

SBM 2 Review

Simplify each expression.

$$1) (5x^3 - 7 + 3x^4) + (3x^4 + 4 - 3x^3) - (5x^3 - 2) \\ 6x^4 - 3x^3 - 1$$

$$2) (8v^2 + 8v^3) - (1 - 6v^4 + v^3 + 7v^2) \\ 6v^4 + 7v^3 + v^2 - 1$$

Simplify.

$$3) \frac{2\sqrt{24} + 3\sqrt{54}}{13\sqrt{6}}$$

$$4) \frac{-3\sqrt{45} - 2\sqrt{5}}{-11\sqrt{5}}$$

$$5) \frac{-2\sqrt{18} + 2\sqrt{20} - 3\sqrt{20}}{-6\sqrt{2} - 2\sqrt{5}}$$

$$6) \frac{2\sqrt{5} + 2\sqrt{5} - 3\sqrt{20}}{-2\sqrt{5}}$$

Simplify. Tell if result is a rational or irrational number.

$$7) -3\sqrt{20} \cdot 4\sqrt{5} \\ -120 \text{ Rational}$$

$$8) 2\sqrt{6}(4 + \sqrt{2}) \\ 8\sqrt{6} + 4\sqrt{3} \text{ Irrational}$$

$$9) -\sqrt{12} + 2\sqrt{3} \\ 0 \text{ Rational}$$

$$10) 2(\pi + 7) \\ 2\pi + 14 \text{ Irrational}$$

Factor each completely.

$$11) 2k^2 + 22k + 56 \\ 2(k+7)(k+4)$$

$$12) 3r^2 + 3r - 270 \\ 3(r-9)(r+10)$$

$$13) p^3 - 2p^2 \\ p^2(p-2)$$

$$14) -6b^2 + 6 \\ -6(b-1)(b+1)$$

$$15) 7x^2 - 36x + 5$$

$$(7x - 1)(x - 5)$$

$$16) 7r^3 - 33r^2 - 10r$$

$$r(7r + 2)(r - 5)$$

$$17) a^2 + 6a - 40$$

$$(a + 10)(a - 4)$$

$$18) n^2 - 11n + 24$$

$$(n - 3)(n - 8)$$

$$19) p^6 - 9s^2$$

$$(p^3 - 3s)(p^3 + 3s)$$

$$20) 6x^2 - 24y^8$$

$$6(x - 2y^4)(x + 2y^4)$$

Solve each equation by factoring.

$$21) x^2 = -2 + 3x$$

$$\{1, 2\}$$

$$22) 2r^2 - 24 = -2r$$

$$\{-4, 3\}$$

$$23) 2x^2 + 30 = 17x$$

$$\left\{\frac{5}{2}, 6\right\}$$

$$24) 3n^2 - 20 = 11n$$

$$\left\{-\frac{4}{3}, 5\right\}$$

Solve each equation by completing the square.

$$25) v^2 + 10v - 51 = 5$$

$$\{4, -14\}$$

Solve each equation with the quadratic formula.

$$26) x^2 - 5x = -1$$

$$\left\{\frac{5 + \sqrt{21}}{2}, \frac{5 - \sqrt{21}}{2}\right\}$$

$$27) 11k^2 = -9k - 1$$

$$\left\{\frac{-9 + \sqrt{37}}{22}, \frac{-9 - \sqrt{37}}{22}\right\}$$

Write a quadratic function with the following roots.

28) 0, -6

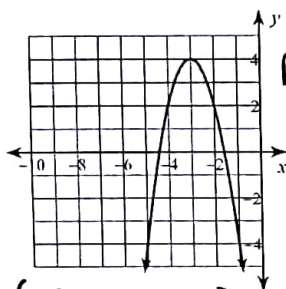
$$y = x^2 + 6x$$

29) $\frac{2}{3}, 4$

$$y = 3x^2 - 14x + 8$$

Find the x-intercepts, y-intercept, end behavior, AOS, and vertex of the following quadratic functions.

30) $y = -2x^2 - 12x - 14$

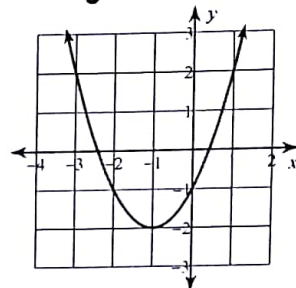


$x \rightarrow -\infty, f(x) \rightarrow -\infty$
 $x \rightarrow \infty, f(x) \rightarrow -\infty$

AOS: $x = -3$
 vertex $(-3, 4)$

xint $(-3 \pm \sqrt{2}, 0)$
 yint $(0, -14)$

31) $y = x^2 + 2x - 1$



xint $(-1 \pm \sqrt{2}, 0)$
 yint $(0, -1)$

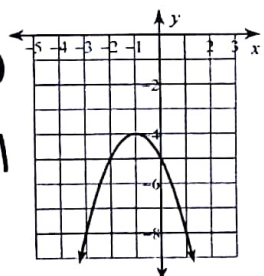
$x \rightarrow -\infty, f(x) \rightarrow \infty$
 $x \rightarrow \infty, f(x) \rightarrow \infty$

AOS: $x = -1$
 vertex $(-1, -2)$

Give the direction, AOS, vertex, max/min, domain and range of the following functions.

32) $y = -(x+1)^2 - 4$

Vertex $(-1, -4)$
 AOS $x = -1$

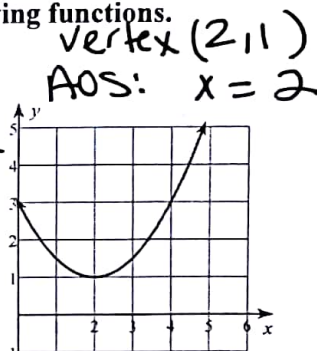


max @ -4
 Domain: \mathbb{R}
 Range: $y | y \leq -4$
 Direction: \downarrow

33) $y = \frac{1}{2}(x-2)^2 + 1$

Direction \uparrow
 min @ 1

Domain: \mathbb{R}
 Range: $y | y \geq 1$



vertex $(2, 1)$
 AOS: $x = 2$

Use the information provided to write the standard form equation of each circle.

34) Center: $(-7, -\frac{11}{2})$

Radius: 4

$$(x + 7)^2 + \left(y + \frac{11}{2}\right)^2 = 16$$

35) Center: $(2, -4)$

Radius: $3\sqrt{11}$

$$(x - 2)^2 + (y + 4)^2 = 99$$

Find the center and radius of the circle given in general form.

36) $x^2 + y^2 - 16x - 30y + 285 = 0$

$(x - 8)^2 + (y - 15)^2 = 4$ Center (8,15) $r = 2$

37) $x^2 + y^2 + 6x + 2y - 14 = 0$

$(x + 3)^2 + (y + 1)^2 = 24$ Center (-3,-1) $r = 2\sqrt{6}$

Use the information provided to write the standard form equation of each circle.

38) Center: (12, -7)
Point on Circle: (18, -9)

$(x - 12)^2 + (y + 7)^2 = 40$

39) Ends of a diameter: (2, 3) and (4, 9)

$(x - 3)^2 + (y - 6)^2 = 10$

40) Center: (-10, 9)
Area: 45π

$(x + 10)^2 + (y - 9)^2 = 45$

41) Center: (-9, -9)
Circumference: 6π

$(x + 9)^2 + (y + 9)^2 = 9$

Does the given point lie on the circle? Yes or No

42) Center: (-11, 15)
Radius: 2
Point: (-13, 17)

$(x + 11)^2 + (y - 15)^2 = 4$

8 does not equal 4, therefore not on the circle

43) Center: (-12, 3)
Radius: $\sqrt{13}$
Point: (-14, 6)

$(x + 12)^2 + (y - 3)^2 = 13$ $13 = 13$, therefore point is on
 $(-14 + 12)^2 + (6 - 3)^2$
 $(-2)^2 + (3)^2$
 $4 + 9$
 $13 = 13$

Find the volume of each figure. Round your answers to the nearest hundredth, if necessary. Leave your answers in terms of π for answers that contain π .

44) A sphere with a diameter of 16 m.

$682.67\pi \text{ m}^3$

45) A rectangular pyramid of height 11 km measuring 5 km and 9 km along the base.

165 km^3

46) A cylinder with a radius of 3 mi and a height of 11 mi.

$99\pi \text{ mi}^3$

Find the area of each circle.

47) diameter = 18 km

$$81\pi \text{ km}^2$$

48) circumference = 24π cm

$$144\pi \text{ cm}^2$$

Find the diameter of each circle.

49) area = 64π m²

$$16 \text{ m}$$

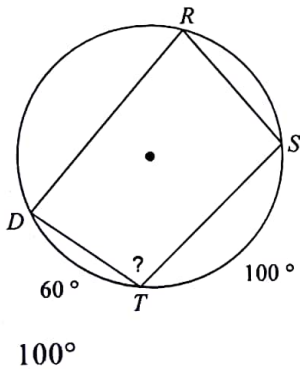
Find the circumference of each circle.

50) area = 49π in²

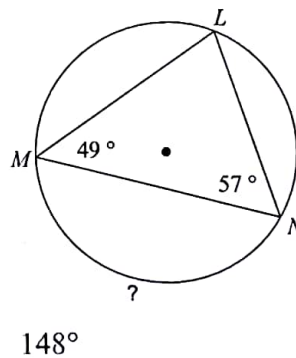
$$14\pi \text{ in}$$

Find the measure of the arc or angle indicated.

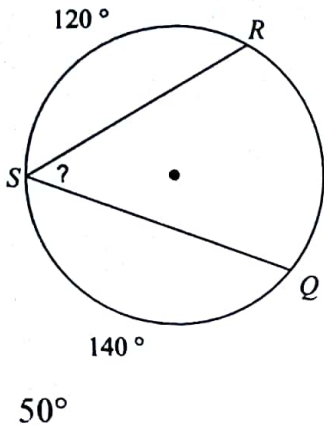
51)



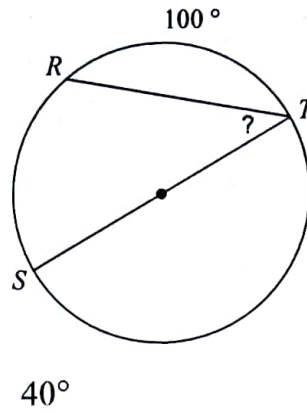
52)



53)

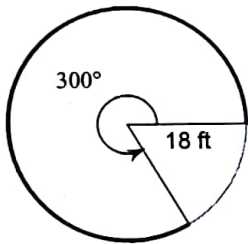


54)



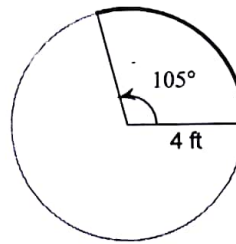
Find the length of each arc.

55)



30π ft

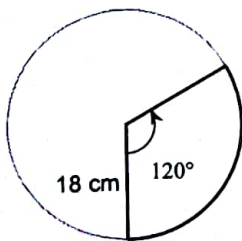
56)



$\frac{7\pi}{3}$ ft

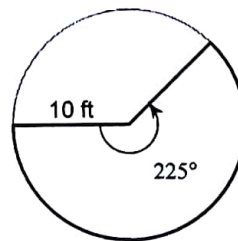
Find the area of each sector.

57)



108π cm²

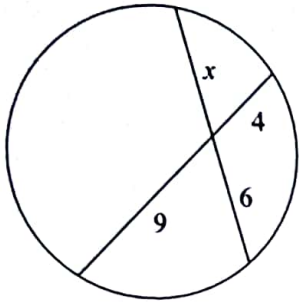
58)



$\frac{125\pi}{2}$ ft²

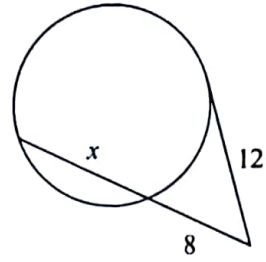
Solve for x . Assume that lines which appear tangent are tangent.

59)



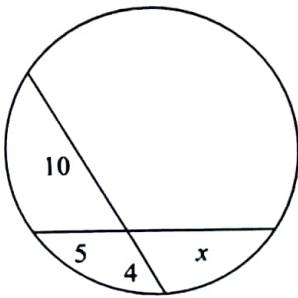
6

60)



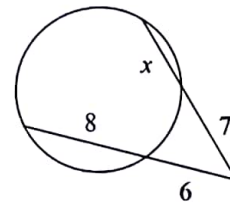
10

61)



8

62)



5