Expression and Equations Level 3-Part 1

1. Simplify the following so that there are no complex numbers in the denominator:

$$\frac{-4+5i}{-7-2i}$$

2. Simplify the following so that there are no complex numbers in the denominator:

$$\frac{-6-5i}{-8-3i}$$

3. Simplify the following so that there are no complex numbers in the denominator:

$$\frac{5+7i}{-9+7i}$$

4. What is the radius of the circle with this equation:

$$y^2 + x^2 + 4x - 6y = -9$$

5. What is the radius of the circle with this equation:

$$y^2 + x^2 - 6x - 4y = 3$$

6. What is the radius of the circle with this equation:

$$y^2 + x^2 - 8x - 4y = -11$$

7. Simplify the following so that it is in the form $a + bi$ what is the value of a?

$$\frac{-9-5i}{8-7i}$$

8. Simplify the following so that it is in the form $a + bi$ what is the value of a?

$$\frac{8 - 3i}{4 + 9i}$$

9. Simplify the following so that it is in the form $a + bi$ what is the value of a?

$$\frac{3 + 2i}{9 - 7i}$$

10. What is the sum of $\left(\frac{1}{x-3}\right) + \left(\frac{1}{x-6}\right)$?

11. What is the sum of $\left(\frac{1}{x+5}\right) + \left(\frac{1}{x-3}\right)$?

12. What is the sum of $\left(\frac{1}{x+4}\right) + \left(\frac{1}{x+5}\right)$?

13. What is the sum of $\left(\frac{1}{x+7}\right) + \left(\frac{1}{x+7}\right)$?

14. If $(ax + 3)(bx - 3) = 10x^2 + bx - 9$ and a+b=7 what are the possible values of b?

15. If $(ax - 7)(bx + 5) = 12x^2 + bx - 35$ and a+b=8 what are the possible values of b?

16. If $(ax-2)(bx-3)=-6x^2+bx+6$ and a+b=-1 what are the possible values of b?
17. If $(ax+4)(bx-6)=20x^2+bx-24$ and a+b=-9 what are the possible values of b?
18. If $(ax-3)(bx+5)=10x^2+bx-15$ and a-b=-3 what are the possible values of b?
19. If $(ax-3)(bx-2)=-4x^2+bx+6$ and a-b=4 what are the possible values of b?
20. If $(ax+6)(bx+2)=-20x^2+bx+12$ and a-b=9 what are the possible values of b?

Answers

1	$\frac{18-43i}{53}$
2	$\frac{63+22i}{73}$
3	$\frac{4-98i}{130}$
4	$r=2$
5	$r=4$
6	$r=3$
7	$\frac{-37}{113}$
8	$\frac{5}{97}$
9	$\frac{13}{130}$
10	$\frac{2x-9}{x^2-9x+18}$
11	$\frac{2x+2}{x^2+2x-15}$
12	$\frac{2x+9}{x^2+9x+20}$
13	$\frac{2x+14}{x^2+14x+49}$
14	$b=9\ or\ b=-9$
15	$b=16\ or\ b=-32$
16	$b=0\ or\ b=5$
17	$b=14\ or\ b=4$
18	$b=-5\ or\ b=19$
19	$b=2\ or\ b=-2$
20	$b=-14\ or\ b=22$