Ch. 4 Practice for Test

Multiple Choice
Identify the choice that best completes the statement or answers the question.

D 1. Emma works part-time at a bakery shop in Saskatoon. Today, the baker made 50 apple pies, 70 cherry pies, and 20 bumbleberry pies. Which conjecture is Emma most likely to make from this evidence?
   a. People are more likely to buy bumbleberry pie than any other pie.
   b. People are more likely to buy apple pie than any other pie.
   c. Each type of pie will sell equally as well as the others.
   d. People are more likely to buy cherry pie than any other pie.

B 2. Debbie gathered the following evidence.

\[
\begin{align*}
4(33) &= 132 \\
5(33) &= 165 \\
6(33) &= 198 \\
4 \times 3 &= 12 \\
5 \times 3 &= 15 \\
6 \times 3 &= 18 \\
\end{align*}
\]

Which conjecture, if any, is Debbie most likely to make from this evidence?
   a. When you multiply a two-digit number by 33, the first and last digits of the product form a number that is twice the original number.
   b. When you multiply a one-digit number by 33, the first and last digits of the product form a number that is three times the original number.
   c. When you multiply a one-digit number by 33, the sum of the digits in the product is equal to the original number.
   d. None of the above conjectures can be made from this evidence.

A 3. Which conjecture, if any, could you make about the product of an odd integer and an even integer?

\[
\begin{align*}
\text{odd} \times \text{even} &= \text{even} \\
5 \times 4 &= 20 \\
3 \times 2 &= 6 \\
\end{align*}
\]

a. The product will be an even integer.
   b. The product will be an odd integer.
   c. The product will be negative.
   d. It is not possible to make a conjecture.

D 4. Henry made the following conjecture:

The square of a number is always greater than the number.

Is the following equation a counterexample to this conjecture? Explain.

\[
0.4^2 = 0.16 \\
\]

a. Yes, it is a counterexample, because 0.4 is less than 0.16.
   b. No, it is not a counterexample, because 0.16 is less than 0.4.
   c. No, it is not a counterexample, because 0.4 is less than 0.16.
   d. Yes, it is a counterexample, because 0.16 is less than 0.4.
5. All birds have backbones. Birds are the only animals that have feathers. Rosie is not a bird. What can be deduced about Rosie?
   
   1. Rosie has a backbone. ✗
   2. Rosie does not have feathers. ✓
   
   a. Neither Choice 1 nor Choice 2
   b. Choice 1 only
   c. Choice 1 and Choice 2
   d. Choice 2 only

6. All ostriches are birds. All birds have backbones. Birds are the only animals that have feathers. Floradora is an ostrich. What can be deduced about Floradora?
   
   1. Floradora has a backbone. ✓
   2. Floradora has feathers.
   
   a. Neither Choice 1 nor Choice 2
   b. Choice 1 and Choice 2
   c. Choice 2 only
   d. Choice 1 only

7. Which of the following choices, if any, uses inductive reasoning to show that the sum of two odd integers is even? ⬤ use #1's
   
   a. \((2x + 1) + (2y + 1) = 2(x + y + 1)\)
   b. \(2x + 2y + 1 = 2(x + y) + 1\)
   c. None of the above choices
   d. \(3 + 5 = 8\) and \(7 + 5 = 12\)

8. Which of the following choices, if any, uses deductive reasoning to show that the sum of three even integers is even? ⬤ letters
   
   a. \(x + y + z = 2(x + y + z)\)
   b. \(2x + 2y + 2z = 2(x + y + z)\)
   c. \(2 + 4 + 6 = 12\) and \(4 + 6 + 8 = 18\)
   d. None of the above choices

9. Which of the following choices, if any, uses deductive reasoning to show that the sum of two odd integers is even? ⬤
   
   a. \(3 + 5 = 8\) and \(7 + 5 = 12\)
   b. \((2x + 1) + (2y + 1) = 2(x + y + 1)\)
   c. \(2x + 2y + 1 = 2(x + y) + 1\)
   d. None of the above choices
10. Which of the following choices, if any, uses inductive reasoning to show that the sum of two even numbers and one odd number is an odd number?

a. \(6 + 6 + 7 = 19\) and \(4 + 6 + 3 = 13\)

b. \((2x + 1) + (2y + 1) + (2z + 1) = 2(x + y + z) + 3\)

c. \(2x + 2y + (2z + 1) = 2(x + y + z) + 1\)

d. None of the above choices

11. Which type of reasoning does the following statement demonstrate?

Every multiple of 9 has a factor of 3.
27 is a multiple of 9.
Therefore, 27 has a factor of 3.

a. inductive reasoning

b. deductive reasoning

c. neither inductive nor deductive reasoning

12. Which type of reasoning does the following statement demonstrate?

Over the past few years, a tree has produced APPLES each year.
Therefore, the tree will produce apples this year.

a. inductive reasoning

b. deductive reasoning

c. neither inductive nor deductive reasoning

13. Determine the unknown term in this pattern.

\[1, 1, 2, 3, 5, \underline{6}, 13, 21\]

3 + 5 = 8

a. 6

b. 7

c. 8

d. 9

14. Determine the unknown term in this pattern.

\[3, 6, 12, 24, \underline{48}, 96, 192\]

\[\times 2, \times 2, \times 2, \times 3\]

a. 48

b. 36

c. 102

d. 96

15. Determine the unknown term in this pattern.

\[4, 8, 12, \underline{16}, 20, 24, 28\]

\[\times 4, \times 4, \times 4\]

a. 16

b. 18

c. 14

d. 21

16. Determine the unknown term in this pattern.

\[17, 14, 8, -5, -3, 8, 5, 2, -1\]

a. 14

b. 11

c. 13

d. 12
17. Choose the next figure in this sequence.

```
   △  3 sides
   □  4 sides
   5 sides
```

```
   a.  b.  c.  d.
```

18. Choose the next figure in this sequence.

```
   □   □   △   □   □   △
   1   1   1   1   1   1
   4   4   4   4   4   4
   2   2   2   2   2   2
```

```
   a.  b.  c.  d.
```

19. Which number should appear in the centre of Figure 4?

```
   1  2
   4  3
```

```
   4  6
   2  2
```

```
   3  5
   6  5
```

```
   2  3
```

```
   2\times3\times2\times2 = 24
```

```
a. 41  b. 24  c. 36  d. 11
```
20. Which number should go in the grey square in this Sudoku puzzle?

```
A
1 5 3 2 6
7 3 8 4
9
1
7 5 6 8
9
3
4 2 7 1
6 2 5 4
9

a. 2  b. 8  c. 4  d. 6
```

Short Answer

21. Which conjecture, if any, could you make about the sum of two even integers and one odd integer?

The sum will be **odd**

\[2 + 4 + 7 = 13\]
\[6 + 2 + 5 = 13\] (odd)

22. Determine the unknown term in this pattern.

\[4, 7, 5, 8, \boxed{9}, 7, 10, 8\]

23. Determine the unknown term in this pattern.

\[2, 2, 4, 6, \boxed{10}, 16, 26, 42\]

24. What statement can you determine from these equations? (Use words such as ‘even’ and ‘odd’)

\[5 + 7 = 12\]
\[3 + 1 = 4\]
\[19 + 5 = 24\] (odd + odd = even)

25. What can you say about the product of two odd integers and one even integer?

Product is even

\[3 \times 1 \times 2 = 6\] (even)
\[5 \times 3 \times 4 = 60\] (even)
26. Does the following statement demonstrate inductive reasoning or deductive reasoning? **deductive**

All reptiles have scales. Crocodiles are reptiles. Therefore, crocodiles have scales.

27. Does the following statement demonstrate inductive reasoning or deductive reasoning? **inductive**

For the past three years, a bush has produced roses. Therefore, the bush will produce roses this year.

28. Determine the \(n^{th}\) term. (need a formula)

\[
\begin{array}{c|c|c}
\text{n} & 1 & 2 \\
\hline
\text{4} & 4 & 7 \\
\text{7} & 10 & 13 \\
\text{3} & 10 & 13 \\
\text{4} & 13 & 13
\end{array}
\]

\[
3n + 1
\]

29. Do the following number trick with different numbers. What conjecture can you make?

Choose a number. **\( \circ \)**

Add 3.

Add 4.

Choose a number. **\( \circ \)**

Add 3.

You get same number back that you started with.

\[
\begin{align*}
\text{Choose a number.} & \quad \text{**\( \circ \)**} \\
\text{Add 3.} & \quad 5 + 3 = 8 \\
\text{Multiply by 2.} & \quad 8 \times 2 = 16 \\
\text{Add 4.} & \quad 16 + 4 = 20 \\
\text{Divide by 2.} & \quad 20 \div 2 = 10 \\
\text{Subtract 5.} & \quad 10 - 5 = 5
\end{align*}
\]

(Show work and calculations)

30. a) Prove that 2 odd numbers plus an even number is even.

\[
(2x+1) + (2x+1) + 2x = 6x + 2
\]

\[2(3x+1) \rightarrow 2 \text{ times anything is even}\]

b) Prove that an even number plus an odd number is odd

\[
(2x) + (2x+1) = 4x + 1
\]

\[\text{even} + 1 = \text{odd}\]
31. Match each person with their pet.

**People:** Ryan, Angela, Paul, Anika

**Pets:** fish, dog, bird, cat

1. Anika’s pet does not have feathers
2. Ryan’s pet does not swim every day.
3. The dog belongs to a boy.
4. Angela’s pet has fur.
5. Ryan’s pet does not bark.

\[
\begin{array}{cccc}
\text{Ryan} & \text{Angela} & \text{Paul} & \text{Anika} \\
\hline
\text{fish} & \times & \times & \times \checkmark \\
\text{dog} & \times & \times & \checkmark \times \\
\text{bird} & \checkmark & \times & \times \times \\
\text{cat} & \times & \checkmark & \times \times \\
\end{array}
\]

**Problem**

32. Blake discovered a number trick in a book he was reading:

Choose a number. 
Subtract 2.
Multiply by 3.
Add 9.
Multiply by 3.
Subtract 9.
Divide by 9.

\[
\begin{align*}
  \text{x} - 2 & \\
  3(\text{x} - 2) & = 3\text{x} - 6 \\
  3\text{x} - 6 + 9 & = 3\text{x} + 3 \\
  3(3\text{x} + 3) & = 9\text{x} + 9 \\
  9\text{x} + 9 - 9 & = 9\text{x} \\
  \div 9 & = \text{x}
\end{align*}
\]

Prove it. Use x as your number. PROVE, do not give examples.

Prove you get x back again.

\[ \text{you get x back again} \]

33. How many sticks in 160th pattern?

\[
\begin{align*}
  n & \\
  1 & 2 \rightarrow 3 \rightarrow 5 \rightarrow 7 \\
  2n+1 & \\
  320 + 1 & = 321
\end{align*}
\]
use #1 - 6

use #1's 1 - 9