1.

Type	Size (in bits)	Range
byte	8	-128 to 127
short	16	-32,768 to 32,767
int	32	-2^{31} to $2^{31}-1$
long	64	-2^{63} to $2^{63}-1$
float	32	1.4e-045 to 3.4e+038
double	64	4.9e-324 to 1.8e+308
char	16	0 to 65,535
boolean	1	true or false

2. A. Legal (data range -128 to 127)
C. Legal (data range -128 to 127)
D. Legal (data range -128 to 127)
E. Legal (data range -32 768 to 32 767)
G. Legal (data range -32 768 to 32 767)
H. Legal (data range -32 768 to 32 767)

3. A. Legal (char variable can added one letter)
B. Legal (char variable can added one number)
D. Legal (Boolean variable can added true)
F. Legal (Boolean variable can added false)

4.

No	Decimal	Binary	Octal	Hexadecimal
A.	**10**	1010	12	A
B.	**16**	10000	20	10
C.	**128**	10000000	200	80
D.	**255**	11111111	377	FF
E.	**32767**	111111111111111	77777	7FFF
F.	**1**	1	1	1
G.	**0**	0	0	0
H.	**26**	11010	32	1A
I .	**31**	11111	37	1F

5. A. 11110110
B. 10011100
C. 11000000
D. 11111111
E. 11111101
F. 10000000
G. 00000000
H. 10000000
I . 11100000

6. A. Casting: Data type is converted into another data type by a programmer using casting operator.

```
import java.util.*;
class Example{
    public static void main(String args[]){
        short s=10;
        byte b;
        //b=s; //Illegal, incompatible typs
        b=(byte)s; //casting, assign last 8bite to b
        System.out.println(b+" "+s); //10 10
    }
}
```

Conversion: A data type is converted into another data type by a compiler

```
import java.util.*;
class Example{
    public static void main(String args[]){
        byte b=10;
        short s;
        s=b; //Legal, Conversion
        System.out.println(b+" "+s); //10 10


    }
}
```

B. Narrow Conversion: long range data type converted into short range data type by a compiler.

```
class Example{
    public static void main(String[] args){
        int age=20;
        long a=10;
        age+=a; //Narrow conversion
        System.out.println(age);

    }
}
```

Narrow Casting: Long range data type converted into short range data type by a programmer using casting operator

```
class Example{
    public static void main(String[] args){
        short s=100;
        byte b;
        b=(byte)s; //narrow casting
        System.out.println(b+" "+s);
    }
}
```

C. Wider Conversion: Short range data type converted into long range data type by a compiler.

```
class Example{
    public static void main(String[] args){
        byte b=100;
        short s;
        s=b; //wider conversion
        System.out.println(s+" "+b);
    }
}
```

Wider Casting: Short range data type converted into long range data type by a programmer using casting operator

```
class Example{
    public static void main(String[] args){
        char ch='A';
        System.out.println(ch); //prints A
        System.out.println((int)ch); //prints 65-->wider casting
    }
}
```

7. A
E

8.

```
class Example{
public static void main(String args[]){
byte b1=10,b2=20,b3;
b3=b1+b2; //Line 1
b3=b1+1; //Line 2
b3=b1*2; //Line 3
short s1=10,s2=20,s3;
s3=s1+s2; //Line 4
s3=s1+1; //Line 5
s3=s*1; //Line 6
int x1=10,x2=20,x3;
x3=x1+x2; //Line 7
x3=b1+b2; //Line 8
x3=b1+1; //Line 9
x3=b1*2; //Line 10
x3=s1+s2; //Line 11
x3=s1+1; //Line 12
x3=s1*1; //Line 13
}
}
```

Adding two-byte variables or two short variables can be assigning an int variable only.

9. A C and E

10. A and B

11. B

12. A B and D

13. A B C D

14. 0 to 65535

15. A C and G

16. A. 3
B. -3
C. 3
D. -3
E. 3
F. -3
G. 3

17. Line 1
Line 2
Line 4

18. A D and E

19. A B C and D

20. A. 17
B. -10
C. -17
D. -3
E. 7
F. -3

21.

```
-100
100
-100
-200
400
0
```

22.

```
100101
104
104
```

23.

```
101 100
102 101
103 102
```

24.

```
101 101
102 102
103 103
```

25.

```
100
100
100
101
102
103
```

26. A. 3
B. 0
C. 10
D. 0.0
E. 1.0999999999999996

27. A. 30
B. -10
C. 31
D. 31
E. 33
F. 34
G. 38
H. 39

28. X = 12 - 4 * 2
X = 12 – 8
X = 4

X = (12 – 4)*2
X = 8 * 2
X = 16

X = 12 – (4*2)
X = 12 - 8
X = 4

29. A. X = 7%10/2*2
= 7/2*2
= 3*2
= 6

B. X = 7%(10/2)*2
= 7%5*2
= 2*2
= 4

C. X = 7%10/(2*2)
= 7%10/4
= 7/4
= 1

D. X = 7%(10/(2*2))
X = 7%(10/4)
X = 7%2
X = 1

E. X = 7%((10/2)*2)
X = 7%(5*2)
X = 7%10
X = 7

30. A. a=a+(a=6)
=100+(a=6)
=6

B. a=(a=6)+a
=6+6
=12

C. a=(a=6)+(a=5)
=6+5
=11

D. a=a*3+a
=11*3+11
=44

31. A. x=a++ + a
=10+11
=21

B. x=a + a++
=11+11
=22

C. x=++a + a
=13+13
=26

D. x=a + ++a
=13+14
=27

E. x=++a + ++a
=15+16
=31

F. x=a++ + a++
=16+17
=33

G. x=++a + a++
=19+19
=38

H. x=a++ + ++a
=20+22
=42

32.

```
303
306

404 102
```