

## 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)  $2\sqrt{24} + 3\sqrt{54}$

$$13\sqrt{6}$$

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

$$-11\sqrt{5}$$

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

$$-6\sqrt{2} - 2\sqrt{5}$$

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

$$-2\sqrt{5}$$

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

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

 $-120$ , rational

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

 $8\sqrt{6} + 4\sqrt{3}$ , irrational

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

0, rational

10)  $2(\pi + 7)$

 $2\pi + 14$ , irrational

Factor each completely.

11)  $2k^2 + 22k + 56$

$$2(k+4)(k+7)$$

12)  $3r^2 + 3r - 270$

$$3(r+10)(r-9)$$

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

$$p^2(p-2)$$

14)  $-6b^2 + 6$

$$-6(b+1)(b-1)$$

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

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

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

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

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

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

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

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

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

$$x = 2, 1$$

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

$$r = -4, 3$$

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

$$x = 6, \frac{5}{2}$$

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

$$n = 5, -\frac{4}{3}$$

Solve each equation by completing the square.

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

$$v = -14, 4$$

Solve each equation with the quadratic formula.

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

$$\frac{5 \pm \sqrt{21}}{2}$$

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

$$\frac{-9 \pm \sqrt{37}}{22}$$

Write a quadratic function with the following roots.

28) 0, -6

$$f(x) = x^2 + 6x$$

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

$$f(x) = 3x^2 - 14x + 8$$

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

30)  $y = -2x^2 - 12x - 14$   
 x-int  $(-3 \pm \sqrt{2}, 0)$   
 y-int  $(0, -14)$   
 as  $x \rightarrow -\infty, f(x) \rightarrow -\infty$   
 as  $x \rightarrow \infty, f(x) \rightarrow -\infty$   
 AOS  $x = -3$   
 vertex  $(-3, 4)$

31)  $y = x^2 + 2x - 1$   
 x-int  $(-1 \pm \sqrt{2}, 0)$   
 y-int  $(0, -1)$   
 as  $x \rightarrow -\infty, f(x) \rightarrow \infty$   
 as  $x \rightarrow \infty, f(x) \rightarrow \infty$   
 AOS  $x = -1$   
 vertex  $(-1, -2)$

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

32)  $y = -(x+1)^2 - 4$   
 opens down  
 $x = -1$   
 $(-1, -4)$   
 $D: \mathbb{R}$   
 $R: \{y \mid y \leq -4\}$   
 max @  $-4$

33)  $y = \frac{1}{2}(x-2)^2 + 1$   
 opens up  
 $x = 2$   
 $(2, 1)$  min @ 1  
 $D: \mathbb{R}$   
 $R: \{y \mid y \geq 1\}$

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

34) Center:  $(-7, -\frac{11}{2})$   
 Radius: 4

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

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

$$(8, 15) \quad r = 2$$

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

$$(-3, -1) \quad r = 2\sqrt{6}$$

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:  $45\pi$

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

- 41) Center:  $(-9, -9)$   
Circumference:  $6\pi$

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

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

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

no

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

yes

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

- 44) A sphere with a diameter of 16 m.

$$V = \frac{2048\pi}{3} \text{ m}^3$$

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

$$V = 165 \text{ km}^3$$

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

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

Find the area of each circle.

- 47) diameter = 18 km

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

- 48) circumference =  $24\pi$  cm

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

Find the diameter of each circle.

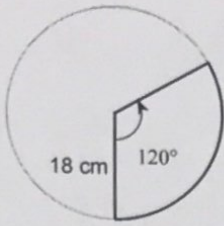
- 49) area =  $64\pi \text{ m}^2$

$$d = 16 \text{ m}$$



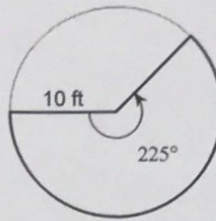
Find the area of each sector.

57)



$$108\pi \text{ cm}^2$$

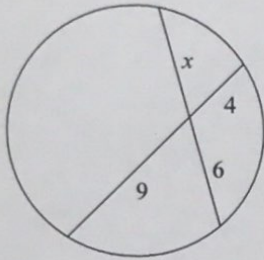
58)



$$\frac{125}{2} \pi \text{ ft}^2$$

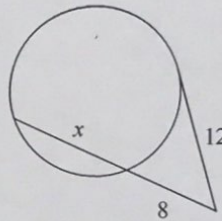
Solve for  $x$ . Assume that lines which appear tangent are tangent.

59)



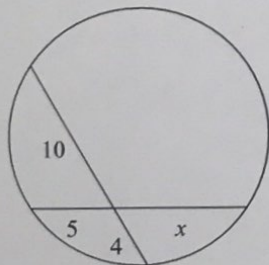
$$x = 6$$

60)



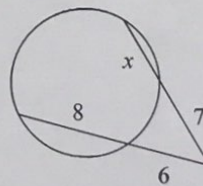
$$x = 10$$

61)



$$x = 8$$

62)



$$x = 5$$