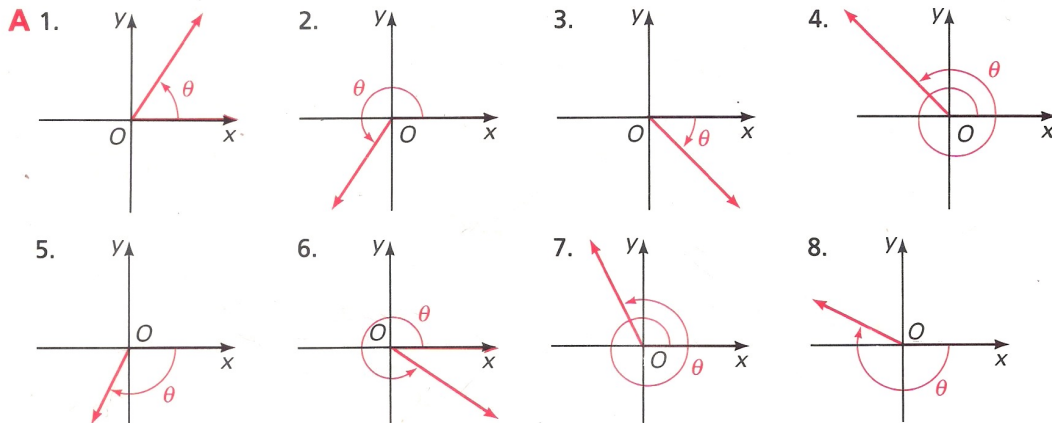


EXERCISES 1-1

Estimate the degree measure of angle θ .



Draw an angle in standard position having the given measure.

- | | | | |
|------------------|-----------------|------------------|-----------------|
| 9. 45° | 10. 180° | 11. 270° | 12. 135° |
| 13. 225° | 14. -90° | 15. -135° | 16. 120° |
| 17. -240° | 18. -60° | 19. 405° | 20. 450° |

Find the degree measure of each of the following angles.

- | | |
|---|---|
| 21. $\frac{3}{4}$ of a counterclockwise revolution | 22. $\frac{2}{3}$ of a counterclockwise revolution |
| 23. $\frac{3}{8}$ of a clockwise revolution | 24. $\frac{1}{6}$ of a clockwise revolution |
| 25. $\frac{2}{5}$ of a clockwise revolution | 26. $\frac{3}{10}$ of a counterclockwise revolution |
| 27. $1\frac{2}{3}$ of a counterclockwise revolution | 28. $2\frac{1}{4}$ of a counterclockwise revolution |

Express in degrees, minutes, and seconds. Give answers to the nearest second.

- | | | |
|-------------------|--------------------|--------------------|
| 29. 23.75° | 30. 62.5° | 31. 15.43° |
| 32. 41.16° | 33. 24.687° | 34. 54.321° |

Express in decimal degrees. Give answers to the nearest 0.0001° .

- | | | |
|-------------------------|-----------------------|-------------------------|
| 35. $9^\circ 45'$ | 36. $82^\circ 15'$ | 37. $67^\circ 22' 30''$ |
| 38. $27^\circ 15' 45''$ | 39. $0^\circ 0' 27''$ | 40. $42^\circ 42' 42''$ |

Find two angles, one positive and one negative, that are coterminal with and different from the given angle.

- | | | |
|----------------|------------------|------------------|
| 41. 90° | 42. 180° | 43. 270° |
| 44. 60° | 45. -240° | 46. -120° |

Find an angle between 0° and 360° that is coterminal with the given angle.

- | | | |
|--------------------------|---------------------|---------------------|
| 47. 460° | 48. -300° | 49. -60° |
| 50. 500° | 51. -120° | 52. -180° |
| B 53. 750° | 54. 1000° | 55. 821.7° |
| 56. -521.3° | 57. -803.25° | 58. 1206.37° |

Two positive angles are **complementary** if the sum of their measures is 90° . Find the degree-minute-second measure of the complement of each of the following angles. (Hint: $90^\circ = 89^\circ 59' 60''$.)

- | | |
|-------------------------|-------------------------|
| 59. $48^\circ 17' 40''$ | 60. $16^\circ 43' 22''$ |
|-------------------------|-------------------------|

Two positive angles are **supplementary** if the sum of their measures is 180° . Find the degree-minute-second measure of the supplement of each angle.

- | | |
|-------------------------|-------------------------|
| 61. $72^\circ 18' 40''$ | 62. $109^\circ 7' 42''$ |
|-------------------------|-------------------------|
63. A machine part rotates through an angle of 150° every second. How many revolutions does it make in one minute?
64. A long-playing record makes $33\frac{1}{3}$ revolutions per minute. Through what angle does it rotate in one second?