the nearest tenth of a cm.

7. When working out in a gym the maximum safe heart rate is given by the formula $R = \frac{4}{5}(220 - a)$, where a is the age in years and R is the maximum safe heart rate in beats per minute. At what age is the maximum safe heart rate 156 beats per minute?

Answers

1a) $x = -\frac{1}{30}$ 1b) $x = -\frac{15}{28}$ 1c) $x = 9$ 1d) $a = -\frac{2}{15}$

1e) $x = \frac{24}{7}, 3\frac{3}{7}$ 1f) $x = \frac{36}{11}, 3\frac{3}{11}$ 1g) $x = -2.88$ 1h) $a = -2.92$

1i) $x = -\frac{21}{4}, -5\frac{1}{4}$ 1j) $y = -\frac{11}{7}, -1\frac{4}{7}$ k) $n = \frac{1}{4}$ 1l) $x = \frac{33}{5}, 6\frac{3}{5}$

2a) $x = \frac{11}{2}, 5\frac{1}{2}$ 2b) $x = 29$ 2c) $x = \frac{1}{4}$ 2d) $x = \frac{5}{6}$

2e) $x = \frac{23}{7}, 3\frac{2}{7}$ 2f) $x = -4$ 2g) $x = 3$ 2h) $x = \frac{2}{3}$

2i) $x = \frac{8}{11}$ 2j) $x = \frac{3}{4}$ 2k) $m = -\frac{9}{5}$ 2l) $a = 6.5$

2m) $a = \frac{7}{20}$ 2n) $x = -\frac{1}{5}$

3. $22.84

4. 7.80 cm

5. 50

6. 5.7 cm

7. 25 years