- Page 335 = #11 – 28, 79 – 88, 94 – 112, 127 – 144
- Page 403 = #1 – 3, 5 – 10

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Problem 11
-93 < 17 … anything negative is less than anything positive

Problem 12
-2 > -200 … small negative numbers are GREATER than large negative numbers

Problem 13
| -860 | = 860

Problem 14
| 53 | = 53

Problem 15
| 0 | = 0

Problem 16
8 + (-11) = -3

Problem 17
-6 + (-5) = -11

Problem 18
-7 – 8 = -15

Problem 19
-7 – (-8) = -7 + 8 = 1

Problem 20
(-9)(-11) = 90 … the negatives cancel

Problem 21
5(-3) = -15

Problem 22
-36 ÷ -4 = 9 … the negatives cancel

Problem 23
20 ÷ -5 = -4

Problem 24
-40 ÷ 5 • 2 = -8 • 2 = -16

Problem 25
-6 + (-2) • 5 = -6 + -10 = -16

Problem 26
6 – 4(-3 + 2) = 6 – 4(-1) = 6 + 4 = 10

Problem 27
$28 \div (2 - 4^2) = 28 \div (2 - 16) = 28 \div (-14) = -2$

Problem 28

$36 - 24 \div 4 \bullet 3 - 1 = 36 - 6 \bullet 3 - 1 = 36 - 18 - 1 = 18 - 1 = 17$

Problem 79

a. Natural Numbers = $\sqrt{81}$, which is 9 … counting numbers
b. Whole Numbers = 0 and $\sqrt{81}$ … natural numbers and also zero
c. Integers = -17, 0, and $\sqrt{81}$ … whole numbers and their opposites
d. Rational Numbers = -17, 0, $\sqrt{81}$, $-{}^{9}/_{13}$, and 0.75 … can be written as fraction of integers
e. Irrational Numbers = $\sqrt{2}$ and π … weird numbers; can't be written as fraction of integers
f. -17, $-{}^{9}/_{13}$, 0, 0.75, $\sqrt{2}$, π, and $\sqrt{81}$ … all numbers you know

Problem 80

-2 is an integer that isn't a natural number
… could be any negative number that isn't a fraction; could also be 0

Problem 81

${}^{3}/_{5}$ is a rational number that is not an integer
… could be pretty much any easy fraction or decimal

Problem 82

$\sqrt{2}$ is a real number that is not a rational number
… could be any square root you don't know the answer to, a defined number like π, or a decimal with a weird pattern like .36336633366633336666…

Problem 83

Commutative … You can add in any order (forwards or backwards)

Problem 84

Associative … You can move parentheses when you multiply

Problem 85

Distributive … Parentheses on one side of the equation, but not the other.

Problem 86

Commutative … The (6•9) moved from the beginning to the end (changed order)

Problem 87

Commutative … The order of multiplication changed

Problem 88

Commutative … The order of addition changed

Problem 94

$6 \bullet 6^2 = 6^3$ or 216 … add exponents when you multiply

Problem 95

$2^3 \bullet 2^3 = 2^6 = 64$ … add exponents when you multiply

Problem 96

$(2^2)^2 = 2^4 = 16$ … multiply exponents when you take parentheses to a power

Problem 97

$(3^3)^2 = 3^6 = 729$ … multiply exponents when you take parentheses to a power

Problem 98
$5^6 \div 5^4 = 5^2 = 25$ … subtract exponents when you divide

Problem 99
$7^0 = 1$ … anything to the zero power equals one

Problem 100
$(-7)^0 = 1$ … anything to the zero power equals one

Problem 101
$6^{-3} = \frac{1}{6^3} = \frac{1}{216}$ … negative exponent means reciprocal

Problem 102
$2^{-4} = \frac{1}{2^4} = \frac{1}{16}$ … negative exponent means reciprocal

Problem 103
$\frac{7^4}{7^6} = 7^{-2} = \frac{1}{7^2} = \frac{1}{49}$ … subtract exponents when you divide; negative exponent means reciprocal

Problem 104
$3^5 \bullet 3^{-2} = 3^3 = 27$ … add exponents when you multiply

Problem 105
$4.6 \times 10^2 = 460$ … 2 places after the 4

Problem 106
$3.74 \times 10^4 = 37{,}400$ … 4 places after the 3

Problem 107
$2.55 \times 10^{-3} = .00255$ … the 2 is the 3rd place after the decimal point

Problem 108
$7.45 \times 10^{-5} = .0000745$ … the 7 is the 5th place after the decimal point

Problem 109
$7520 = 7.52 \times 10^3$ … 3 places after the 7

Problem 110
$3{,}560{,}000 = 3.59 \times 10^6$ … 6 places after the 3

Problem 111
$0.00725 = 7.25 \times 10^{-3}$ … the 7 is the 3rd place after the decimal point

Problem 112
$0.000000409 = 4.09 \times 10^{-7}$ … the 4 is the 7th place after the decimal point

Problem 127

- $a_1 = 7$ … given
- $a_2 = 11$ … 7 + 4
- $a_3 = 15$ … 11 + 4
- $a_4 = 19$ … 15 + 4
- $a_5 = 23$ … 19 + 4
- $a_6 = 27$ … 23 + 4

Problem 128

- $a_1 = -4$ … given
- $a_2 = -9$ … -4 + -5
- $a_3 = -14$ … continue subtracting 5 (or adding -5)
- $a_4 = -19$
- $a_5 = -24$
- $a_6 = -29$

Problem 129

- $a_1 = {}^3/_2$ … given
- $a_2 = 1$ … ${}^3/_2 - ½$
- $a_3 = ½$ … continue subtracting ½ (or adding –½)
- $a_4 = 0$
- $a_5 = -½$
- $a_6 = -1$

Problem 130
The formula would be $a_n = 5 + 3(n - 1)$
So $a_6 = 5 + 3(6 - 1)$ or $5 + 3(5) = 5 + 15 = 20$

Problem 131
The formula would be $a_n = -8 - 2(n - 1)$
So $a_{12} = -8 - 2(12 - 1) = -8 - 2(11) = -8 - 22 = -30$

Problem 132
The formula would be $a_n = 14 - 4(n - 1)$
So $a_{14} = 14 - 4(14 - 1) = 14 - 4(13) = 14 - 52 = -38$

Problem 133
-7, -3, 1, 5, …
The first term is -7, and you're adding 4 each time
So $a_n = -7 + 4(n - 1)$
This means $a_{20} = -7 + 4(20 - 1) = -7 + 4(19) = -7 + 76 = 69$

Problem 134
The formula is $a_n = 200 - 20(n - 1)$
This means $a_{20} = 200 - 20(20 - 1) = 200 - 20(19) = 200 - 380 = -180$

Problem 135

- $a_1 = 3$ … given
- $a_2 = 6$ … 3 • 2
- $a_3 = 12$ … 6 • 2
- $a_4 = 24$ … 12 • 2
- $a_5 = 48$ … 24 • 2
- $a_6 = 96$ … 48 • 2

Problem 136

- $a_1 = ½$ … given
- $a_2 = ¼$ … ½ • ½
- $a_3 = {}^1/_8$ … Keep multiplying by ½
- $a_4 = {}^1/_{16}$
- $a_5 = {}^1/_{32}$
- $a_6 = {}^1/_{64}$

Problem 137

- $a_1 = 16$ … given
- $a_2 = 8$ … 16 • ½
- $a_3 = 4$ … Keep multiplying by ½
- $a_4 = 2$
- $a_5 = 1$
- $a_6 = ½$

Problem 138
The formula would be $a_n = 2 \bullet 3^{n-1}$
So $a_4 = 2 \bullet 3^{4-1} = 2 \bullet 3^3 = 2 \bullet 27 = 54$

Problem 139
The formula would be $a_n = 16 \bullet (½)^{n-1}$
So $a_6 = 16 \bullet (½)^{6-1} = 16 \bullet (½)^5 = 16 \bullet {}^1/_{32} = ½$

Problem 140
The formula would be $a_n = -3 \bullet 2^{n-1}$
So $a_5 = -3 \bullet 2^{5-1} = -3 \bullet 2^4 = -3 \bullet 16 = -48$

Problem 141
1, 2, 4, 8, …
We know $a_1 = 1$ and $r = 2$
So the formula is $a_n = 1 \bullet 2^{n-1}$
So $a_8 = 1 \bullet 2^{8-1} = 1 \bullet 2^7 = 1 \bullet 128 = 128$

Problem 142
100, 10, 1, ${}^1/_{10}$ …
We know $a_1 = 100$ and $r = {}^1/_{10}$ or .1
So the formula is $a_n = 100 \bullet (.1)^{n-1}$
So $a_8 = 100 \bullet (.1)^{8-1} = 100 \bullet (.1)^7 = 100 \bullet .0000001 = .00001$ or ${}^1/_{100,000}$

Problem 143
4, 9, 14, 19, … is arithmetic because you're adding 5 each time
The next two terms are 24 and 29 (keep adding 5)

Problem 144
2, 6, 18, 54, … is geometric because you're multiplying by 3 each time
The next two terms are 162 and 486 (keep multiplying by 3)

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Problem 1
$6 \bullet 4 + 9 = 24 + 9 = 33$

Problem 2
$7 \bullet (-2)^2 + 4(-2) – 5 = 7 \bullet 4 + 4(-2) – 5 = 28 – 8 – 5 = 20 – 5 = 15$

Problem 3

$6 + 2(5 - 8)^3 = 6 + 2(-3)^3 = 6 + 2 \bullet (-27) = 6 + (-54) = -48$

Problem 5

$5(2x - 3) + 7x = 10x - 15 + 7x = 17x - 15$

Problem 6

$3(4y - 5) - (7y - 2) = 3(4y - 5) - 1(7y - 2) = 12y - 15 - 7y + 2 = 5y - 13$

Problem 7

$2(x^2 + 5x) + 3(4x^2 - 3x) = 2x^2 + 10x + 12x^2 - 9x = 14x^2 + 1x$ or $14x^2 + x$

Problem 8

$4x + 9 = 33$

Subtract 9 on each side

$4x = 24$

Divide by 4 on each side

$x = 6$

Problem 9

$5x - 3 = x + 5$

Subtract x on each side

$4x - 3 = 5$

Add 3 on each side

$4x = 8$

Divide by 4 on each side

$x = 2$

Problem 10

$3(x + 4) = 5x - 12$

Distribute to remove the parentheses

$3x + 12 = 5x - 12$

Subtract 3x on each side

$12 = 2x - 12$

Add 12 on each side

$24 = 2x$

Divide by 2 on each side

$12 = x$