Homework Packet 5 - Answer Key

Multiplication Facts to 100 (E) Answers

Name: _____   Date: _____   Score: ____ /100

Calculate each product.

3 ×3 = 9	6 ×10 = 60	2 ×3 = 6	4 ×10 = 40	9 ×9 = 81	8 ×8 = 64	10 ×3 = 30	6 ×8 = 48	8 ×2 = 16	7 ×10 = 70
6 ×2 = 12	7 ×4 = 28	9 ×7 = 63	5 ×5 = 25	10 ×8 = 80	4 ×5 = 20	10 ×7 = 70	2 ×8 = 16	4 ×3 = 12	3 ×6 = 18
3 ×7 = 21	5 ×3 = 15	4 ×7 = 28	8 ×7 = 56	8 ×10 = 80	10 ×4 = 40	4 ×2 = 8	2 ×4 = 8	7 ×9 = 63	7 ×6 = 42
6 ×3 = 18	2 ×7 = 14	10 ×2 = 20	5 ×2 = 10	8 ×5 = 40	9 ×3 = 27	5 ×10 = 50	10 ×10 = 100	3 ×8 = 24	3 ×2 = 6
6 ×6 = 36	3 ×10 = 30	7 ×3 = 21	3 ×4 = 12	8 ×6 = 48	9 ×8 = 72	9 ×4 = 36	2 ×2 = 4	9 ×5 = 45	7 ×7 = 49
8 ×9 = 72	2 ×9 = 18	6 ×9 = 54	7 ×2 = 14	5 ×6 = 30	6 ×7 = 42	6 ×5 = 30	4 ×4 = 16	9 ×2 = 18	10 ×9 = 90
5 ×4 = 20	3 ×9 = 27	7 ×5 = 35	8 ×3 = 24	5 ×7 = 35	5 ×9 = 45	3 ×5 = 15	5 ×8 = 40	7 ×8 = 56	2 ×6 = 12
9 ×10 = 90	4 ×6 = 24	4 ×9 = 36	8 ×4 = 32	10 ×5 = 50	4 ×8 = 32	2 ×10 = 20	6 ×4 = 24	2 ×5 = 10	10 ×6 = 60
9 ×6 = 54	2 ×6 = 12	9 ×8 = 72	9 ×9 = 81	6 ×4 = 24	7 ×6 = 42	9 ×10 = 90	3 ×10 = 30	10 ×2 = 20	3 ×8 = 24
8 ×6 = 48	6 ×10 = 60	3 ×2 = 6	5 ×9 = 45	7 ×2 = 14	6 ×2 = 12	5 ×2 = 10	5 ×4 = 20	7 ×5 = 35	6 ×6 = 36

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Unit 10

Answer Key

Section 10-1

1. 9 2. $\dfrac{3}{16}$ 3. 9 4. 155 5. D

6. 3 7. $\dfrac{2}{3}$ 8. 9 9. 4

Section 10-2

1. A 2. C 3. B 4. B 5. 2
6. 3

Section 10-3

1. C 2. B 3. D 4. D 5. A
6. C

Section 10-4

1. B 2. A 3. D 4. 9 5. 8
6. 143

Section 10-5

1. B 2. C 3. D 4. A 5. C
6. B

Chapter 10 Practice Test

1. B 2. B 3. A 4. B 5. D
6. D 7. A 8. D 9. C 10. 5

11. $\dfrac{1}{4}$ 12. 10

Answers and Explanations

Section 10-1

1. 9

$(-a^2b^3)(2ab^2)(-3b)$

$=(-1)(2)(-3)a^2ab^3b^2b$

$=6a^3b^6=ka^mb^n$

If the equation is true, $m=3$ and $n=6$, thus
$m+n=3+6=9$.

2. $\dfrac{3}{16}$

$(\dfrac{2}{3}a^2b)^2(\dfrac{4}{3}ab)^{-3}$

$=\dfrac{(\dfrac{2}{3}a^2b)^2}{(\dfrac{4}{3}ab)^3}$ $a^{-n}=\dfrac{1}{a^n}$

$=\dfrac{\dfrac{4}{9}a^4b^2}{\dfrac{64}{27}a^3b^3}$

$=\dfrac{4}{9}\cdot\dfrac{27}{64}\dfrac{a}{b}=\dfrac{3}{16}\dfrac{a}{b}$

If $(\dfrac{2}{3}a^2b)^2(\dfrac{4}{3}ab)^{-3}=ka^mb^n$, then $k=\dfrac{3}{16}$.

3. 9

$\dfrac{(x)^3(-y)^2z^{-2}}{(x)^{-2}y^3z}=\dfrac{x^3y^2(x)^2}{y^3zz^2}$ $a^{-n}=\dfrac{1}{a^n}$ and $\dfrac{1}{a^{-n}}=a^n$

$=\dfrac{x^5y^2}{y^3z^3}=\dfrac{x^5}{yz^3}=\dfrac{x^m}{y^nz^p}$

If the equation is true, $m=5$, $n=1$, and $p=3$,
thus $m+n+p=5+1+3=9$.

4. 155

$2^x+2^{2x}+2^{3x}$

$=2^x+(2^x)^2+(2^x)^3$ $(a^m)^n=a^{m\cdot n}$

$=(5)+(5)^2+(5)^3$ $2^x=5$

$=155$

5. D

$(3^x+3^x+3^x)\cdot3^x$

$=(3\cdot3^x)\cdot3^x$

$=(3^{1+x})\cdot3^x$ $a^ma^n=a^{m+n}$

$=3^{1+2x}$ $a^ma^n=a^{m+n}$

6. 3

$\dfrac{(6xy^2)(2xy)^2}{8x^2y^2}$

$=\dfrac{(6xy^2)(4x^2y^2)}{8x^2y^2}$

$=\dfrac{24x^3y^4}{8x^2y^2}=3xy^2$

If the expression above is written in the form
ax^my^n, $a=3$, $m=1$, and $n=2$.
Therefore, $m+n=1+2=3$.

7. $\dfrac{2}{3}$

$$\dfrac{(2x)^3(3x)}{(6x^2)^2} = \dfrac{(8x^3)(3x)}{36x^4} = \dfrac{24x^4}{36x^4} = \dfrac{2}{3}$$

8. 9

$$8,200 \times 300,000 = 8.2 \times 10^3 \times 3 \times 10^5$$
$$= 24.6 \times 10^8 = 2.46 \times 10 \times 10^8 = 2.46 \times 10^9$$

9. 4

$$\dfrac{240}{80,000} \times \dfrac{6,000}{900,000}$$
$$= \dfrac{24 \times 6}{8,000 \times 900}$$
$$= \dfrac{144}{72 \times 10^5} = \dfrac{2}{10^5}$$
$$= \dfrac{2}{10 \times 10^4} = \dfrac{1}{5 \times 10^4}$$

If the above expression is equal to $\dfrac{1}{5 \times 10^n}$,

then the value of n is 4.

Section 10-2

1. A

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

2. C

$$(-m^2n - n^2 + 3mn^2) - (m^2n - n^2 + mn^2)$$
$$= -m^2n - n^2 + 3mn^2 - m^2n + n^2 - mn^2$$
$$= -2m^2n + 2mn^2$$

3. B

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

If the expression above is written in the form
$ax^2 + bx + c$, $a = 4$, $b = 0$, and $c = -1$.
Therefore, $a + b + c = 4 + 0 + (-1) = 3$.

4. B

$$
\begin{array}{r}
x^2 + 3 \\
x-1 \overline{)\,x^3 - x^2 + 3x - 3} \\
\underline{x^3 - x^2} \\
0 \\
\end{array}
$$

$x^2 + 3$	Quotient
$x^3 - x^2 + 3x - 3$	Dividend
$x^2 \times (x-1) = x^3 - x^2$	
	Result of subtraction

$$3x - 3$$
$$\underline{3x - 3} \qquad 3 \times (x-1) = 3x - 3$$
$$0 \qquad \text{Result of subtraction}$$

Therefore, $(x^3 - x^2 + 3x - 3) \div (x-1) = x^2 + 3$.

5. 2

$$(14x^2 + 9x - 20) \div (ax - 1) = 7x + 8 + \dfrac{-12}{ax - 1}$$

Multiply each side of the equation by $ax - 1$.
$$(ax - 1)[(14x^2 + 9x - 20) \div (ax - 1)]$$
$$= (ax - 1)[7x + 8 + \dfrac{-12}{ax - 1}]$$
$$\Rightarrow 14x^2 + 9x - 20 = (ax - 1)(7x + 8) + (-12)$$
$$\Rightarrow 14x^2 + 9x - 20 = 7ax^2 + (8a - 7)x - 20$$

The coefficients of x- terms
have to be equal, so $9 = 8a - 7$.

$$14x^2 + 9x - 20 = 7ax^2 + (8a - 7)x - 20$$

The coefficients of x^2- terms
have to be equal, so $14 = -7a$.

Since the coefficients of x^2- terms have to be equal
on both sides of the equation, $14 = 7a$, or $a = 2$.

6. 3

$$\dfrac{6x^2 - 5x + 4}{-3x + 1} = -2x + 1 + \dfrac{A}{-3x + 1}$$

Multiply each side of the equation by $-3x + 1$.

$$(-3x + 1)[\dfrac{6x^2 - 5x + 4}{-3x + 1}]$$
$$= (-3x + 1)[-2x + 1 + \dfrac{A}{-3x + 1}]$$
$$\Rightarrow 6x^2 - 5x + 4 = 6x^2 - 5x + 1 + A$$

Since the constant terms have to be equal on both
sides of the equation, $4 = 1 + A$, or $A = 3$

Homework Packet 5 - Answer Key

Section 10-3

1. C

$(x+3)(x-5) = x^2 - 5x + 3x - 15$

$= x^2 - 2x - 15$

Choice A gives x-term $+2$ and constant term -13.
Choice B gives x-term -2 and constant term -11.
Choice C gives x-term -2 and constant term -15.
Choice C is correct.

2. B

$(2-5x)(5x+2)$

$= (2)(5x) + (2)(2) - (5x)(5x) - (5x)(2)$

$= 10x + 4 - 25x^2 - 10x$

$= 4 - 25x^2$

3. D

$4x^2 - 12xy + 9y^2$

$= (2x)^2 - 2(2x)(3y) + (3y)^2$

$= (2x-3y)^2$

4. D

$(x+y)(x-y)(x^2+y^2)$

$= (x^2 - y^2)(x^2 + y^2)$ $(x+y)(x-y) = x^2 - y^2$

$= x^2 x^2 + x^2 y^2 - y^2 x^2 - y^2 y^2$

$= x^4 - y^4$

5. A

$\dfrac{3^{(a-b)} \cdot 3^{(a+b)}}{3^{2a+1}}$

$= 3^{(a-b)+(a+b)-(2a+1)}$ $a^m a^n = a^{m+n}$ and $\dfrac{a^m}{a^n} = a^{m-n}$

$= 3^{-1} = \dfrac{1}{3}$

6. C

$\dfrac{2^{(a-1)(a+1)}}{2^{(a-2)(a+2)}}$

$= \dfrac{2^{(a^2-1)}}{2^{(a^2-4)}}$ FOIL

$= 2^{(a^2-1)-(a^2-4)}$ $\dfrac{a^m}{a^n} = a^{m-n}$

$= 2^3 = 8$

Section 10-4

1. B

$42x^2 y^2 + 63xy^3$

$= 21xy^2(2x + 3y)$ GCF is $21xy^2$.

2. A

$12x^2 y - 18xy^2 z$

$= 6xy(2x - 3yz)$ GCF is $6xy$.

3. D

$5a^2 b - 10abc + 5bc^2$

$= 5b(a^2 - 2ac + c^2)$ GCF is $5b$.

$= 5b(a-c)^2$ $(a-c)^2 = a^2 - 2ac + c^2$

4. 9

$12^3 = 2^x \cdot 3^y$

$(2^2 \cdot 3)^3 = 2^x \cdot 3^y$ $12 = 2^2 \cdot 3$

$2^6 \cdot 3^3 = 2^x \cdot 3^y$ $(2^2)^3 = 2^6$

So, we can conclude that $x = 6$ and $y = 3$.
Therefore, $x + y = 6 + 3 = 9$.

5. 8

$2 \times 5^9 - k \times 5^8 = 2 \times 5^8$

$2 \times 5 \cdot 5^8 - k \times 5^8 = 2 \times 5^8$ $5^9 = 5 \cdot 5^8$

$10 \cdot 5^8 - k \times 5^8 = 2 \times 5^8$ Simplify.

$(10 - k)5^8 = 2 \times 5^8$ Factor.

Therefore, $10 - k = 2$, or $k = 8$.

6. 143

$12^{99} - 12^{97} = 12^{97} \times n$

$12^2 \times 12^{97} - 12^{97} = 12^{97} \times n$ $12^{99} = 12^2 \times 12^{97}$

$12^{97}(12^2 - 1) = 12^{97} \times n$ Factor.

Therefore, $12^2 - 1 = n$, or $n = 143$.

Section 10-5

1. B

$1 + 2x - x(1 + 2x)$

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

$= (1 + 2x)(1 - x)$ GCF is $1 + 2x$.

Homework Packet 5 - Answer Key

2. **C**

$$rx + sx = 3$$
$$x(r + s) = 3 \qquad \text{Factor.}$$
$$x\left(\frac{1}{3}\right) = 3 \qquad \text{Substitute } \frac{1}{3} \text{ for } r + s.$$
$$x = 9$$

3. **D**

$$2ax - 6a - 3x + 9$$
$$= (2ax - 6a) - (3x - 9) \qquad \text{Group terms with common factors. } -3x + 9 = -(3x - 9)$$
$$= 2a(x - 3) - 3(x - 3) \qquad \text{Factor the GCF.}$$
$$= (x - 3)(2a - 3) \qquad \text{Distributive Property}$$

4. **A**

$$mn - 5n - m + 5$$
$$= (mn - 5n) - (m - 5) \qquad \text{Group terms with common factors. } -m + 5 = -(m - 5)$$
$$= n(m - 5) - (m - 5) \qquad \text{Factor the GCF.}$$
$$= (m - 5)(n - 1) \qquad \text{Distributive Property}$$

5. **C**

$$7y^2 - 21xy - 2y + 6x$$
$$= (7y^2 - 21xy) - (2y - 6x)$$
$$= 7y(y - 3x) - 2(y - 3x)$$
$$= (7y - 2)(y - 3x)$$

6. **B**

$$x - 2y + 3z - 2wx + 4wy - 6wz$$
$$= (x - 2y + 3z) - (2wx - 4wy + 6wz)$$
$$= (x - 2y + 3z) - 2w(x - 2y + 3z)$$
$$= (1 - 2w)(x - 2y + 3z)$$

Chapter 10 Practice Test

1. **B**

$$\frac{2^{(a+b)^2}}{2^{(a-b)^2}}$$
$$= 2^{(a+b)^2 - (a-b)^2} \qquad \frac{a^m}{a^n} = a^{m-n}$$
$$= 2^{(a^2 + 2ab + b^2) - (a^2 - 2ab + b^2)}$$
$$= 2^{4ab}$$
$$= (2^4)^{ab} \qquad (a^m)^n = a^{m \cdot n}$$
$$= (16)^{ab}$$

2. **B**

$$2m^2 n - mnp - 6m + 3p$$
$$= (2m^2 n - mnp) - (6m - 3p)$$
$$= mn(2m - p) - 3(2m - p)$$
$$= (2m - p)(mn - 3)$$

3. **A**

$$\left(\frac{a+b}{2}\right)^2 - \left(\frac{a-b}{2}\right)^2 = \frac{(a+b)^2}{4} - \frac{(a-b)^2}{4}$$
$$= \frac{a^2 + 2ab + b^2}{4} - \frac{a^2 - 2ab + b^2}{4}$$
$$= \frac{4ab}{4} = ab$$

4. **B**

$$\left(x + \frac{1}{x}\right)^2 = 9$$
$$x^2 + 2x \cdot \frac{1}{x} + \left(\frac{1}{x}\right)^2 = 9$$
$$x^2 + 2 + \frac{1}{x^2} = 9$$
$$x^2 + \frac{1}{x^2} = 7$$
$$\left(x - \frac{1}{x}\right)^2 = x^2 - 2x \cdot \frac{1}{x} + \frac{1}{x^2}$$
$$= x^2 - 2 + \frac{1}{x^2} = x^2 + \frac{1}{x^2} - 2$$
$$= 7 - 2 = 5 \qquad \text{Substitute 7 for } x^2 + \frac{1}{x^2} = 7.$$

5. **D**

$$8^{\frac{4}{3}} \cdot 8^{-\frac{8}{3}} = 8^{\frac{4}{3} - \frac{8}{3}} = 8^{-\frac{4}{3}} = (2^3)^{-\frac{4}{3}}$$
$$= 2^{-4} = \frac{1}{2^4}$$
If $8^{\frac{4}{3}} \cdot 8^{-\frac{8}{3}} = \frac{1}{2^m}$, then $m = 4$.

6. **D**

$$\frac{(-2xy^2)^3}{4x^4 y^5} = \frac{-8x^3 y^6}{4x^4 y^5}$$
$$= -\frac{2y}{x}$$

Homework Packet 5 - Answer Key

7. **A**

Given $x^{12} = 32n^4$ and $x^9 = 4n$.

$x^{12} = 32n^4$

$\dfrac{x^{12}}{x^9} = \dfrac{32n^4}{x^9}$ Divide each side by x^9.

$x^3 = \dfrac{32n^4}{x^9}$ Simplify.

$x^3 = \dfrac{32n^4}{4n}$ Substitute $4n$ for x^9.

$x^3 = 8n^3$ Simplify.

$(x)^3 = (2n)^3$ $8n^3 = (2n)^3$

Therefore, $x = 2n$.

8. **D**

$(3x^3 - 2x^2 - 7) - (-2x^2 + 6x + 2)$

$= 3x^3 - 2x^2 - 7 + 2x^2 - 6x - 2$

$= 3x^3 - 6x - 9$

$= 3(x^3 - 2x - 3)$

9. **C**

$9x - (x - 3)(x + 12)$

$= 9x - (x^2 + 9x - 36)$

$= 9x - x^2 - 9x + 36$

$= 36 - x^2$

$= (6 - x)(6 + x)$

10. **5**

$\dfrac{(2.1 \times 10^{-3})(2 \times 10^5)}{7 \times 10^{-4}}$

$= \dfrac{4.2 \times 10^2}{7 \times 10^{-4}}$

$= \dfrac{4.2 \times 10^2 \times 10^4}{7}$ $\dfrac{1}{a^{-n}} = a^n$

$= 0.6 \times 10^2 \times 10^4$

$= 0.6 \times 10^6$

$= 6 \times 10^5$

If $\dfrac{(2.1 \times 10^{-3})(2 \times 10^5)}{7 \times 10^{-4}} = 6 \times 10^n$, then $n = 5$.

11. $\dfrac{1}{4}$

$a^{\frac{3}{4}} = 8$

$(a^{\frac{3}{4}})^{\frac{4}{3}} = (8)^{\frac{4}{3}}$

$a = (2^3)^{\frac{4}{3}}$

$a = 2^4$

Therefore, $a^{-\frac{1}{2}} = (2^4)^{-\frac{1}{2}} = 2^{-2} = \dfrac{1}{2^2} = \dfrac{1}{4}$.

12. **10**

$\dfrac{x^2 - x - a}{x - 2} = x + 1 - \dfrac{8}{x - 2}$

Multiply each side of the equation by $x - 2$.

$(x - 2)[\dfrac{x^2 - x - a}{x - 2}] = (x - 2)[x + 1 - \dfrac{8}{x - 2}]$

$\Rightarrow x^2 - x - a = (x - 2)(x + 1) - 8$

$\Rightarrow x^2 - x - a = x^2 - x - 2 - 8$

$\Rightarrow x^2 - x - a = x^2 - x - 10$

Since the constant terms have to be equal on both sides of the equation, $a = 10$.