

Homework Packet 5 - Answer Key

Multiplication Facts to 100 (E) Answers

Name: _____ Date: _____ Score: ____/100

Calculate each product.

| | | | | | | | | | |
|--|--|--|--|--|--|--|--|--|--|
| $\begin{array}{r} 3 \\ \times 3 \\ \hline 9 \end{array}$ | $\begin{array}{r} 6 \\ \times 10 \\ \hline 60 \end{array}$ | $\begin{array}{r} 2 \\ \times 3 \\ \hline 6 \end{array}$ | $\begin{array}{r} 4 \\ \times 10 \\ \hline 40 \end{array}$ | $\begin{array}{r} 9 \\ \times 9 \\ \hline 81 \end{array}$ | $\begin{array}{r} 8 \\ \times 8 \\ \hline 64 \end{array}$ | $\begin{array}{r} 10 \\ \times 3 \\ \hline 30 \end{array}$ | $\begin{array}{r} 6 \\ \times 8 \\ \hline 48 \end{array}$ | $\begin{array}{r} 8 \\ \times 2 \\ \hline 16 \end{array}$ | $\begin{array}{r} 7 \\ \times 10 \\ \hline 70 \end{array}$ |
| $\begin{array}{r} 6 \\ \times 2 \\ \hline 12 \end{array}$ | $\begin{array}{r} 7 \\ \times 4 \\ \hline 28 \end{array}$ | $\begin{array}{r} 9 \\ \times 7 \\ \hline 63 \end{array}$ | $\begin{array}{r} 5 \\ \times 5 \\ \hline 25 \end{array}$ | $\begin{array}{r} 10 \\ \times 8 \\ \hline 80 \end{array}$ | $\begin{array}{r} 4 \\ \times 5 \\ \hline 20 \end{array}$ | $\begin{array}{r} 10 \\ \times 7 \\ \hline 70 \end{array}$ | $\begin{array}{r} 2 \\ \times 8 \\ \hline 16 \end{array}$ | $\begin{array}{r} 4 \\ \times 3 \\ \hline 12 \end{array}$ | $\begin{array}{r} 3 \\ \times 6 \\ \hline 18 \end{array}$ |
| $\begin{array}{r} 3 \\ \times 7 \\ \hline 21 \end{array}$ | $\begin{array}{r} 5 \\ \times 3 \\ \hline 15 \end{array}$ | $\begin{array}{r} 4 \\ \times 7 \\ \hline 28 \end{array}$ | $\begin{array}{r} 8 \\ \times 7 \\ \hline 56 \end{array}$ | $\begin{array}{r} 8 \\ \times 10 \\ \hline 80 \end{array}$ | $\begin{array}{r} 10 \\ \times 4 \\ \hline 40 \end{array}$ | $\begin{array}{r} 4 \\ \times 2 \\ \hline 8 \end{array}$ | $\begin{array}{r} 2 \\ \times 4 \\ \hline 8 \end{array}$ | $\begin{array}{r} 7 \\ \times 9 \\ \hline 63 \end{array}$ | $\begin{array}{r} 7 \\ \times 6 \\ \hline 42 \end{array}$ |
| $\begin{array}{r} 6 \\ \times 3 \\ \hline 18 \end{array}$ | $\begin{array}{r} 2 \\ \times 7 \\ \hline 14 \end{array}$ | $\begin{array}{r} 10 \\ \times 2 \\ \hline 20 \end{array}$ | $\begin{array}{r} 5 \\ \times 2 \\ \hline 10 \end{array}$ | $\begin{array}{r} 8 \\ \times 5 \\ \hline 40 \end{array}$ | $\begin{array}{r} 9 \\ \times 3 \\ \hline 27 \end{array}$ | $\begin{array}{r} 5 \\ \times 10 \\ \hline 50 \end{array}$ | $\begin{array}{r} 10 \\ \times 10 \\ \hline 100 \end{array}$ | $\begin{array}{r} 3 \\ \times 8 \\ \hline 24 \end{array}$ | $\begin{array}{r} 3 \\ \times 2 \\ \hline 6 \end{array}$ |
| $\begin{array}{r} 6 \\ \times 6 \\ \hline 36 \end{array}$ | $\begin{array}{r} 3 \\ \times 10 \\ \hline 30 \end{array}$ | $\begin{array}{r} 7 \\ \times 3 \\ \hline 21 \end{array}$ | $\begin{array}{r} 3 \\ \times 4 \\ \hline 12 \end{array}$ | $\begin{array}{r} 8 \\ \times 6 \\ \hline 48 \end{array}$ | $\begin{array}{r} 9 \\ \times 8 \\ \hline 72 \end{array}$ | $\begin{array}{r} 9 \\ \times 4 \\ \hline 36 \end{array}$ | $\begin{array}{r} 2 \\ \times 2 \\ \hline 4 \end{array}$ | $\begin{array}{r} 9 \\ \times 5 \\ \hline 45 \end{array}$ | $\begin{array}{r} 7 \\ \times 7 \\ \hline 49 \end{array}$ |
| $\begin{array}{r} 8 \\ \times 9 \\ \hline 72 \end{array}$ | $\begin{array}{r} 2 \\ \times 9 \\ \hline 18 \end{array}$ | $\begin{array}{r} 6 \\ \times 9 \\ \hline 54 \end{array}$ | $\begin{array}{r} 7 \\ \times 2 \\ \hline 14 \end{array}$ | $\begin{array}{r} 5 \\ \times 6 \\ \hline 30 \end{array}$ | $\begin{array}{r} 6 \\ \times 7 \\ \hline 42 \end{array}$ | $\begin{array}{r} 6 \\ \times 5 \\ \hline 30 \end{array}$ | $\begin{array}{r} 4 \\ \times 4 \\ \hline 16 \end{array}$ | $\begin{array}{r} 9 \\ \times 2 \\ \hline 18 \end{array}$ | $\begin{array}{r} 10 \\ \times 9 \\ \hline 90 \end{array}$ |
| $\begin{array}{r} 5 \\ \times 4 \\ \hline 20 \end{array}$ | $\begin{array}{r} 3 \\ \times 9 \\ \hline 27 \end{array}$ | $\begin{array}{r} 7 \\ \times 5 \\ \hline 35 \end{array}$ | $\begin{array}{r} 8 \\ \times 3 \\ \hline 24 \end{array}$ | $\begin{array}{r} 5 \\ \times 7 \\ \hline 35 \end{array}$ | $\begin{array}{r} 5 \\ \times 9 \\ \hline 45 \end{array}$ | $\begin{array}{r} 3 \\ \times 5 \\ \hline 15 \end{array}$ | $\begin{array}{r} 5 \\ \times 8 \\ \hline 40 \end{array}$ | $\begin{array}{r} 7 \\ \times 8 \\ \hline 56 \end{array}$ | $\begin{array}{r} 2 \\ \times 6 \\ \hline 12 \end{array}$ |
| $\begin{array}{r} 9 \\ \times 10 \\ \hline 90 \end{array}$ | $\begin{array}{r} 4 \\ \times 6 \\ \hline 24 \end{array}$ | $\begin{array}{r} 4 \\ \times 9 \\ \hline 36 \end{array}$ | $\begin{array}{r} 8 \\ \times 4 \\ \hline 32 \end{array}$ | $\begin{array}{r} 10 \\ \times 5 \\ \hline 50 \end{array}$ | $\begin{array}{r} 4 \\ \times 8 \\ \hline 32 \end{array}$ | $\begin{array}{r} 2 \\ \times 10 \\ \hline 20 \end{array}$ | $\begin{array}{r} 6 \\ \times 4 \\ \hline 24 \end{array}$ | $\begin{array}{r} 2 \\ \times 5 \\ \hline 10 \end{array}$ | $\begin{array}{r} 10 \\ \times 6 \\ \hline 60 \end{array}$ |
| $\begin{array}{r} 9 \\ \times 6 \\ \hline 54 \end{array}$ | $\begin{array}{r} 2 \\ \times 6 \\ \hline 12 \end{array}$ | $\begin{array}{r} 9 \\ \times 8 \\ \hline 72 \end{array}$ | $\begin{array}{r} 9 \\ \times 9 \\ \hline 81 \end{array}$ | $\begin{array}{r} 6 \\ \times 4 \\ \hline 24 \end{array}$ | $\begin{array}{r} 7 \\ \times 6 \\ \hline 42 \end{array}$ | $\begin{array}{r} 9 \\ \times 10 \\ \hline 90 \end{array}$ | $\begin{array}{r} 3 \\ \times 10 \\ \hline 30 \end{array}$ | $\begin{array}{r} 10 \\ \times 2 \\ \hline 20 \end{array}$ | $\begin{array}{r} 3 \\ \times 8 \\ \hline 24 \end{array}$ |
| $\begin{array}{r} 8 \\ \times 6 \\ \hline 48 \end{array}$ | $\begin{array}{r} 6 \\ \times 10 \\ \hline 60 \end{array}$ | $\begin{array}{r} 3 \\ \times 2 \\ \hline 6 \end{array}$ | $\begin{array}{r} 5 \\ \times 9 \\ \hline 45 \end{array}$ | $\begin{array}{r} 7 \\ \times 2 \\ \hline 14 \end{array}$ | $\begin{array}{r} 6 \\ \times 2 \\ \hline 12 \end{array}$ | $\begin{array}{r} 5 \\ \times 2 \\ \hline 10 \end{array}$ | $\begin{array}{r} 5 \\ \times 4 \\ \hline 20 \end{array}$ | $\begin{array}{r} 7 \\ \times 5 \\ \hline 35 \end{array}$ | $\begin{array}{r} 6 \\ \times 6 \\ \hline 36 \end{array}$ |

Homework Packet 5 - Answer Key

Unit 10

Answer Key

Section 10-1

1. 9 2. $\frac{3}{16}$ 3. 9 4. 155 5. D
6. 3 7. $\frac{2}{3}$ 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. $\frac{1}{4}$ 12. 10

Answers and Explanations

Section 10-1

1. 9

$$\begin{aligned} & (-a^2b^3)(2ab^2)(-3b) \\ & = (-1)(2)(-3)a^2ab^3b^2b \\ & = 6a^3b^6 = ka^mb^n \end{aligned}$$

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

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

$$\left(\frac{2}{3}a^2b\right)^2\left(\frac{4}{3}ab\right)^{-3}$$

$$\begin{aligned} & \left(\frac{2}{3}a^2b\right)^2 \\ & = \frac{\left(\frac{2}{3}a^2b\right)^2}{\left(\frac{4}{3}ab\right)^3} \end{aligned} \quad a^{-n} = \frac{1}{a^n}$$

$$\begin{aligned} & \frac{\frac{4}{9}a^4b^2}{\frac{64}{27}a^3b^3} \\ & = \frac{4}{9} \cdot \frac{27}{64} \cdot \frac{a}{b} = \frac{3}{16} \cdot \frac{a}{b} \end{aligned}$$

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

3. 9

$$\begin{aligned} & \frac{(x)^3(-y)^2z^{-2}}{(x)^{-2}y^3z} = \frac{x^3y^2(x)^2}{y^3zz^2} \quad a^{-n} = \frac{1}{a^n} \text{ and } \frac{1}{a^{-n}} = a^n \\ & = \frac{x^5y^2}{y^3z^3} = \frac{x^5}{yz^3} = \frac{x^m}{y^n z^p} \end{aligned}$$

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

4. 155

$$\begin{aligned} & 2^x + 2^{2x} + 2^{3x} \\ & = 2^x + (2^x)^2 + (2^x)^3 \quad (a^m)^n = a^{m \cdot n} \\ & = (5) + (5)^2 + (5)^3 \quad 2^x = 5 \\ & = 155 \end{aligned}$$

5. D

$$\begin{aligned} & (3^x + 3^x + 3^x) \cdot 3^x \\ & = (3 \cdot 3^x) \cdot 3^x \\ & = (3^{1+x}) \cdot 3^x \quad a^m a^n = a^{m+n} \\ & = 3^{1+2x} \quad a^m a^n = a^{m+n} \end{aligned}$$

6. 3

$$\begin{aligned} & \frac{(6xy^2)(2xy)^2}{8x^2y^2} \\ & = \frac{(6xy^2)(4x^2y^2)}{8x^2y^2} \\ & = \frac{24x^3y^4}{8x^2y^2} = 3xy^2 \end{aligned}$$

If the expression above is written in the form

$$ax^my^n, \quad a = 3, \quad m = 1, \text{ and } n = 2.$$

Therefore, $m + n = 1 + 2 = 3$.

Homework Packet 5 - Answer Key

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

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

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

$$\frac{24\cancel{0} \times 6,000}{80,00\cancel{0} \times 900,000} \\ = \frac{24 \times 6}{8,000 \times 900} \\ = \frac{144}{72 \times 10^5} = \frac{2}{10^5} \\ = \frac{2}{10 \times 10^4} = \frac{1}{5 \times 10^4}$$

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

$$(-m^2n - n^2 + 3mn^2) - (m^2n - n^2 + mn^2) \\ = -m^2n - \cancel{n^2} + 3mn^2 - m^2n + \cancel{n^2} - mn^2 \\ = -2m^2n + 2mn^2$$

3. B

$$(2x^2 - 3x + 1) - (-2x^2 - 3x + 2) \\ = 2x^2 - \cancel{3x} + 1 + 2x^2 + \cancel{3x} - 2 \\ = 4x^2 - 1$$

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

| | | |
|-------|---|--------------------------------|
| $x-1$ | $\overline{) \begin{array}{r} x^2 + 3 \\ x^3 - x^2 + 3x - 3 \\ \underline{x^3 - x^2} \\ 0 \end{array}}$ | Quotient |
| | $\underline{3x-3}$ | Dividend |
| | $\underline{3x-3}$ | $x^2 \times (x-1) = x^3 - x^2$ |
| | 0 | Result of subtraction |
| | $\underline{3x-3}$ | |
| | 0 | $3 \times (x-1) = 3x-3$ |
| | | Result of subtraction |

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

5. 2

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

Multiply each side of the equation by $ax - 1$.

$$(ax-1)[14x^2 + 9x - 20] \div (ax-1) \\ = (ax-1)\left[7x + 8 + \frac{-12}{ax-1}\right] \\ \Rightarrow 14x^2 + 9x - 20 = (ax-1)(7x+8) + (-12) \\ \Rightarrow 14x^2 + 9x - 20 = 7ax^2 + (8a-7)x - 20$$

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

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

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

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

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

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

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

$$\begin{aligned}(x+3)(x-5) &= x^2 - 5x + 3x - 15 \\ &= x^2 - 2x - 15\end{aligned}$$

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

$$\begin{aligned}(2-5x)(5x+2) \\ &= (2)(5x) + (2)(2) - (5x)(5x) - (5x)(2) \\ &= 10x + 4 - 25x^2 - 10x \\ &= 4 - 25x^2\end{aligned}$$

3. D

$$\begin{aligned}4x^2 - 12xy + 9y^2 \\ &= (2x)^2 - 2(2x)(3y) + (3y)^2 \\ &= (2x - 3y)^2\end{aligned}$$

4. D

$$\begin{aligned}(x+y)(x-y)(x^2+y^2) \\ &= (x^2-y^2)(x^2+y^2) \quad (x+y)(x-y) = x^2-y^2 \\ &= x^2x^2 + \cancel{x^2y^2} - \cancel{y^2x^2} - y^2y^2 \\ &= x^4 - y^4\end{aligned}$$

5. A

$$\begin{aligned}\frac{3^{(a-b)} \cdot 3^{(a+b)}}{3^{2a+1}} \\ &= 3^{(a-b)+(a+b)-(2a+1)} \quad a^m a^n = a^{m+n} \text{ and } \frac{a^m}{a^n} = a^{m-n} \\ &= 3^{-1} = \frac{1}{3}\end{aligned}$$

6. C

$$\begin{aligned}\frac{2^{(a-1)(a+1)}}{2^{(a-2)(a+2)}} \\ &= \frac{2^{(a^2-1)}}{2^{(a^2-4)}} \quad \text{FOIL} \\ &= 2^{(a^2-1)-(a^2-4)} \quad \frac{a^m}{a^n} = a^{m-n} \\ &= 2^3 = 8\end{aligned}$$

Section 10-4

1. B

$$\begin{aligned}42x^2y^2 + 63xy^3 \\ &= 21xy^2(2x+3y) \quad \text{GCF is } 21xy^2.\end{aligned}$$

2. A

$$\begin{aligned}12x^2y - 18xy^2z \\ &= 6xy(2x-3yz) \quad \text{GCF is } 6xy.\end{aligned}$$

3. D

$$\begin{aligned}5a^2b - 10abc + 5bc^2 \\ &= 5b(a^2 - 2ac + c^2) \quad \text{GCF is } 5b. \\ &= 5b(a-c)^2 \quad (a-c)^2 = a^2 - 2ac + c^2\end{aligned}$$

4. 9

$$\begin{aligned}12^3 &= 2^x \cdot 3^y \\ (2^2 \cdot 3)^3 &= 2^x \cdot 3^y & 12 &= 2^2 \cdot 3 \\ 2^6 \cdot 3^3 &= 2^x \cdot 3^y & (2^2)^3 &= 2^6\end{aligned}$$

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

Therefore, $x + y = 6 + 3 = 9$.

5. 8

$$\begin{aligned}2 \times 5^9 - k \times 5^8 &= 2 \times 5^8 \\ 2 \times 5 \cdot 5^8 - k \times 5^8 &= 2 \times 5^8 & 5^9 &= 5 \cdot 5^8 \\ 10 \cdot 5^8 - k \times 5^8 &= 2 \times 5^8 & \text{Simplify.} \\ (10-k)5^8 &= 2 \times 5^8 & \text{Factor.}\end{aligned}$$

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

6. 143

$$\begin{aligned}12^{99} - 12^{97} &= 12^{97} \times n \\ 12^2 \times 12^{97} - 12^{97} &= 12^{97} \times n & 12^{99} &= 12^2 \times 12^{97} \\ 12^{97}(12^2 - 1) &= 12^{97} \times n & \text{Factor.}\end{aligned}$$

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

Section 10-5

1. B

$$\begin{aligned}1 + 2x - x(1+2x) \\ &= 1(1+2x) - x(1+2x) \\ &= (1+2x)(1-x) \quad \text{GCF is } 1+2x.\end{aligned}$$

Homework Packet 5 - Answer Key

2. C

$$rx + sx = 3$$

$$x(r + s) = 3 \quad \text{Factor.}$$

$$x\left(\frac{1}{3}\right) = 3 \quad \text{Substitute } \frac{1}{3} \text{ for } r + s.$$

$$x = 9$$

3. D

$$2ax - 6a - 3x + 9$$

$$= (2ax - 6a) - (3x - 9) \quad \text{Group terms with common factors. } -3x + 9 = -(3x - 9)$$

$$= 2a(x - 3) - 3(x - 3) \quad \text{Factor the GCF.}$$

$$= (x - 3)(2a - 3) \quad \text{Distributive Property}$$

4. A

$$mn - 5n - m + 5$$

$$= (mn - 5n) - (m - 5) \quad \text{Group terms with common factors. } -m + 5 = -(m - 5)$$

$$= n(m - 5) - (m - 5) \quad \text{Factor the GCF.}$$

$$= (m - 5)(n - 1) \quad \text{Distributive Property}$$

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

$$\frac{2^{(a+b)^2}}{2^{(a-b)^2}}$$

$$= 2^{(a+b)^2 - (a-b)^2} \quad \frac{a^m}{a^n} = a^{m-n}$$

$$= 2^{(a^2 + 2ab + b^2) - (a^2 - 2ab + b^2)}$$

$$= 2^{4ab}$$

$$= (2^4)^{ab} \quad (a^m)^n = a^{m \cdot n}$$

$$= (16)^{ab}$$

2. B

$$2m^2n - mnp - 6m + 3p$$

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

$$= mn(2m - p) - 3(2m - p)$$

$$= (2m - p)(mn - 3)$$

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

$$\left(x + \frac{1}{x}\right)^2 = 9$$

$$x^2 + 2x \cdot \frac{1}{x} + \left(\frac{1}{x}\right)^2 = 9$$

$$x^2 + 2 + \frac{1}{x^2} = 9$$

$$x^2 + \frac{1}{x^2} = 7$$

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

$$= x^2 - 2 + \frac{1}{x^2} = x^2 + \frac{1}{x^2} - 2$$

$$= 7 - 2 = 5 \quad \text{Substitute 7 for } x^2 + \frac{1}{x^2} = 7.$$

5. D

$$8^{\frac{4}{3}} \cdot 8^{-\frac{8}{3}} = 8^{\frac{4}{3} - \frac{8}{3}} = 8^{-\frac{4}{3}} = (2^3)^{-\frac{4}{3}}$$

$$= 2^{-4} = \frac{1}{2^4}$$

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

6. D

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

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

Homework Packet 5 - Answer Key

7. A

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

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

$$\frac{x^{12}}{x^9} = \frac{32n^4}{x^9}$$

Divide each side by x^9 .

$$x^3 = \frac{32n^4}{x^9}$$

Simplify.

$$x^3 = \frac{32n^4}{4n}$$

Substitute $4n$ for x^9 .

$$x^3 = 8n^3$$

Simplify.

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

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

Therefore, $x = 2n$.

8. D

$$\begin{aligned} & (3x^3 - 2x^2 - 7) - (-2x^2 + 6x + 2) \\ &= 3x^3 - 2x^2 - 7 + 2x^2 - 6x - 2 \\ &= 3x^3 - 6x - 9 \\ &= 3(x^3 - 2x - 3) \end{aligned}$$

9. C

$$\begin{aligned} & 9x - (x - 3)(x + 12) \\ &= 9x - (x^2 + 9x - 36) \\ &= 9x - x^2 - 9x + 36 \\ &= 36 - x^2 \\ &= (6 - x)(6 + x) \end{aligned}$$

10. 5

$$\begin{aligned} & \frac{(2.1 \times 10^{-3})(2 \times 10^5)}{7 \times 10^{-4}} \\ &= \frac{4.2 \times 10^2}{7 \times 10^{-4}} \\ &= \frac{4.2 \times 10^2 \times 10^4}{7} \quad \frac{1}{a^{-n}} = a^n \\ &= 0.6 \times 10^2 \times 10^4 \\ &= 0.6 \times 10^6 \\ &= 6 \times 10^5 \end{aligned}$$

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

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

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

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

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

$$a = 2^4$$

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

12. 10

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

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

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

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

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

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

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