

Functional Languages 2nd practice

9. Measure the distance between two points in the plane.

```
distance' (2, 5) (5, 9) == 5.0
distance' (-4, 3) (1, -9) == 13.0
```

1. Define a function which measures the distance between two integers on the number line.

```
distance 5 (-2) == 7
distance (-2) 5 == 7
distance 5 9 == 4
```

Hint: in Haskell, the absolute value function is `abs`.

2. Define the addition of fractions.

```
add (1, 2) (1, 2) == (2, 2)
add (4, 3) (6, 5) == (38, 15)
```

3. Define the multiplication of fractions.

```
mul (1, 2) (1, 2) == (1, 4)
mul (4, 3) (6, 5) == (24, 15)
```

4. Calculate the remainder and quotient of dividing an integer with another.

```
modDiv 10 5 == (0,2)
modDiv 11 5 == (1,2)
modDiv 7 7 == (0,1)
modDiv 7 8 == (7,0)
modDiv 7 1 == (0,7)
```

5. Solve quadratic equations. Lets assume the equations have two real solutions.

For example, solutions of $x^2 - 6x + 8$:

```
quadratic 1.0 (-6.0) 8.0 == (2.0, 4.0)
```

6. Check whether two dominos match.

```
matches (2, 4) (4, 6)
matches (4, 2) (4, 6)
matches (6, 2) (4, 6)
not (matches (2, 8) (4, 6))
```

7. Measure the length of a vector that starts in the origin (0,0).

```
len (3, 4) == 5.0
len (4, 3) == 5.0
len (5, 12) == 13.0
```

8. Stretch a vector with a constant factor.

```
stretch (2, 4) 2 == (4, 8)
stretch (1, 6) 3 == (3, 18)
```