

Review P. 140: Using and Transforming Formulas

1. If $2m + 2p = 16$, p equals

[A] $8 - m$ [B] $16 - m$
[C] $16 + 2m$ [D] $9m$

[1] _____

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

[A] $\frac{2-K}{b}$ [B] $\frac{K-2}{b}$
[C] $\frac{K}{b} + 2$ [D] $\frac{K+2}{b}$

[2] _____

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

[A] $\frac{c-d}{2}$ [B] $\frac{c}{2} - d$
[C] $c - \frac{d}{2}$ [D] $d - 2c$

[3] _____

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

[A] $\frac{b^2 - x}{2}$ [B] $\frac{x - b^2}{2}$
[C] $\frac{x + b^2}{2}$ [D] $x + b^2$

[4] _____

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

[A] $\frac{2+5a}{2a}$ [B] $7 - 2a$
[C] $\frac{1}{a-5}$ [D] $\frac{2}{2a-5}$

[5] _____

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

[A] $-\frac{a}{4b}$ [B] $\frac{4a}{b}$ [C] $\frac{a}{4b}$ [D] $-\frac{4a}{b}$

[6] _____

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

[A] $y = 15 - 3x$ [B] $y = \frac{15-3x}{4}$
[C] $y = 3x - 15$ [D] $y = \frac{3x-15}{4}$

[7] _____

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

[A] $L = \frac{P+2W}{2}$ [B] $L = P - W$
[C] $L = \frac{P-2W}{2}$ [D] $2L = \frac{P}{2W}$

[8] _____

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

[A] $\frac{A-pr}{p}$ [B] $\frac{A-p}{pr}$
[C] $\frac{A}{pr} - p$ [D] $\frac{A}{P} - pr$

[9] _____

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

[A] $\frac{\pi r^2}{V}$ [B] $V - \pi r^2$
[C] $\frac{V}{\pi} r^2$ [D] $\frac{V}{\pi r^2}$

[10] _____

11. 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 ?

[A] $P - mh$ [B] $P - m - h$
[C] $\frac{P}{mh}$ [D] $\frac{P}{m} - h$

[11] _____

12. 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?

[12] _____

13. If $\sqrt{x - a} = b$, $x > a$, which expression is equivalent to x ?

[A] $b^2 - a$ [B] $b - a$
[C] $b + a$ [D] $b^2 + a$

[13] _____

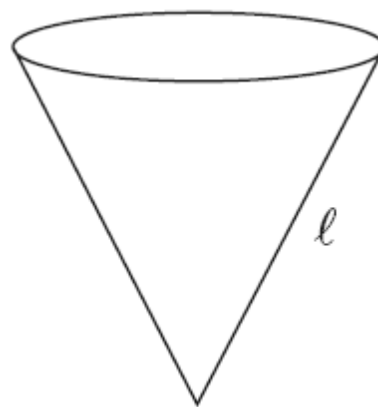
14. The volume of any spherical balloon can be found by using the formula $V = \frac{4}{3}\pi r^3$.

Write an equation for r in terms of V and π .

[14] _____

15. The slant height, ℓ , of the conical water tank shown in the accompanying diagram is

$\ell = \sqrt[3]{\frac{8v}{\pi}}$. Solve for v , in terms of ℓ and π .



[15] _____

16. If the temperature in Buffalo is 23° Fahrenheit, what is the temperature in degrees Celsius? [Use the formula $C = \frac{5}{9}(F - 32)$.]

[A] -5 [B] 45 [C] 5 [D] -45

[16] _____

17. The formula $C = \frac{5}{9}(F - 32)$ can be used to find the Celsius temperature (C) for a given Fahrenheit temperature (F). What Celsius temperature is equal to a Fahrenheit temperature of 77° ?

[A] 171° [B] 8° [C] 45° [D] 25°

[17] _____

18. The formula for changing Celsius (C) temperature to Fahrenheit (F) temperature is

$$F = \frac{9}{5}C + 32.$$
 Calculate, to the *nearest*

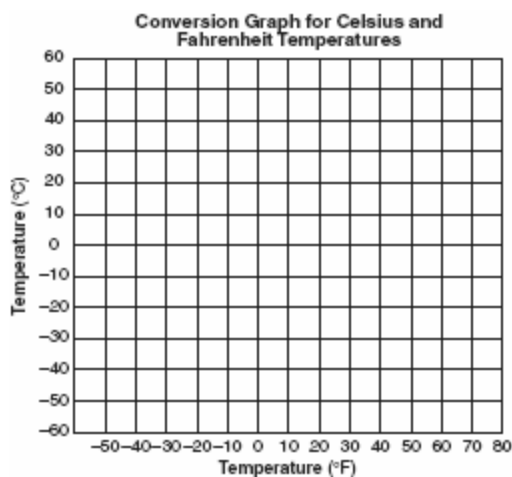
degree, the Fahrenheit temperature when the Celsius temperature is -8.

[18] _____

19. The formula $C = \frac{5}{9}(F - 32)$ is used to convert Fahrenheit temperature, F , to Celsius temperature, C . What temperature, in degrees Fahrenheit, is equivalent to a temperature of 10° Celsius?

[19] _____

20. Connor wants to compare Celsius and Fahrenheit temperatures by drawing a conversion graph. He knows that $-40^{\circ}C = -40^{\circ}F$ and that $20^{\circ}C = 68^{\circ}F$. On the accompanying grid, construct the conversion graph and, using the graph, determine the Celsius equivalent of $25^{\circ}F$.



[20] _____

[1] A

[2] D

[3] A

[4] C

[5] D

[6] B

[7] B

[8] C

[9] B

[10] D

[11] C

a [1] $\frac{S+24}{3}$ or $\frac{S}{3} + 8$

b [1] 11.5

or [1] Correct substitution into an incorrect part a is shown, and the answer is given to the nearest tenth of an inch.

a and b

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously

[12] incorrect procedure.

[13] D

[2] $r = \sqrt[3]{\frac{3V}{4\pi}}$ or $r = \left(\frac{3V}{4\pi}\right)^{\frac{1}{3}}$ or an equivalent

answer, and appropriate work is shown.

[1] Appropriate work is shown, but one computational error is made.

or [1] Appropriate work is shown, but one conceptual error is made.

or [1] $\sqrt[3]{\frac{3V}{4\pi}}$ or $\left(\frac{3V}{4\pi}\right)^{\frac{1}{3}}$ or an equivalent answer

is found, and appropriate work is shown, but an equation is not written.

or [1] $r = \sqrt[3]{\frac{3V}{4\pi}}$ or $r = \left(\frac{3V}{4\pi}\right)^{\frac{1}{3}}$ or an equivalent

answer, but no work is shown.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.

[14] _____

[2] $v = \frac{\pi \ell^3}{8}$, and appropriate work is shown.

[1] Appropriate work is shown, but one computational error is made.

[1] Appropriate work is shown, but one conceptual error is made.

[1] $v = \frac{\pi \ell^3}{8}$, but no work is shown.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously

[15] incorrect procedure.

[16] A

[17] D

[2] 18 and correct substitution, $F = \frac{9}{5}(-8) + 32$, is shown.

[1] A correct substitution method is shown, but one computational error is made.

or [1] The answer is not rounded to the nearest integer, such as 17.6 or 17.

or [1] The student substitutes -8 for F , but then solves appropriately for C .

or [1] The student substitutes +8 for C , but then solves appropriately for F .

or [1] 18 but no work is shown.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously

[18] incorrect procedure.

[2] 50, and appropriate work is shown, such as solving the equation $10 = \frac{5}{9}(F - 32)$.

[1] Appropriate work is shown, but one computational error is made.

or [1] Appropriate work is shown, but one conceptual error is made.

or [1] Correct substitution is made into the equation, but no further correct work is shown.

or [1] 50, but no work is shown.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously

[19] incorrect procedure.

[3] A correct graph is shown, and an answer between -6° and -2° is found.

[2] A correct formula is used, and -4°C or an equivalent answer is found, but no graph is shown.

or [2] An appropriate graph is shown, and the correct answer is marked, but it is stated incorrectly, such as 5°C instead of -5°C .

or [2] An appropriate graph is shown, but answers outside the given range are found.

or [2] The line graph passes through at least one correct point, and an appropriate answer is found.

[1] The formula is used correctly, but the answer is not in the range, and no graph is shown.

or [1] An answer between -6° and -2° is found, but no graph is shown.

[0] A completely incorrect graph is shown.

or [0] No graph is shown and the formula is used incorrectly.

or [0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an

[20] obviously incorrect procedure.