PRACTICE QUESTIONS

1. What is the value of $a(b-1)+\frac{bc}{2}$ if $a=3$, $b=6$, and $c=5$?
   (A) 0
   (B) 15
   (C) 30
   (D) 45
   (E) 60

2. If $\frac{c}{d}=3$ and $d=1$, then $3c+d=$
   (A) 3
   (B) 4
   (C) 6
   (D) 7
   (E) 10

3. What is the value of x in the equation $5x-7=y$, if $y=8$?
   (A) −1
   (B) 1
   (C) 2
   (D) 3
   (E) 70

4. What is the value of $x(y-2)+xz$, if $x=2$, $y=5$, and $z=7$?
   (A) 12
   (B) 20
   (C) 22
   (D) 28
   (E) 32

5. If $x=\sqrt{3}$, $y=2$, and $z=\frac{1}{2}$, then $x^2-5yz+y^2=$
   (A) 1
   (B) 2
   (C) 4
   (D) 7
   (E) 8

6. If $x+y=7$, what is the value of $2x+2y-2$?
   (A) 5
   (B) 9
   (C) 12
   (D) 14
   (E) 16

7. What is the value of a in the equation $3a-6=b$, if $b=18$?
   (A) 4
   (B) 6
   (C) 8
   (D) 10
   (E) 18

8. If $\frac{x}{y}=\frac{2}{5}$ and $x=10$, $y=$
   (A) 4
   (B) 10
   (C) 15
   (D) 20
   (E) 25

9. $-5n(3m-2)=$
   (A) $-15mn+10n$
   (B) $15mn-10n$
   (C) $-8mn+7n$
   (D) $8mn+7n$
   (E) $-2mn-7n$

10. What is the value of $(a+b)^2$, when $a=-1$ and $b=3$?

(A) 2
(B) 4
(C) 8
(D) 10
(E) 16

11. If $s-t=5$, what is the value of $3s-3t+3$?

(A) 2
(B) 8
(C) 11
(D) 12
(E) 18

12. $(3d-7)-(5-2d)=$

(A) $d-12$
(B) $5d-2$
(C) $5d+12$
(D) $5d-12$
(E) $8d+5$

13. What is the value of $xyz+y(z-x)+2x$ if $x=-2$, $y=3$, and $z=1$?

(A) −13
(B) −7
(C) −1
(D) 7
(E) 19

14. If $3x+7=14$, then $x=$

(A) −14
(B) 0
(C) $\frac{7}{3}$
(D) 3
(E) 7

15. If x is an integer, which of the following expressions is always even?

(A) $2x+1$
(B) $3x+2$
(C) $4x+3$
(D) $5x+4$
(E) $6x+2$

16. If $4z-3=-19$, then $z=$

(A) −16
(B) $-5\frac{1}{2}$
(C) −4
(D) 0
(E) 4

17. If $3ab=6$, what is the value of a in terms of b?

(A) 2
(B) $\frac{2}{b}$
(C) $\frac{2}{b^2}$
(D) $2b$
(E) $2b^2$

18. If x and y are integers, in which equation must x be negative?

(A) $xy=-1$
(B) $xy^2=-1$
(C) $x^2y=-1$
(D) $x^2y^2=1$
(E) $xy^2=1$

19. If n is an odd number, which of the following expressions is always odd?

(A) $2n+4$
(B) $3n+2$
(C) $3n+5$
(D) $5n+5$
(E) $5n+7$

20. If $5p + 12 = 17 - 4\left(\frac{p}{2} + 1\right)$, what is the value of p?
    (A) $\frac{1}{7}$
    (B) $\frac{1}{3}$
    (C) $\frac{6}{7}$
    (D) $1\frac{2}{7}$
    (E) 2

21. If $\frac{2x}{5y} = 6$, what is the value of y, in terms of x?
    (A) $\frac{x}{15}$
    (B) $\frac{x}{2}$
    (C) $\frac{8}{2}$
    (D) $15x$
    (E) $\frac{30}{x}$

22. If x is an odd integer and y is an even integer, which of the following expressions MUST be odd?
    (A) $2x + y$
    (B) $2(x + y)$
    (C) $x^2 + y^2$
    (D) $xy + y$
    (E) $2x + y^2$

23. If $100 \div x = 10n$, then which of the following is equal to nx?
    (A) 10
    (B) $10x$
    (C) 100
    (D) $10xn$
    (E) 1,000

24. For what value of y is $4(y-1) = 2(y+2)$?
    (A) 0
    (B) 2
    (C) 4
    (D) 6
    (E) 8

25. $$\frac{3}{4} + x = 8.3$$
    What is the value of x in the equation above?
    (A) 4.9
    (B) 6.75
    (C) 7.55
    (D) 8
    (E) 9.05

26. If $2(a + m) = 5m - 3 + a$, what is the value of a, in terms of m?
    (A) $\frac{3m}{2}$
    (B) 3
    (C) $5m$
    (D) $4m + 33$
    (E) $3m - 3$

PRACTICE QUESTION ANSWERS

1. C

Substitute $a = 3$, $b = 6$, and $c = 5$.

$$3(6 - 1) + \frac{6 \times 5}{2} = 3(5) + \frac{30}{2}$$
$$= 15 + 15$$
$$= 30$$

2. E

Since we're told the value of d, we can substitute it into the equation $\frac{c}{d} = 3$ to find the value of c. We are told that $d = 1$, so $\frac{c}{d} = 3$ can be rewritten as $\frac{c}{1} = 3$. Since $\frac{c}{1}$ is the same as c, we can rewrite the equation again as $c = 3$. Now we can substitute the values of c and d into the expression $3c + d$ to get $3(3) + 1 = 10$.

3. D

We are told that $y = 8$, so first we'll substitute 8 for y, and then we can solve for x.

$$5x - 7 = y$$
$$5x - 7 = 8$$

Now we can add 7 to both sides:

$$5x - 7 + 7 = 8 + 7$$
$$5x = 15$$

Next we divide both sides by 5:

$$\frac{5x}{5} = \frac{15}{5}$$
$$x = 3$$

4. B

Here we have three values to substitute. Remember, xz means x times z. After we substitute the values of x, y, and z, we will do the operations in PEMDAS order—parentheses, exponents, multiplication and division, addition and subtraction.

$$x(y - 2) + xz = 2(5 - 2) + 2 \times 7$$
$$= 2(3) + 2 \times 7$$
$$= 6 + 14$$
$$= 20$$

5. B

This is another "plug-in" question. Remember, $5yz$ means $5 \times y \times z$. First, we will replace x, y, and z with the values given. Then we will carry out the indicated operations using PEMDAS.

$$x^2 - 5yz + y^2 = (\sqrt{3})^2 - 5 \times 2 \times \frac{1}{2} + 2^2$$
$$= 3 - 5 \times 2 \times \frac{1}{2} + 4$$
$$= 3 - 5 + 4$$
$$= -2 + 4$$
$$= 2$$

6. C

If you look carefully at the expression $2x + 2y - 2$, you should see some similarity to $x + y = 7$. If we ignore the -2 for a moment, $2x + 2y$ is really just twice $x + y$. If it helps to make it clearer, we can factor out the 2, making $2x + 2y$ into $2(x + y)$. Since $x + y = 7$, $2(x + y)$ must equal $2(7)$, or 14. If we replace $2x + 2y$ with 14, the expression $2x + 2y - 2$ becomes $14 - 2$, which equals 12, (C).

7. C

This question is solved the same way as question 3.

Plug in 18 for b in the equation:

$$3a - 6 = 18$$

Isolate a on one side of the equation:

$$3a = 18 + 6$$

$$3a = 24$$

Divide both sides by 3 to find the value of a: $a = 8$.

8. E

Substitute 10 for x in the equation:

$$\frac{10}{y} = \frac{2}{5}$$

Cross multiply:

$$(10)(5) = (2)(y)$$

$$50 = 2y$$

Divide both sides by 2 to find the value of y:

$$\frac{50}{2} = \frac{2y}{2}$$

$$25 = y$$

9. A

Distribute $-5n$ to each term within the parentheses:

$$-5n(3m - 2) = (-5n)(3m) + (-5n)(-2)$$

Multiply:

$$= -15mn + 10n$$

Note that $(-5n)(-2) = +10n$, because a negative times a negative yields a positive.

10. B

Plug $a = -1$ and $b = 3$ into the expression:

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

11. E

The expression can be rewritten as $3(s - t) + 3$.

Plug in 5 for $s - t$:

$$3(5) + 3 = 15 + 3$$

$$= 18$$

12. D

Distribute the minus sign over the terms in parentheses: $3d - 7 - 5 - (-2d)$. Combine like terms:

$$3d - (-2d) - 7 - 5$$

$$5d - 12$$

$3d$ minus $-2d$ equals $+5d$, because subtraction is equivalent to "addition of the opposite." So $3d - (-2d)$ becomes $3d + (+2d)$, which is equal to $5d$.

13. C

Plug in $x = -2$, $y = 3$, and $z = 1$:

$$(-2)(3)(1) + 3[(1 - (-2)] + 2(-2)$$

$$= -6 + 3(3) - 4$$

$$= -6 + 9 - 4$$

$$= 3 - 4$$

$$= -1$$

14. C

We have to rearrange the equation until the x is alone on one side of the equal sign. You must do the same thing to both sides of the equation. First, we will take away the 7:

$$3x + 7 = 14$$

$$3x + 7 - 7 = 14 - 7$$

$$3x = 7$$

$$\frac{3x}{3} = \frac{7}{3}$$

$$x = \frac{7}{3}$$

15. E

Notice that the question asks which expression is always even. (E), $6x + 2$, is correct because, first, the product of an even number and any integer is even, so $6x$ is even because 6 is even. Then, when two even numbers are added, their sum is also even, so $6x + 2$ is even. (A) and (C) are always odd regardless of what integer is substituted for x. (B) and (D) are even only when x is even.

16. C

We must rearrange the equation until the z is alone on one side of the equal sign. Anything we do to one

side of the equation we must also do to the other side. First, we'll add 3 to both sides:

$$4z - 3 = -19$$
$$4z - 3 + 3 = -19 + 3$$
$$4z = -16$$

Next, we'll divide both sides by 4:

$$\frac{4z}{4} = -\frac{16}{4}$$
$$z = -4$$

17. B

Rearrange the equation until the variable a is alone on one side of the equal sign.

$$3ab = 6$$
$$\frac{3ab}{3} = \frac{6}{3}$$
$$ab = 2$$
$$\frac{ab}{b} = \frac{2}{b}$$
$$a = \frac{2}{b}$$

18. B

Try each answer choice until you find the correct one.

(A) xy = −1. If the product of two integers is negative, then one of the two integers must be negative. In this case, x could be negative, but it's possible that y is negative and x is positive. We're looking for an equation where x will always have to be negative.

(B) $xy^2 = -1$. The exponent here applies only to the y, not to the x. The square of any non-zero number is positive, so whatever y is, y^2 must be positive. (We know that y isn't zero; if it were, then the product xy^2 would also be zero.) Since y^2 is positive and the product of y^2 and x is negative, x must be negative. (B) is the answer.

19. B

We're told that n is odd, so we don't have to check to see what happens if n is even. We do have to try each answer to see which one represents an odd number. Let's say $n = 3$ and replace all the ns with 3s.

(A) 2n + 4. 2(3) + 4 = 6 + 4 = 10. 10 is even.

(B) 3n + 2. 3(3) + 2 = 9 + 2 = 11. 11 is odd, so (B) is the answer.

20. A

This equation takes a few more steps to solve than the previous ones, but it follows the same rules.

First, we multiply using the distributive law:

$$5p + 12 = 17 - 4\left(\frac{p}{2} + 1\right)$$
$$5p + 12 = 17 + (-4)\left(\frac{p}{2}\right) + (-4)(1)$$
$$5p + 12 = 17 + \left(-\frac{4p}{2}\right) + (-4)$$

$+\left(-\frac{4p}{2}\right)$ is equal to $-2p$, so $5p + 12 = 17 - 2p - 4$

Combine the integers on the right side:

$$5p + 12 = 13 - 2p$$

We can add $2p$ to each side to get all the ps on one side:

$$5p + 2p + 12 = 13 - 2p + 2p$$
$$7p + 12 = 13$$

Now we will subtract 12 from both sides:

$$7p + 12 - 12 = 13 - 12$$
$$7p = 1$$

And lastly, we divide both sides by 7:

$$\frac{7p}{7} = \frac{1}{7}$$
$$p = \frac{1}{7}$$

21. A

We want to rearrange the equation until y is alone on one side of the equal sign. There's more than one way to do this, but here's one way:

$$\frac{2x}{5y} = 6$$

$$(5y)\frac{2x}{5y} = 6(5y)$$

$$2x = 30y$$

$$\frac{2x}{30} = y$$

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

22. C

This is another "try each answer" problem. We know that x is odd and y is even. Let's say that $x = 3$ and $y = 4$.

(A) $2x + y$. $2(3) + 4 = 6 + 4 = 10$. 10 is even, so this isn't correct.

(B) $2(x + y)$. $2(3 + 4) = 2(3 + 4) = 2(7) = 14$. 14 is even.

(C) $x^2 + y^2$. $3^2 + 4^2 = 9 + 16 = 25$. 25 is odd, so (C) is correct.

23. A

This problem looks harder than it really is. If

$100 \div x = 10n$, then

$(10n)(x) = 100$ or

$10nx = 100$

$nx = 10$, (A)

24. C

Multiply through and solve for y by isolating it on one side of the equation:

$$4(y - 1) = 2(y + 2)$$

$$4y - 4 = 2y + 4$$

$$2y - 4 = 4$$

$$2y = 8$$

$$\frac{2y}{2} = \frac{8}{2}$$

$$y = 4$$

25. C

Isolate x on one side of the equation:

$$\frac{3}{4} + x = 8.3$$

$$\frac{3}{4} + x - \frac{3}{4} = 8.3 - \frac{3}{4}$$

$$x = 8.3 - \frac{3}{4}$$

Then $\frac{3}{4}$ can be rewritten as 0.75, and subtracting 0.75 from 8.3 gives you 7.55.

26. E

Multiply through and find a in terms of m by isolating a on one side of the equation:

$$2(a + m) = 5m - 3 + a$$

$$2a + 2m = 5m - 3 + a$$

$$2a = 3m - 3 + a$$

$$a = 3m - 3$$