Unit 3 Review: Equations

Write the letter corresponding to the correct answer. Show all necessary work.

1. What is the solution to $3(x - 5) = x - 1$

a) 2 **b)** 7

c) 0 d) *there is no solution*

$3(x-5) = x - 1$

$3x - 15 = x - 1$

$+15 \quad +15$

$3x = x + 14$

$-x \quad -x$

$\frac{2x}{2} = \frac{14}{2}$

$\boldsymbol{x = 7}$

2. If **mx – q = d**, then **x** =

a) d + q + m b) d + q • m

c) $\frac{d+q}{m}$ d) $\frac{d-q}{m}$

$mx - q = d$

$+q \quad +q$

$\frac{mx}{m} = \frac{d+q}{m}$

$\boldsymbol{x = \frac{d+q}{m}}$

3. What is the solution to the following equation? $4(x - 1) - 3x = -2x - 4 + 3x$

a) $x = -4$ b) $x = 0$

c) *there is no solution* **d)** *x = all real numbers*

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

$4x - 4 - 3x = x - 4$

$x - 4 = x - 4$

infinite solutions (*x* is all real numbers)

4. Which equation has the same solution set as $\frac{1}{2}(6 - x) + 3x = \frac{1}{2}x - 8$?

a) $6 - x + 6x = x - 8$

b) $6 - x + 3x = x - 16$

c) $3 + \frac{5}{2}x = \frac{1}{2}x - 8$

d) $6 + 2x = x - 8$

$\frac{1}{2}(6-x) + 3x = \frac{1}{2}x - 8$

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

$\boldsymbol{3 + \frac{5}{2}x = \frac{1}{2}x - 8}$

Solve for *x*. Show all necessary work.

5. $-2 + 3x = 13$

$-2 + 3x = 13$

$+2 \qquad +2$

$\frac{3x}{3} = \frac{15}{3}$

$x = 5$

6. $-3x - 4 + x - 6 = -18$

$-3x - 4 + x - 6 = -18$

$-2x - 10 = -18$

$+10 \quad +10$

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

$x = 4$

7. $5x - 4 = 3x + 10$

$5x - 4 = 3x + 10$

$+4 \qquad +4$

$5x = 3x + 14$

$-3x \quad -3x$

$\frac{2x}{2} = \frac{14}{2}$

$x = 7$

8. $3(5x - 10) = -5x$

$3(5x - 10) = -5x$

$15x - 30 = -5x$

$-15x \qquad -15x$

$\frac{-30}{-20} = \frac{-20x}{-20}$

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

or

$1.5 = x$

9. $\frac{1}{2}(4x - 6) - 17 = 0$

$\frac{1}{2}(4x - 6) - 17 = 0$

$2x - 3 - 17 = 0$

$2x - 20 = 0$

$+20 \quad +20$

$\frac{2x}{2} = \frac{20}{2}$

$x = 10$

10. $\frac{2x+4}{7} = -2$

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

$2x + 4 = -14$

$-4 \quad -4$

$\frac{2x}{2} = \frac{-18}{2}$

$x = -9$

Solve for the indicated variable. Show all necessary work.

11. **A = P + Prt** for **t**

$A = P + Prt$

$-P \quad -P$

$\frac{A - P}{Pr} = \frac{Prt}{Pr}$

$\frac{A - P}{Pr} = t$

12. $\frac{\mathbf{m}}{\mathbf{n}} = \frac{\mathbf{p}}{\mathbf{q}}$ for **p**

$\frac{m}{n} = \frac{p}{q}$

$\frac{mq}{n} = \frac{pn}{n}$

$\frac{mq}{n} = p$

13. The formula used to find the area of a trapezoid is **$A = \frac{1}{2} h(b_1 + b_2)$**. Solve this formula for **h**.

$$A = \frac{1}{2} h(b_1 + b_2)$$

$$2 \cdot A = 2 \cdot \frac{1}{2} h(b_1 + b_2)$$

$$\frac{2A}{(b_1 + b_2)} = \frac{h(b_1 + b_2)}{(b_1 + b_2)}$$

$$\frac{2A}{b_1 + b_2} = h$$

14. Solve each equation below.

a. $\frac{x-2}{4} + \frac{1}{3} = \frac{7}{3}$

$$12\left(\frac{x-2}{4} + \frac{1}{3}\right) = 12\left(\frac{7}{3}\right)$$

$$12^{3}\left(\frac{x-2}{4}\right) + 12^{4}\left(\frac{1}{3}\right) = 12^{4}\left(\frac{7}{3}\right)$$

$$3(x-2) + 4(1) = 4(7)$$

$$3x - 6 + 4 = 28$$

$$3x - 2 = 28$$

$$+2 \quad +2$$

$$\frac{3x}{3} = \frac{30}{3}$$

$$x = 10$$

b. $\frac{3a}{5} - \frac{a}{2} = \frac{1}{20}$

$$20\left(\frac{3a}{5} - \frac{a}{2}\right) = 20\left(\frac{1}{20}\right)$$

$$20^{4}\left(\frac{3a}{5}\right) - 20^{10}\left(\frac{a}{2}\right) = 20^{1}\left(\frac{1}{20}\right)$$

$$4(3a) - 10(a) = 1(1)$$

$$12a - 10a = 1$$

$$\frac{2a}{2} = \frac{1}{2}$$

$$a = ½$$

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

$$6\left(\frac{x}{3} - 1\right) = 6\left(\frac{x}{2} + 3\right)$$

$$6^{2}\left(\frac{x}{3}\right) - 6(1) = 6^{3}\left(\frac{x}{2}\right) + 6(3)$$

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

$$2x - 6 = 3x + 18$$

$$-2x \quad -2x$$

$$-6 = x + 18$$

$$-18 \quad -18$$

$$-24 = x$$

15. The formula **T = p + sp** gives the total cost of an item with price **p** and sales tax **s**, expressed as a decimal.

A. Solve this formula for **s**.

$$T = p + sp$$
$$-p \quad -p$$

$$\frac{T - p}{p} = \frac{sp}{p}$$

$$\frac{T - p}{p} = s \text{ or } \frac{T}{p} - 1 = s$$

B. The total cost of a sweater, including tax, is $25.32 (**T**). Calculate the sales tax (**s**) if the ticket price of the sweater is $24 (**p**). *Represent the tax as a percent*.

$$\frac{T - p}{p} = s$$

$$\frac{25.32 - 24}{24} = s$$

Tax in dollars →

$$\frac{1.32}{24} = s$$

$$.055 = s$$

Tax Rate →

5.5%

16. Examine the literal equation below that has been solved for ***x***. For each step taken, name the property of equality that was applied.

$ax + b = c$

$ax = c - b$ Subtraction Property of Equality

$$ax + b = c$$
$$-b \quad -b$$

$x = \frac{c - b}{a}$ Division Property of Equality

$$\frac{ax}{a} = \frac{c - b}{a}$$

$$x = \frac{c - b}{a}$$