

Midterm Review worksheet #1

Answers

$i^1 = i$
 $i^2 = -1$
 $i^3 = -i$
 $i^4 = 1$
 $i^4 \cdot i^4 = 1$

Simplify each of the following.

19. $\sqrt{-200}$

$20 \quad 10$
 $4 \quad 5 \quad 2$
 $2 \quad 2$
 $10i\sqrt{2}$

20. $\frac{12(\sqrt{3})}{\sqrt{3}(-\sqrt{3})}$

$-12\sqrt{3}$
 -3
 $= 4\sqrt{3}$

21. $\sqrt{-10} \cdot \sqrt{-12}$

$\sqrt{120}$
 $12 \quad 10$
 $4 \quad 3 \quad 5 \quad 2$
 $2 \quad 2$
 $2\sqrt{30}$

22. i^8

$i^4 \cdot i^4 = 1$

24. $(4-3i)-(2+5i)$

$4-3i-2-5i$
 $2-8i$

25. $(7+3i)(2-i)$

$14-7i+6i-3i^2$
 $14-i+3$
 $17-i$

23. $(3-2i)^2$

$(3-2i)(3-2i)$
 $9-6i-6i+4i^2$
 $9-12i-4(-1)$
 $5-12i$

26. $(-6+2i)+(3-5i)$

$-3-3i$

27. $\frac{(3+2i)(4+i)}{4-i(4+i)}$

$\frac{12+3i+8i+2i^2}{16+4i-4i-i^2}$
 $\frac{10+11i}{17}$

28. $\frac{(4+i)(-2i)}{2i(-2i)}$

$\frac{-8i-2i^2}{-4i^2}$
 $\frac{2-8i}{4}$
 $\frac{1-4i}{2}$

29. $\sqrt[3]{27x^3y^5}$

$9 \quad 3 \quad 5$
 $3 \quad 3 \quad 1 \quad 1 \quad 1$
 $3xy\sqrt[3]{y^2}$

30. $\sqrt{500xy^4}$

$50 \quad 10$
 $5 \quad 10 \quad 2 \quad 5$
 $3 \quad 2$
 $10y^2\sqrt{5x}$

31. $3\sqrt{98}-2\sqrt{50}$

$4 \quad 14 \quad 5 \quad 10$
 $2 \quad 7 \quad 2 \quad 5$
 $11\sqrt{2}$

32. $\left(\frac{3x^2}{y^3}\right)^{-3}$ negative means to flip

$\left(\frac{y^3}{3x^2}\right)^3$ house party
 $\frac{y^9}{27x^6}$

33. $(\sqrt[3]{8})^{-3}$

$\left(\frac{1}{\sqrt[3]{8}}\right)^3 = \left(\frac{1}{2}\right)^3$
 $= \frac{1}{8}$

34. $\frac{2x^3 \cdot 4x^3y}{3y^3 \cdot -2x^2}$

$\frac{1}{2x^3 \cdot 3y^3} \cdot \frac{4x^3y}{-2x^2}$
 $\frac{4x^3y}{-12x^5y^3} = \frac{-1}{3x^2y^2}$

35. Given the functions $f(x) = -x^2 + 3x - 4$ and $g(x) = 2x + 1$ find each of the following:

a) $f(-2)$

$-(-2)^2 + 3(-2) - 4$
 $-4 - 6 - 4$
 $-10 - 4 = -14$

b) $g(4)$

$2(4) + 1$
 $8 + 1$
 9

36. Find the inverse of the function: $f(x) = -2x + 5$

$$y = -2x + 5$$

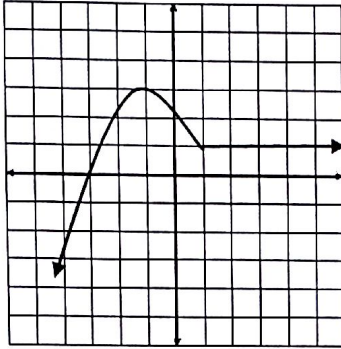
$$x = -2y + 5$$

Switch
 $x \leftrightarrow y = \text{solve for } x$

$$\frac{x-5}{-2} = \frac{-2y}{-2}$$

$$y = \frac{-(x-5)}{2}$$

37. State the domain and range for the graph:

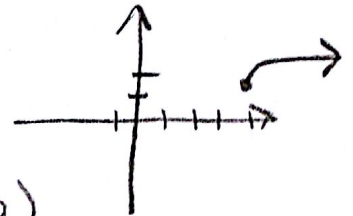


$$D: (-\infty, \infty)$$

$$R: (-\infty, 3]$$

38. State the domain and range for the function

$$f(x) = \sqrt{x-4} + 2$$



$$D: [4, \infty)$$

$$R: [2, \infty)$$

Solve each of the following. Be sure to check for extraneous roots. Leave all answers in exact form.

39. $\sqrt[3]{2x+4} = 5$

$$2x + 4 = 125$$

$$\frac{2x}{2} = \frac{125-4}{2}$$

$$x = 60.5$$

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40. $\sqrt{(x+3)^2} = 81$

$$x + 3 = \pm 9$$

$$x + 3 = 9 \quad x + 3 = -9$$

$$\frac{x}{-3} = \frac{9-3}{-3} \quad \frac{x}{-3} = \frac{-9-3}{-3}$$

$$x = 6 \quad x = -12$$

41. $4x^2 - 9 = 0$

$$4x^2 = 9$$

$$\sqrt{4x^2} = \sqrt{\frac{9}{4}}$$

$$x = \pm \frac{3}{2}$$

42. $3x^2 + 10x - 8 = 0$

$$3x^2 + 10x - 8 = 0$$

$$24 \quad 6, 4$$

$$3x^2 + 6x + 4x - 8 = 0$$

$$3x(x+2) + 4(x+2) = 0$$

$$(3x+4)(x+2) = 0$$

$$x = -2, -\frac{4}{3}$$

$$x + 3 = -5$$

$$x + 3 = 25$$

$$\frac{x}{-3} = \frac{25-3}{-3}$$

$$x = 22$$

43. $x^2 + 5x - 6 = 0$

$$(x+6)(x-1) = 0$$

$$x = -6, 1$$

44. $14x^2 = 3x + 2$

$$14x^2 - 3x - 2 = 0$$

$$14x^2 - 7x + 4x - 2 = 0$$

$$7x(2x-1) + 4x-2 = 0$$

$$(7x+2)(2x-1) = 0$$

$$7x+2 = 0 \quad 2x-1 = 0$$

$$x = -\frac{2}{7}, \frac{1}{2}$$

47. $(3x+1)^2 = 16$

$$3x+1 = \pm 4$$

$$3x+1 = 64$$

$$3x+1 = -64$$

$$\frac{3x}{3} = \frac{64-1}{3} \quad \frac{3x}{3} = \frac{-64-1}{3}$$

$$x = 21, -21.67$$

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