A.A.23: Transforming Formulas 1: Solve literal equations for a given variable

1 Which equation is equivalent to $3x + 4y = 15$?

1) $y = \frac{15 - 3x}{4}$
2) $y = \frac{3x - 15}{4}$
3) $y = 15 - 3x$
4) $y = 3x - 15$

2 The equation $P = 2L + 2W$ is equivalent to

1) $L = \frac{P - 2W}{2}$
2) $L = \frac{P + -2W}{2}$
3) $2L = \frac{P}{2W}$
4) $L = P - W$

3 If $3ax + b = c$, then x equals

1) $c - b + 3a$
2) $c + b - 3a$
3) $\frac{c - b}{3a}$
4) $\frac{b - c}{3a}$

4 If $bx - 2 = K$, then x equals

1) $\frac{K}{b} + 2$
2) $\frac{K - 2}{b}$
3) $\frac{2 - K}{b}$
4) $\frac{K + 2}{b}$

5 If $x = 2a - b^2$, then a equals

1) $\frac{x - b^2}{2}$
2) $\frac{x + b^2}{2}$
3) $\frac{b^2 - x}{2}$
4) $x + b^2$

6 If $2m + 2p = 16$, p equals

1) $8 - m$
2) $16 - m$
3) $16 + 2m$
4) $9m$

7 In the equation $A = p + prt$, t is equivalent to

1) $\frac{A - pr}{p}$
2) $\frac{A - p}{pr}$
3) $\frac{A}{pr} - p$
4) $\frac{A}{p} - pr$

8 If $c = 2m + d$, then m is equal to

1) $\frac{c - d}{2}$
2) $\frac{c}{2} - d$
3) $c - \frac{d}{2}$
4) $d - 2c$

9 The members of the senior class are planning a dance. They use the equation $r = pn$ to determine the total receipts. What is n expressed in terms of r and p ?

1) $n = r + p$
2) $n = r - p$
3) $n = \frac{p}{r}$
4) $n = \frac{r}{p}$

10 The formula for potential energy is $P = mgh$, where P is potential energy, m is mass, g is gravity, and h is height. Which expression can be used to represent g?

1) $P - m - h$
2) $P - mh$
3) $\frac{P}{m} - h$
4) $\frac{P}{mh}$

11 If the formula for the perimeter of a rectangle is $P = 2l + 2w$, then w can be expressed as

1) $w = \frac{2l - P}{2}$
2) $w = \frac{P - 2l}{2}$
3) $w = \frac{P - l}{2}$
4) $w = \frac{P - 2w}{2l}$

12 Sean knows the length of the base, b, and the area, A, of a triangular window in his bedroom. Which formula could he use to find the height, h, of this window?

1) $h = 2A - b$
2) $h = \frac{A}{2b}$
3) $h = (2A)(b)$
4) $h = \frac{2A}{b}$

13 The formula for the volume of a right circular cylinder is $V = \pi r^2 h$. The value of h can be expressed as

1) $\frac{V}{\pi} r^2$
2) $\frac{V}{\pi r^2}$
3) $\frac{\pi r^2}{V}$
4) $V - \pi r^2$

14 A formula used for calculating velocity is $v = \frac{1}{2} at^2$. What is a expressed in terms of v and t?

1) $a = \frac{2v}{t}$
2) $a = \frac{2v}{t^2}$
3) $a = \frac{v}{t}$
4) $a = \frac{v}{2t^2}$

15 If $\frac{x}{4} - \frac{a}{b} = 0, b \neq 0$, then x is equal to

1) $-\frac{a}{4b}$
2) $\frac{a}{4b}$
3) $-\frac{4a}{b}$
4) $\frac{4a}{b}$

16 If $9x + 2a = 3a - 4x$, then x equals

1) a
2) $-a$
3) $\frac{5a}{12}$
4) $\frac{a}{13}$

17 If $x + y = 9x + y$, then x is equal to

1) y
2) $\frac{1}{5}y$
3) 0
4) 8

18 If $7x + 2a = 3x + 5a$, then x is equivalent to

1) $\frac{7a}{10}$
2) $\frac{7a}{4}$
3) $\frac{3a}{10}$
4) $\frac{3a}{4}$

19 If $a + ar = b + r$, the value of a in terms of b and r can be expressed as

1) $\frac{b}{r} + 1$
2) $\frac{1+b}{r}$
3) $\frac{b+r}{1+r}$
4) $\frac{1+b}{r+b}$

20 If $2ax - 5x = 2$, then x is equivalent to

1) $\frac{2+5a}{2a}$
2) $\frac{1}{a-5}$
3) $\frac{2}{2a-5}$
4) $7 - 2a$

21 Solve: $(a - x)(b - x) = x^2$

22 Shoe sizes and foot length are related by the formula $S = 3F - 24$, where S represents the shoe size and F represents the length of the foot, in inches.
a Solve the formula for F.
b To the *nearest tenth of an inch,* how long is the foot of a person who wears a size $10\frac{1}{2}$ shoe?

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Answer Section

1 ANS: 1

$$3x + 4y = 15$$
$$4y = 15 - 3x$$
$$y = \frac{15 - 3x}{4}$$

PTS: 2 REF: 080722a

2 ANS: 1

$$P = 2L + 2W$$
$$P - 2W = 2L$$
$$\frac{P - 2W}{2} = L$$

PTS: 2 REF: 010310a

3 ANS: 3

$$3ax + b = c$$
$$3ax = c - b$$
$$x = \frac{c - b}{3a}$$

PTS: 2 REF: 080808ia

4 ANS: 4

$$bx - 2 = K$$
$$bx = K + 2$$
$$x = \frac{K + 2}{b}$$

PTS: 2 REF: 010116a

5 ANS: 2

$$x = 2a - b^2$$
$$x + b^2 = 2a$$
$$\frac{x + b^2}{2} = a$$

PTS: 2 REF: 060219a

6 ANS: 1

$2m + 2p = 16$

$2p = 16 - 2m$

$p = \frac{16 - 2m}{2}$

$p = \frac{2(8 - m)}{2}$

$p = 8 - m$

PTS: 2 REF: 080218a

7 ANS: 2

$A = p + prt$

$A - p = prt$

$\frac{A - p}{pr} = t$

PTS: 2 REF: 010620a

8 ANS: 1

$c = 2m + d$

$c - d = 2m$

$m = \frac{c - d}{2}$

PTS: 2 REF: 060719a

9 ANS: 4 PTS: 2 REF: 011016ia

10 ANS: 4

$P = mgh$

$g = \frac{P}{mh}$

PTS: 2 REF: 010710a

11 ANS: 2

$P = 2l + 2w$

$P - 2l = 2w$

$\frac{P - 2l}{2} = w$

PTS: 2 REF: 010911ia

12 ANS: 4

$$A = \frac{1}{2}bh$$
$$2A = bh$$
$$h = \frac{2A}{b}$$

PTS: 2 REF: 010517a

13 ANS: 2

$$V = \pi r^2 h$$
$$\frac{V}{\pi r^2} = v$$

PTS: 2 REF: 060617a

14 ANS: 2 PTS: 2 REF: 061023ia

15 ANS: 4

$$\frac{x}{4} - \frac{a}{b} = 0$$
$$\frac{x}{4} = \frac{a}{b}$$
$$bx = 4a$$
$$x = \frac{4a}{b}$$

PTS: 2 REF: 080530a

16 ANS: 4

$$9x + 2a = 3a - 4x$$
$$a = 13x$$
$$\frac{a}{13} = x$$

PTS: 2 REF: 010011a

17 ANS: 3

$$x + y = 9x + y$$
$$x = 9x$$
$$0 = 8x$$
$$x = 0$$

PTS: 2 REF: 060310a

18 ANS: 4

$$7x + 2a = 3x + 5a$$
$$4x = 3a$$
$$x = \frac{3a}{4}$$

PTS: 2 REF: 060513a

19 ANS: 3

$$a + ar = b + r$$
$$a(1 + r) = b + r$$
$$a = \frac{b + r}{1 + r}$$

PTS: 2 REF: 060913ia

20 ANS: 3

$$2ax - 5x = 2$$
$$x(2a - 5) = 2$$
$$x = \frac{2}{2a - 5}$$

PTS: 2 REF: 010421a

21 ANS:

$$\frac{a^2}{a + b}$$

PTS: 2 REF: 039008al

22 ANS:

$$\frac{S + 24}{3}, 11.5. \quad S + 24 = 3F \quad S = 3F - 24 \quad F = \frac{S + 24}{3} \quad . \quad F = \frac{(10.5) + 24}{3} = 11.5$$

PTS: 2 REF: 069922a