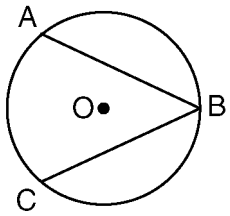
1. Express $\frac{5}{2}$ radians in degrees.

2. What is the image of point $A(1,3)$ after a dilation with the center at the origin and a scale factor of 4?

3. In the accompanying diagram of circle O, m´ B¼ = 260. What is m*ABC*?



4. Solve for x: $4^{2x} = 2^{(6x-8)}$

5. If 0.0435 is written as 4.35×10^n, what is the value of n?

6. If f(x) = $x^{-2} + 27^x$, find f(¤)in simplest form.

7. Express `™27 + 7`™12 as a monomial in terms of i.

8. If $f(x) = \frac{x^3}{3}$ and $g(x) = \sqrt[3]{x}$, find $f(g(9))$.

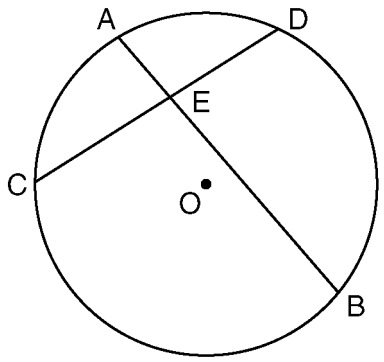
9. Evaluate:

$$\sum_{k=3}^{6} \frac{1}{2}k^2$$

10. Find the sum of the roots of the equation $x^2 + 7x - 8 = 0$.

11. In (*RST*, sin T = §, m*R* = 30, and r = 15. What is the length of t?

12. In the accompanying diagram of circle O, chords AB and CD intersect at E, AE = 5, CD = 18, and ED = 8. Find the length of EB.



13. Express in simplest form:

$$\frac{x - \frac{1}{x}}{1 + \frac{1}{x}}$$

14. What is the greatest value of c for which the roots of the equation $x^2 + 4x + c = 0$ are real?

15. Express sin 150° as a function of a positive acute angle.

16. In (*DEF*, m*D* = 40, *DE* = 12 meters, and *DF* = 8 meters. Find the area of (*DEF* to the *nearest tenth of a square meter*.

17. For which value of x is the expression $\frac{(1 - \sin x)(1 + \sin x)}{\cos x}$ undefined?

(1) 0° (3) 90°
(2) 45° (4) 180°

18. What are the coordinates of P', the image of $P(-1,4)$ after a reflection in the line $x = 2$?

(1) (4,1) (3) (0,4)
(2) (–1,1) (4) (5,4)

19. The students' scores on a standardized test with a normal distribution have a mean of 500 and a standard deviation of 40. What percent of the students scored between 420 and 580?

(1) 47.5% (3) 95%
(2) 68% (4) 99.5%

20. Which trigonometric function is positive in Quadrant IV?

(1) sin x (3) csc x
(2) sec x (4) cot x

21. The expression $\frac{\sqrt{x}}{\sqrt{x} - 1}$ is equivalent to

(1) x + `•
(3) $\frac{\text{`•} - 1}{x}$
(2) $\frac{x + \text{`•}}{x - 1}$
(4) 1 – `•

22. What is the solution set of the equation $|x - 6| + 4 = 10$?

(1) {0,12} (3) {–12,0}
(2) {–8,12} (4) {–12,–8}

23. What is the period of the graph of the equation y = 2 sin 3x?

(1) $\frac{2p}{3}$ (3) 3
(2) 2 (4) p

24. What is the value of x in the equation $x = 2 \text{ Arc sin } ¡$?
    (1) $\frac{p}{6}$ (3) $\frac{p}{3}$
    (2) $\frac{p}{2}$ (4) $\frac{p}{4}$

25. The expression $\sin 2A - 2 \sin A$ is equivalent to
    (1) $(\sin A)(\sin A - 2)$ (3) $(\sin A)(2 \cos A - 1)$
    (2) $(2 \sin A)(\sin A - 1)$ (4) $(2 \sin A)(\cos A - 1)$

26. The expression $2 \log x - 3 \log y$ is equivalent to
    (1) $\log \frac{2x}{3y}$ (3) $\log \frac{x^2}{y^3}$
    (2) $\log x^2y^3$ (4) $\frac{2}{3} \log \frac{x}{y}$

27. What is the domain of the function $f(x) = \frac{4}{\sqrt{2x-1}}$ over the set of real numbers?
    (1) $\{x|x = ¡\}$ (3) $\{x|x < ¡\}$
    (2) $\{x|x \& ¡\}$ (4) $\{x|x > ¡\}$

28. The solution of $\log_x 8 = 2$ is
    (1) $x < 2$ (3) $3 < x < 4$
    (2) $2 < x < 3$ (4) $x > 4$

29. Which statement is true if r varies inversely as s?
    (1) Their difference will be constant.
    (2) Their sum will be constant.
    (3) Their quotient will be constant.
    (4) Their product will be constant.

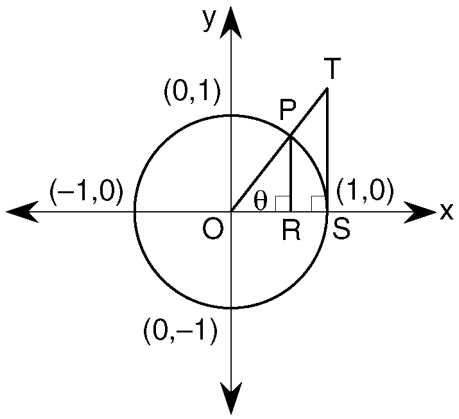
30. Which two values of x satisfy the equation $\sqrt{3 - 2 \cos x} = 2$?
    (1) 150° and 210° (3) 60° and 300°
    (2) 120° and 240° (4) 30° and 330°

31. Which statement best describes a triangle that can be constructed if $m\angle A = 30$, $a = £$, and $b = ¡$?
    (1) It is a right triangle. (3) It is not unique.
    (2) It is an obtuse triangle. (4) It cannot be constructed.

32. What is the solution set of the inequality $x^2 - x > 20$?
    (1) $\{x > 5\}$ (3) $\{x > 5 \text{ or } x < -4\}$
    (2) $\{-4 < x < 5\}$ (4) $\{x > 0\}$

33. What is the solution set of the equation $x^2 + 9 = 0$?
    (1) $\{3,-3\}$ (3) $\{-3,-3i\}$
    (2) $\{3i,-3i\}$ (4) $\{\ \}$

34. In the accompanying diagram, TS is tangent to unit circle O at S, PR ; OS, and TS ; OS



Which line segment represents sin ‡?
    (1) OR (3) TS
    (2) OS (4) PR

35. The third term in the expansion of $(x - 2y)^6$ is
    (1) $60x^4y^2$ (3) $15x^4y^2$
    (2) $60x^2y^4$ (4) $-15x^2y^4$

36. *a* On the same set of axes, sketch and label the graphs of the equations $y = -4 \cos x$ and $y = \tan x$ in the interval $-p \% x \% p$.
    b Using the graphs sketched in part *a*, determine the number of values of x in the interval $-p \% x \% p$ that satisfy the equation $-4 \cos x = \tan x$.

37. *a* On graph paper, sketch and label the graph of the equation $y = -2^x$.
    b On the same set of axes, reflect the graph drawn in part *a* in the line $y = -x$ and label it *b*.
    c Write an equation of the graph drawn in part *b*.

38. Express in simplest form:
$$\frac{4x^2 - 100}{x^2 + x - 6} \div \frac{20 - 4x}{2x^2 - 9x + 10}$$

39. Express the roots of the equation $-6x = 2x^2 + 5$ in simplest $a + bi$ form.

40. Two forces of 80 pounds and 100 pounds yield a resultant force of 60 pounds. Find, to the *nearest ten minutes* or the *nearest tenth of a degree*, the angle between the two forces.

41. Prove the following identity:
$$\frac{(\sin x + \cos x)^2 - 1}{\cos x} = (\sin 2x)(\tan x)(\csc x)$$

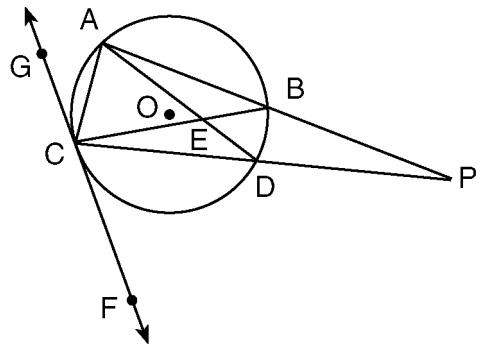
42. A factory that produces light bulbs determined that Í of all light bulbs it produces are defective.
a If four light bulbs are selected at random, what is the probability that
(1) no bulb selected is defective
(2) *at least* three bulbs selected are defective
b The table below shows the number of defective light bulbs that were found in 20 random samples of 40 light bulbs.

x_i	f_i
0	2
1	2
2	2
3	2
4	4
5	2
6	2
7	2
8	1
9	0
10	1

(1) Find the standard deviation of this set of numbers to the *nearest tenth*.
(2) How many samples fell within one standard deviation of the mean?

43. Find, to the *nearest ten minutes* or the *nearest tenth of a degree*, all values of ‡ in the interval 0° % ‡ % 360° that satisfy the equation $4\cos^2 ‡ = 3 + 3\sin ‡$.

44. In the accompanying diagram of circle *O*, secant ABP, secant CDP, and chord AC are drawn; chords AD and BC intersect at *E*, tangent @GCF [intersects circle *O* at *C*, and m´ » :mµ½ :m · ¼ :m¶ º = 8:2:5:3.



Find:

a m¶ º
b ma*ACB*
c ma*P*
d ma*AEB*
e ma*DCF*

Answer Key

1. 75

2. (4,12)

3. 50

4. 4

5. –2

6. 11£

7. 17*i*`3

8. 3

9. 43

10. –7

11. 6

12. 16

13. $x - 1$

14. 4

15. sin 30º *or* cos 60º

16. 30.9

17. ___3___

18. ___4___

19. ___3___

20. ___2___

21. ___2___

22. ___1___

23. ___1___

24. ___3___

25. ___4___

26. ___3___

27. ___4___

28. ___2___

29. ___4___

30. ___2___

31. ___1___

32. ___3___

33. ___2___

34. ___4___

35. ___1___

36. *b* 2

37. *c* $x = 2^{-y}$

38. $\frac{-(2x-5)(x+5)}{x+3}$

39. – ¦) ¡ *i*

40. 143.1º *or* 143º10'

41. proof

42. *a* (1) $\frac{6,561}{10,000}$ (2) $\frac{37}{10,000}$ *b* (1) 2.6 (2) 12

43. 14.5°, 165.5°, 270° *or*
14°30', 165°30', 270°

44. *a* 60 *b* 80 *c* 10 *d* 130 *e* 50

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