Precalculus Name_____ ID: 1

Assignment

Date_____ Period____

Draw a vector diagram to find the resultant of each pair of vectors using the triangle method. Then state the magnitude and direction angle of the resultant.

1) $\mathbf{t} = \langle -12, 16 \rangle$ $\mathbf{u} = \langle 9, 12 \rangle$

2) $\mathbf{a} = \langle -18, 19 \rangle$ $\mathbf{b} = \langle 8, 15 \rangle$

3) $\mathbf{m} = \langle -12, -3 \rangle$ $\mathbf{n} = \langle 12, 16 \rangle$

4) $\mathbf{m} = \langle 8, -15 \rangle$ $\mathbf{n} = \langle -17, 2 \rangle$

5) $\mathbf{m} = \langle 8, 15 \rangle$ $\mathbf{n} = \langle 8, -15 \rangle$

6) $\mathbf{m} = \langle -8, 15 \rangle$ $\mathbf{n} = \langle 12, 16 \rangle$

7) $\mathbf{m} = \langle -8, 15 \rangle$ $\mathbf{n} = \langle 8, 15 \rangle$

8) $\mathbf{t} = \langle -17, -1 \rangle$ $\mathbf{u} = \langle 2, 9 \rangle$

9) $\mathbf{t} = \langle 10, -10 \rangle$ $\mathbf{u} = \langle 8, 15 \rangle$

10) $\mathbf{m} = \langle 11, 5 \rangle$ $\mathbf{n} = \langle 19, -7 \rangle$

11) $\mathbf{m} = \langle 9, -12 \rangle$ $\mathbf{n} = \langle -1, 11 \rangle$

12) $\mathbf{t} = \langle 13, -4 \rangle$ $\mathbf{u} = \langle 12, 16 \rangle$

13) $\mathbf{t} = \langle -9, 11 \rangle$ $\mathbf{u} = \langle 8, 15 \rangle$

14) $\mathbf{m} = \langle 19, -4 \rangle$ $\mathbf{n} = \langle -5, 12 \rangle$

15) $\mathbf{m} = \langle 8, 15 \rangle$ $\mathbf{n} = \langle -1, -8 \rangle$

16) $\mathbf{a} = \langle 6, 8 \rangle$ $\mathbf{b} = \langle 19, -3 \rangle$

17) $\mathbf{t} = \langle 3, -14 \rangle$ $\mathbf{u} = \langle -9, 10 \rangle$

18) $\mathbf{t} = \langle -6, 8 \rangle$ $\mathbf{u} = \langle 6, 8 \rangle$

19) $\mathbf{m} = \langle 12, 16 \rangle$ $\mathbf{n} = \langle -12, 16 \rangle$

20) $\mathbf{m} = \langle 15, 18 \rangle$ $\mathbf{n} = \langle 9, -12 \rangle$

Write each vector in component form.

21) $|\mathbf{m}| = 83, 45°$

22) $|\mathbf{v}| = 76, 204°$

23) $|\mathbf{k}| = 50, 108°$

24) $|\mathbf{m}| = 58, 120°$

25) $|\mathbf{k}| = 93, 172°$

26) $|\mathbf{r}| = 55, 135°$

27) $|\mathbf{n}| = 2, 210°$

28) $|\mathbf{k}| = 11, 45°$

29) $|\mathbf{b}| = 46, 331°$

30) $|\mathbf{v}| = 63, 97°$

31) $|\mathbf{a}| = 29, 147°$

32) $|\mathbf{v}| = 91, 139°$

33) $|\mathbf{r}| = 34, 45°$

34) $|\mathbf{a}| = 49, 300°$

35) $|\mathbf{v}| = 78, 117°$

36) $|\mathbf{a}| = 40, 315°$

37) $|\mathbf{p}| = 13, 10°$

38) $|\mathbf{m}| = 39, 97°$

39) $|\mathbf{b}| = 12, 300°$

40) $|\mathbf{a}| = 6, 60°$

Find the magnitude and direction angle for each vector.

41) $37\mathbf{i} - 16\mathbf{j}$

42) $17\mathbf{i} + 2\sqrt{38}\,\mathbf{j}$

43) $49\mathbf{i} - 32\mathbf{j}$

44) $12\mathbf{i} + 35\mathbf{j}$

45) $-39\mathbf{i} + 9\mathbf{j}$

46) $-30\mathbf{i} - 25\mathbf{j}$

47) $12\mathbf{i} + 35\mathbf{j}$

48) $6\sqrt{22}\mathbf{i} - 27\mathbf{j}$

49) $43\mathbf{i} + 16\mathbf{j}$

50) $35\mathbf{i} - 50\mathbf{j}$

51) $24\mathbf{i} + 32\mathbf{j}$

52) $-15\mathbf{i} - 36\mathbf{j}$

53) $12\mathbf{i} - 35\mathbf{j}$

54) $-11\mathbf{i} + 18\mathbf{j}$

55) $-44\mathbf{i} + 50\mathbf{j}$

56) $12\mathbf{i} - 16\mathbf{j}$

57) $2\sqrt{38}\mathbf{i} - 17\mathbf{j}$

58) $28\mathbf{i} - 17\mathbf{j}$

59) $6\mathbf{i} + 8\mathbf{j}$

60) $\sqrt{7} \cdot \mathbf{i} - 1\mathbf{j}$

Express the resultant vector as a linear combination of unit vectors i and j.

61) $\mathbf{u} = 5\mathbf{i} - \mathbf{j}$
$\mathbf{v} = 11\mathbf{i} - \mathbf{j}$
Find: $-\mathbf{u} + \mathbf{v}$

62) $\mathbf{f} = -6\mathbf{i} + 4\mathbf{j}$
$\mathbf{v} = -\mathbf{i} - 10\mathbf{j}$
Find: $-\mathbf{f} - \mathbf{v}$

63) $\mathbf{u} = -\mathbf{i} + 11\mathbf{j}$
$\mathbf{g} = 12\mathbf{i} - 7\mathbf{j}$
Find: $\mathbf{u} - \mathbf{g}$

64) $\mathbf{u} = -9\mathbf{i} + 3\mathbf{j}$
$\mathbf{g} = 6\mathbf{i} + 3\mathbf{j}$
Find: $\mathbf{u} + \mathbf{g}$

65) $\mathbf{a} = 4\mathbf{i} - 8\mathbf{j}$
$\mathbf{v} = 12\mathbf{i} - 2\mathbf{j}$
Find: $-\mathbf{a} - \mathbf{v}$

66) $\mathbf{f} = 5\mathbf{i} - 5\mathbf{j}$
$\mathbf{v} = -9\mathbf{i} + 9\mathbf{j}$
Find: $\mathbf{f} + \mathbf{v}$

67) $\mathbf{u} = -10\mathbf{i} - 12\mathbf{j}$
$\mathbf{v} = 4\mathbf{i} + 3\mathbf{j}$
Find: $\mathbf{u} + \mathbf{v}$

68) $\mathbf{f} = 11\mathbf{i} + 10\mathbf{j}$
$\mathbf{v} = -3\mathbf{i} - 3\mathbf{j}$
Find: $-\mathbf{f} + \mathbf{v}$

69) $\mathbf{a} = 6\mathbf{i} - 12\mathbf{j}$
$\mathbf{v} = 12\mathbf{i}$
Find: $-\mathbf{a} - \mathbf{v}$

70) $\mathbf{f} = 11\mathbf{i} + 10\mathbf{j}$
$\mathbf{v} = -4\mathbf{i} + 3\mathbf{j}$
Find: $-\mathbf{f} + \mathbf{v}$

71) $\mathbf{u} = -2\mathbf{i} + 4\mathbf{j}$
$\mathbf{v} = -2\mathbf{i} - 4\mathbf{j}$
Find: $-\mathbf{u} + \mathbf{v}$

72) $\mathbf{u} = 3\mathbf{i} + 2\mathbf{j}$
$\mathbf{v} = 12\mathbf{i} - \mathbf{j}$
Find: $\mathbf{u} - \mathbf{v}$

73) $\mathbf{u} = -9\mathbf{i} - 2\mathbf{j}$
$\mathbf{v} = 5\mathbf{i} - 7\mathbf{j}$
Find: $-\mathbf{u} + \mathbf{v}$

74) $\mathbf{f} = -\mathbf{i} - \mathbf{j}$
$\mathbf{v} = 9\mathbf{i} + 10\mathbf{j}$
Find: $-\mathbf{f} + \mathbf{v}$

75) $\mathbf{f} = -9\mathbf{i} - 3\mathbf{j}$
$\mathbf{v} = -4\mathbf{i} - 3\mathbf{j}$
Find: $-\mathbf{f} + \mathbf{v}$

76) $\mathbf{u} = 2\mathbf{i} + \mathbf{j}$
$\mathbf{g} = 4\mathbf{i} - 11\mathbf{j}$
Find: $\mathbf{u} + \mathbf{g}$

77) $\mathbf{f} = -12\mathbf{i} - 6\mathbf{j}$
$\mathbf{g} = 8\mathbf{i} - 3\mathbf{j}$
Find: $\mathbf{f} + \mathbf{g}$

78) $\mathbf{u} = -11\mathbf{i} - 7\mathbf{j}$
$\mathbf{v} = 8\mathbf{i} + 11\mathbf{j}$
Find: $-\mathbf{u} - \mathbf{v}$

79) $\mathbf{a} = 11\mathbf{i} + 3\mathbf{j}$
$\mathbf{g} = -10\mathbf{i} - 10\mathbf{j}$
Find: $-\mathbf{a} - \mathbf{g}$

80) $\mathbf{u} = 4\mathbf{i} - 4\mathbf{j}$
$\mathbf{g} = -2\mathbf{i} + 2\mathbf{j}$
Find: $\mathbf{u} + \mathbf{g}$

Find the magnitude and direction angle of the resultant vector.

81) $\mathbf{u} = 7\mathbf{i} + 10\mathbf{j}$
$\mathbf{g} = -2\mathbf{i} - 2\mathbf{j}$
Find: $-\mathbf{u} - \mathbf{g}$

82) $\mathbf{u} = -6\mathbf{i}$
$\mathbf{g} = -4\mathbf{i} - 7\mathbf{j}$
Find: $\mathbf{u} - \mathbf{g}$

83) $\mathbf{u} = 8\mathbf{i} + 4\mathbf{j}$
$\mathbf{v} = 11\mathbf{i} - 4\mathbf{j}$
Find: $-\mathbf{u} + \mathbf{v}$

84) $\mathbf{u} = 4\mathbf{i} - 6\mathbf{j}$
$\mathbf{g} = -10\mathbf{i} - 6\mathbf{j}$
Find: $-\mathbf{u} - \mathbf{g}$

85) $\mathbf{a} = -7\mathbf{i} - 6\mathbf{j}$
$\mathbf{g} = -4\mathbf{i} + 5\mathbf{j}$
Find: $\mathbf{a} - \mathbf{g}$

86) $\mathbf{f} = -7\mathbf{i} - 3\mathbf{j}$
$\mathbf{v} = 3\mathbf{i} - 4\mathbf{j}$
Find: $\mathbf{f} + \mathbf{v}$

87) $\mathbf{a} = -2\mathbf{i} + 4\mathbf{j}$
$\mathbf{v} = 4\mathbf{i} + \mathbf{j}$
Find: $-\mathbf{a} - \mathbf{v}$

88) $\mathbf{f} = -5\mathbf{i} - 6\mathbf{j}$
$\mathbf{g} = -7\mathbf{i} - \mathbf{j}$
Find: $\mathbf{f} + \mathbf{g}$

89) $\mathbf{u} = -5\mathbf{i} + \mathbf{j}$
$\mathbf{v} = -9\mathbf{i} - 3\mathbf{j}$
Find: $-\mathbf{u} + \mathbf{v}$

90) $\mathbf{u} = 9\mathbf{i} + 3\mathbf{j}$
$\mathbf{g} = 5\mathbf{i} + 11\mathbf{j}$
Find: $-\mathbf{u} + \mathbf{g}$

91) $\mathbf{u} = 7\mathbf{i} - 3\mathbf{j}$
$\mathbf{g} = -10\mathbf{i} + 10\mathbf{j}$
Find: $-\mathbf{u} - \mathbf{g}$

92) $\mathbf{f} = 5\mathbf{j}$
$\mathbf{v} = -7\mathbf{i} - 5\mathbf{j}$
Find: $-\mathbf{f} - \mathbf{v}$

93) $\mathbf{u} = 10\mathbf{i} - 3\mathbf{j}$
$\mathbf{b} = \mathbf{i} - 2\mathbf{j}$
Find: $-\mathbf{u} - \mathbf{b}$

94) $\mathbf{a} = -10\mathbf{i} + 12\mathbf{j}$
$\mathbf{g} = 10\mathbf{i}$
Find: $-\mathbf{a} - \mathbf{g}$

95) $\mathbf{u} = -9\mathbf{i} + 9\mathbf{j}$
$\mathbf{v} = 11\mathbf{i} - 8\mathbf{j}$
Find: $-\mathbf{u} - \mathbf{v}$

96) $\mathbf{f} = -6\mathbf{i} + 6\mathbf{j}$
$\mathbf{g} = 11\mathbf{i} + 5\mathbf{j}$
Find: $-\mathbf{f} - \mathbf{g}$

97) $\mathbf{f} = 6\mathbf{i} - 12\mathbf{j}$
$\mathbf{v} = -10\mathbf{j}$
Find: $-\mathbf{f} - \mathbf{v}$

98) $\mathbf{f} = 2\mathbf{i} + 8\mathbf{j}$
$\mathbf{g} = -\mathbf{i} - 10\mathbf{j}$
Find: $-\mathbf{f} - \mathbf{g}$

99) $\mathbf{f} = -4\mathbf{i} - 9\mathbf{j}$
$\mathbf{v} = 6\mathbf{i}$
Find: $\mathbf{f} + \mathbf{v}$

100) $\mathbf{u} = -3\mathbf{i} - 6\mathbf{j}$
$\mathbf{v} = -11\mathbf{i} - 10\mathbf{j}$
Find: $\mathbf{u} + \mathbf{v}$

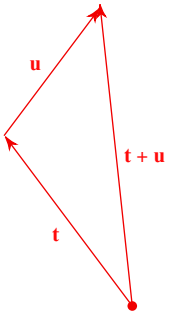
Precalculus Name_____ ID: 1

Assignment

Date_____ Period____

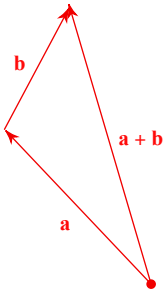
Draw a vector diagram to find the resultant of each pair of vectors using the triangle method. Then state the magnitude and direction angle of the resultant.

1) $\mathbf{t} = \langle -12, 16 \rangle$ $\mathbf{u} = \langle 9, 12 \rangle$



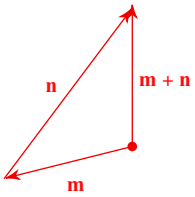
28.16; 96.12°

2) $\mathbf{a} = \langle -18, 19 \rangle$ $\mathbf{b} = \langle 8, 15 \rangle$



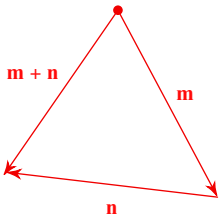
35.44; 106.39°

3) $\mathbf{m} = \langle -12, -3 \rangle$ $\mathbf{n} = \langle 12, 16 \rangle$



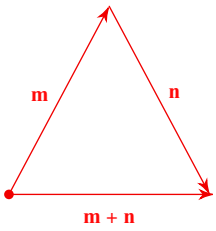
13; 90°

4) $\mathbf{m} = \langle 8, -15 \rangle$ $\mathbf{n} = \langle -17, 2 \rangle$



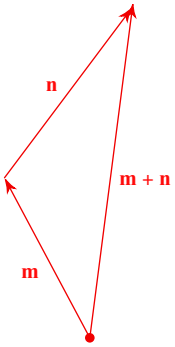
15.81; 235.3°

5) $\mathbf{m} = \langle 8, 15 \rangle$ $\mathbf{n} = \langle 8, -15 \rangle$



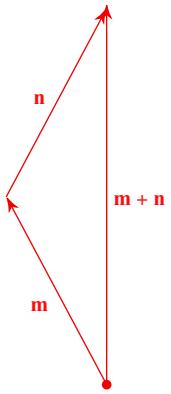
16; 0°

6) $\mathbf{m} = \langle -8, 15 \rangle$ $\mathbf{n} = \langle 12, 16 \rangle$



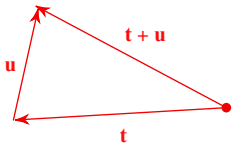
31.26; 82.65°

7) $\mathbf{m} = \langle -8, 15 \rangle$ $\mathbf{n} = \langle 8, 15 \rangle$



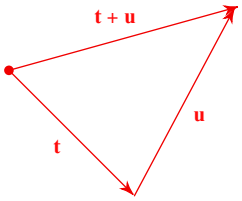
30; 90°

8) $\mathbf{t} = \langle -17, -1 \rangle$ $\mathbf{u} = \langle 2, 9 \rangle$



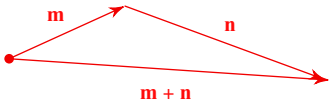
17; 151.93°

9) $\mathbf{t} = \langle 10, -10 \rangle$ $\mathbf{u} = \langle 8, 15 \rangle$



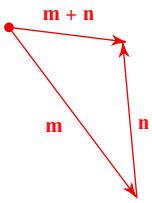
18.68; 15.52°

10) $\mathbf{m} = \langle 11, 5 \rangle$ $\mathbf{n} = \langle 19, -7 \rangle$



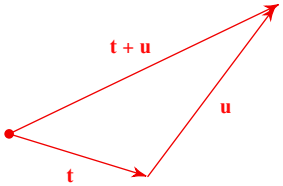
30.07; 356.19°

11) $\mathbf{m} = \langle 9, -12 \rangle$ $\mathbf{n} = \langle -1, 11 \rangle$



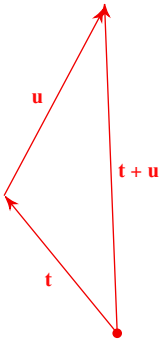
8.06; 352.87°

12) $\mathbf{t} = \langle 13, -4 \rangle$ $\mathbf{u} = \langle 12, 16 \rangle$



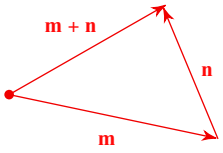
27.73; 25.64°

13) $\mathbf{t} = \langle -9, 11 \rangle$ $\mathbf{u} = \langle 8, 15 \rangle$



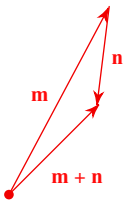
26.02; 92.2°

14) $\mathbf{m} = \langle 19, -4 \rangle$ $\mathbf{n} = \langle -5, 12 \rangle$



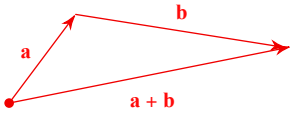
16.12; 29.74°

15) $\mathbf{m} = \langle 8, 15 \rangle$ $\mathbf{n} = \langle -1, -8 \rangle$



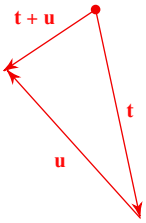
9.9; 45°

16) $\mathbf{a} = \langle 6, 8 \rangle$ $\mathbf{b} = \langle 19, -3 \rangle$



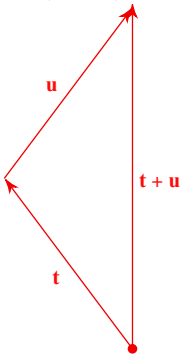
25.5; 11.31°

17) $\mathbf{t} = \langle 3, -14 \rangle$ $\mathbf{u} = \langle -9, 10 \rangle$



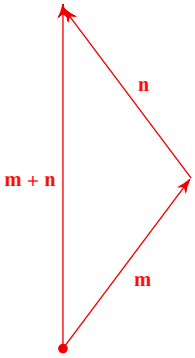
7.21; 213.69°

18) $\mathbf{t} = \langle -6, 8 \rangle$ $\mathbf{u} = \langle 6, 8 \rangle$



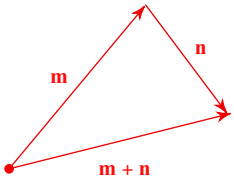
16; 90°

19) $\mathbf{m} = \langle 12, 16 \rangle$ $\mathbf{n} = \langle -12, 16 \rangle$



32; 90°

20) $\mathbf{m} = \langle 15, 18 \rangle$ $\mathbf{n} = \langle 9, -12 \rangle$



24.74; 14.04°

Write each vector in component form.

21) $|\mathbf{m}| = 83, 45°$

$\left\langle \frac{83\sqrt{2}}{2}, \frac{83\sqrt{2}}{2} \right\rangle$

22) $|\mathbf{v}| = 76, 204°$

$\langle -69.43, -30.91 \rangle$

23) $|\mathbf{k}| = 50, 108°$

$\langle -15.45, 47.55 \rangle$

24) $|\mathbf{m}| = 58, 120°$

$\langle -29, 29\sqrt{3} \rangle$

25) $|\mathbf{k}| = 93, 172°$

$\langle -92.09, 12.94 \rangle$

26) $|\mathbf{r}| = 55, 135°$

$\left\langle -\frac{55\sqrt{2}}{2}, \frac{55\sqrt{2}}{2} \right\rangle$

27) $|\mathbf{n}| = 2, 210°$

$\langle -1.73, -1 \rangle$

28) $|\mathbf{k}| = 11, 45°$

$\left\langle \frac{11\sqrt{2}}{2}, \frac{11\sqrt{2}}{2} \right\rangle$

29) $|\mathbf{b}| = 46, 331°$

$\langle 40.23, -22.3 \rangle$

30) $|\mathbf{v}| = 63, 97°$

$\langle -7.68, 62.53 \rangle$

31) $|\mathbf{a}| = 29, 147°$

$\langle -24.32, 15.79 \rangle$

32) $|\mathbf{v}| = 91, 139°$

$\langle -68.68, 59.7 \rangle$

33) $|\mathbf{r}| = 34, 45°$

$\langle 17\sqrt{2}, 17\sqrt{2} \rangle$

34) $|\mathbf{a}| = 49, 300°$

$\left\langle \frac{49}{2}, -\frac{49\sqrt{3}}{2} \right\rangle$

35) $|\mathbf{v}| = 78, 117°$

$\langle -35.41, 69.5 \rangle$

36) $|\mathbf{a}| = 40, 315°$

$\langle 20\sqrt{2}, -20\sqrt{2} \rangle$

37) $|\mathbf{p}| = 13, 10°$

$\langle 12.8, 2.26 \rangle$

38) $|\mathbf{m}| = 39, 97°$

$\langle -4.75, 38.71 \rangle$

39) $|\mathbf{b}| = 12, 300°$

$\langle 6, -6\sqrt{3} \rangle$

40) $|\mathbf{a}| = 6, 60°$

$\langle 3, 5.2 \rangle$

Find the magnitude and direction angle for each vector.

41) $37\mathbf{i} - 16\mathbf{j}$

$5\sqrt{65} \approx 40.311$
$336.61°$

42) $17\mathbf{i} + 2\sqrt{38}\mathbf{j}$

21
$35.95°$

43) $49\mathbf{i} - 32\mathbf{j}$

$5\sqrt{137} \approx 58.523$
$326.85°$

44) $12\mathbf{i} + 35\mathbf{j}$

37
$71.08°$

45) $-39\mathbf{i} + 9\mathbf{j}$

$3\sqrt{178} \approx 40.025$
$167.01°$

46) $-30\mathbf{i} - 25\mathbf{j}$

$5\sqrt{61} \approx 39.051$
$219.81°$

47) $12\mathbf{i} + 35\mathbf{j}$

37
$71.08°$

48) $6\sqrt{22}\mathbf{i} - 27\mathbf{j}$

39
$316.19°$

49) $43\mathbf{i} + 16\mathbf{j}$

$\sqrt{2105} \approx 45.88$
$20.41°$

50) $35\mathbf{i} - 50\mathbf{j}$

$5\sqrt{149} \approx 61.033$
$304.99°$

51) $24\mathbf{i} + 32\mathbf{j}$

40
$53.13°$

52) $-15\mathbf{i} - 36\mathbf{j}$

39
$247.38°$

53) $12\mathbf{i} - 35\mathbf{j}$

37
$288.92°$

54) $-11\mathbf{i} + 18\mathbf{j}$

$\sqrt{445} \approx 21.095$
$121.43°$

55) $-44\mathbf{i} + 50\mathbf{j}$

$2\sqrt{1109} \approx 66.603$
$131.35°$

56) $12\mathbf{i} - 16\mathbf{j}$

20
$306.87°$

57) $2\sqrt{38}\mathbf{i} - 17\mathbf{j}$

21
$305.95°$

58) $28\mathbf{i} - 17\mathbf{j}$

$\sqrt{1073} \approx 32.757$
$328.74°$

59) $6\mathbf{i} + 8\mathbf{j}$

10
$53.13°$

60) $\sqrt{7} \cdot \mathbf{i} - 1\mathbf{j}$

$2\sqrt{2} \approx 2.828$
$339.3°$

Express the resultant vector as a linear combination of unit vectors i and j.

61) $\mathbf{u} = 5\mathbf{i} - \mathbf{j}$
$\mathbf{v} = 11\mathbf{i} - \mathbf{j}$
Find: $-\mathbf{u} + \mathbf{v}$

$6\mathbf{i}$

62) $\mathbf{f} = -6\mathbf{i} + 4\mathbf{j}$
$\mathbf{v} = -\mathbf{i} - 10\mathbf{j}$
Find: $-\mathbf{f} - \mathbf{v}$

$7\mathbf{i} + 6\mathbf{j}$

63) $\mathbf{u} = -\mathbf{i} + 11\mathbf{j}$
$\mathbf{g} = 12\mathbf{i} - 7\mathbf{j}$
Find: $\mathbf{u} - \mathbf{g}$

$-13\mathbf{i} + 18\mathbf{j}$

64) $\mathbf{u} = -9\mathbf{i} + 3\mathbf{j}$
$\mathbf{g} = 6\mathbf{i} + 3\mathbf{j}$
Find: $\mathbf{u} + \mathbf{g}$

$-3\mathbf{i} + 6\mathbf{j}$

65) $\mathbf{a} = 4\mathbf{i} - 8\mathbf{j}$
$\mathbf{v} = 12\mathbf{i} - 2\mathbf{j}$
Find: $-\mathbf{a} - \mathbf{v}$

$-16\mathbf{i} + 10\mathbf{j}$

66) $\mathbf{f} = 5\mathbf{i} - 5\mathbf{j}$
$\mathbf{v} = -9\mathbf{i} + 9\mathbf{j}$
Find: $\mathbf{f} + \mathbf{v}$

$-4\mathbf{i} + 4\mathbf{j}$

67) $\mathbf{u} = -10\mathbf{i} - 12\mathbf{j}$
$\mathbf{v} = 4\mathbf{i} + 3\mathbf{j}$
Find: $\mathbf{u} + \mathbf{v}$

$-6\mathbf{i} - 9\mathbf{j}$

68) $\mathbf{f} = 11\mathbf{i} + 10\mathbf{j}$
$\mathbf{v} = -3\mathbf{i} - 3\mathbf{j}$
Find: $-\mathbf{f} + \mathbf{v}$

$-14\mathbf{i} - 13\mathbf{j}$

69) $\mathbf{a} = 6\mathbf{i} - 12\mathbf{j}$
$\mathbf{v} = 12\mathbf{i}$
Find: $-\mathbf{a} - \mathbf{v}$

$-18\mathbf{i} + 12\mathbf{j}$

70) $\mathbf{f} = 11\mathbf{i} + 10\mathbf{j}$
$\mathbf{v} = -4\mathbf{i} + 3\mathbf{j}$
Find: $-\mathbf{f} + \mathbf{v}$

$-15\mathbf{i} - 7\mathbf{j}$

71) $\mathbf{u} = -2\mathbf{i} + 4\mathbf{j}$
$\mathbf{v} = -2\mathbf{i} - 4\mathbf{j}$
Find: $-\mathbf{u} + \mathbf{v}$

$-8\mathbf{j}$

72) $\mathbf{u} = 3\mathbf{i} + 2\mathbf{j}$
$\mathbf{v} = 12\mathbf{i} - \mathbf{j}$
Find: $\mathbf{u} - \mathbf{v}$

$-9\mathbf{i} + 3\mathbf{j}$

73) $\mathbf{u} = -9\mathbf{i} - 2\mathbf{j}$
$\mathbf{v} = 5\mathbf{i} - 7\mathbf{j}$
Find: $-\mathbf{u} + \mathbf{v}$

$14\mathbf{i} - 5\mathbf{j}$

74) $\mathbf{f} = -\mathbf{i} - \mathbf{j}$
$\mathbf{v} = 9\mathbf{i} + 10\mathbf{j}$
Find: $-\mathbf{f} + \mathbf{v}$

$10\mathbf{i} + 11\mathbf{j}$

75) $\mathbf{f} = -9\mathbf{i} - 3\mathbf{j}$
$\mathbf{v} = -4\mathbf{i} - 3\mathbf{j}$
Find: $-\mathbf{f} + \mathbf{v}$

$5\mathbf{i}$

76) $\mathbf{u} = 2\mathbf{i} + \mathbf{j}$
$\mathbf{g} = 4\mathbf{i} - 11\mathbf{j}$
Find: $\mathbf{u} + \mathbf{g}$

$6\mathbf{i} - 10\mathbf{j}$

77) $\mathbf{f} = -12\mathbf{i} - 6\mathbf{j}$
$\mathbf{g} = 8\mathbf{i} - 3\mathbf{j}$
Find: $\mathbf{f} + \mathbf{g}$

$-4\mathbf{i} - 9\mathbf{j}$

78) $\mathbf{u} = -11\mathbf{i} - 7\mathbf{j}$
$\mathbf{v} = 8\mathbf{i} + 11\mathbf{j}$
Find: $-\mathbf{u} - \mathbf{v}$

$3\mathbf{i} - 4\mathbf{j}$

79) $\mathbf{a} = 11\mathbf{i} + 3\mathbf{j}$
$\mathbf{g} = -10\mathbf{i} - 10\mathbf{j}$
Find: $-\mathbf{a} - \mathbf{g}$

$-\mathbf{i} + 7\mathbf{j}$

80) $\mathbf{u} = 4\mathbf{i} - 4\mathbf{j}$
$\mathbf{g} = -2\mathbf{i} + 2\mathbf{j}$
Find: $\mathbf{u} + \mathbf{g}$

$2\mathbf{i} - 2\mathbf{j}$

Find the magnitude and direction angle of the resultant vector.

81) $\mathbf{u} = 7\mathbf{i} + 10\mathbf{j}$
$\mathbf{g} = -2\mathbf{i} - 2\mathbf{j}$
Find: $-\mathbf{u} - \mathbf{g}$

$\sqrt{89} \approx 9.434; 237.99°$

82) $\mathbf{u} = -6\mathbf{i}$
$\mathbf{g} = -4\mathbf{i} - 7\mathbf{j}$
Find: $\mathbf{u} - \mathbf{g}$

$\sqrt{53} \approx 7.28; 105.95°$

83) $\mathbf{u} = 8\mathbf{i} + 4\mathbf{j}$
$\mathbf{v} = 11\mathbf{i} - 4\mathbf{j}$
Find: $-\mathbf{u} + \mathbf{v}$

$\sqrt{73} \approx 8.544; 290.56°$

84) $\mathbf{u} = 4\mathbf{i} - 6\mathbf{j}$
$\mathbf{g} = -10\mathbf{i} - 6\mathbf{j}$
Find: $-\mathbf{u} - \mathbf{g}$

$6\sqrt{5} \approx 13.416; 63.43°$

85) $\mathbf{a} = -7\mathbf{i} - 6\mathbf{j}$
$\mathbf{g} = -4\mathbf{i} + 5\mathbf{j}$
Find: $\mathbf{a} - \mathbf{g}$

$\sqrt{130} \approx 11.402; 254.74°$

86) $\mathbf{f} = -7\mathbf{i} - 3\mathbf{j}$
$\mathbf{v} = 3\mathbf{i} - 4\mathbf{j}$
Find: $\mathbf{f} + \mathbf{v}$

$\sqrt{65} \approx 8.062; 240.26°$

87) $\mathbf{a} = -2\mathbf{i} + 4\mathbf{j}$
$\mathbf{v} = 4\mathbf{i} + \mathbf{j}$
Find: $-\mathbf{a} - \mathbf{v}$

$\sqrt{29} \approx 5.385; 248.2°$

88) $\mathbf{f} = -5\mathbf{i} - 6\mathbf{j}$
$\mathbf{g} = -7\mathbf{i} - \mathbf{j}$
Find: $\mathbf{f} + \mathbf{g}$

$\sqrt{193} \approx 13.892; 210.26°$

89) $\mathbf{u} = -5\mathbf{i} + \mathbf{j}$
$\mathbf{v} = -9\mathbf{i} - 3\mathbf{j}$
Find: $-\mathbf{u} + \mathbf{v}$

$4\sqrt{2} \approx 5.657; 225°$

90) $\mathbf{u} = 9\mathbf{i} + 3\mathbf{j}$
$\mathbf{g} = 5\mathbf{i} + 11\mathbf{j}$
Find: $-\mathbf{u} + \mathbf{g}$

$4\sqrt{5} \approx 8.944; 116.57°$

91) $\mathbf{u} = 7\mathbf{i} - 3\mathbf{j}$
$\mathbf{g} = -10\mathbf{i} + 10\mathbf{j}$
Find: $-\mathbf{u} - \mathbf{g}$

$\sqrt{58} \approx 7.616; 293.2°$

92) $\mathbf{f} = 5\mathbf{j}$
$\mathbf{v} = -7\mathbf{i} - 5\mathbf{j}$
Find: $-\mathbf{f} - \mathbf{v}$

$7; 0°$

93) $\mathbf{u} = 10\mathbf{i} - 3\mathbf{j}$
$\mathbf{b} = \mathbf{i} - 2\mathbf{j}$
Find: $-\mathbf{u} - \mathbf{b}$

$\sqrt{146} \approx 12.083; 155.56°$

94) $\mathbf{a} = -10\mathbf{i} + 12\mathbf{j}$
$\mathbf{g} = 10\mathbf{i}$
Find: $-\mathbf{a} - \mathbf{g}$

$12; 270°$

95) $\mathbf{u} = -9\mathbf{i} + 9\mathbf{j}$
$\mathbf{v} = 11\mathbf{i} - 8\mathbf{j}$
Find: $-\mathbf{u} - \mathbf{v}$

$\sqrt{5} \approx 2.236; 206.57°$

96) $\mathbf{f} = -6\mathbf{i} + 6\mathbf{j}$
$\mathbf{g} = 11\mathbf{i} + 5\mathbf{j}$
Find: $-\mathbf{f} - \mathbf{g}$

$\sqrt{146} \approx 12.083; 245.56°$

97) $\mathbf{f} = 6\mathbf{i} - 12\mathbf{j}$
$\mathbf{v} = -10\mathbf{j}$
Find: $-\mathbf{f} - \mathbf{v}$

$2\sqrt{130} \approx 22.804; 105.26°$

98) $\mathbf{f} = 2\mathbf{i} + 8\mathbf{j}$
$\mathbf{g} = -\mathbf{i} - 10\mathbf{j}$
Find: $-\mathbf{f} - \mathbf{g}$

$\sqrt{5} \approx 2.236; 116.57°$

99) $\mathbf{f} = -4\mathbf{i} - 9\mathbf{j}$
$\mathbf{v} = 6\mathbf{i}$
Find: $\mathbf{f} + \mathbf{v}$

$\sqrt{85} \approx 9.22; 282.53°$

100) $\mathbf{u} = -3\mathbf{i} - 6\mathbf{j}$
$\mathbf{v} = -11\mathbf{i} - 10\mathbf{j}$
Find: $\mathbf{u} + \mathbf{v}$

$2\sqrt{113} \approx 21.26; 228.81°$