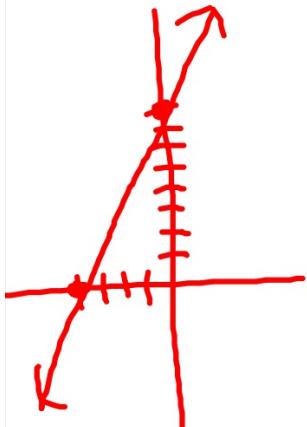


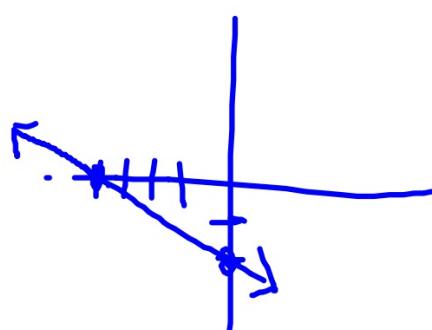
A. Linear Equations

I. Find the slope and the x and y-intercepts of each line. Graph each function.

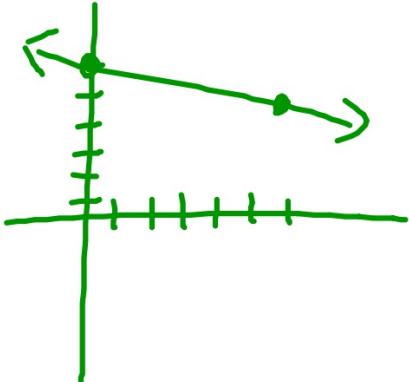
1. $y = 2x + 8$
-int: $(0, 8)$
int: $(-4, 0)$
 $m = 2$



2. $5x + 10y = -20$
y-int: $(0, -2)$
x-int: $(-4, 0)$
 $m = -\frac{1}{2}$



3. $12 - \frac{1}{3}x = 2y$
y-int: $(0, 6)$
x-int: $(36, 0)$
 $m = -\frac{1}{6}$



II. Find the slope of each line.

4. Find the slope of the line that contains the points $(5, 3)$ and $(-7, -1)$.

$$m = \frac{-1-3}{-7-5} = \frac{-4}{-12} = \frac{1}{3}$$

5. Find the slope of a line that is parallel to a line whose equation is $y = \frac{2}{3}x + 1$.

$$m = \frac{2}{3}$$

6. Find the slope of a line that is perpendicular to a line that contains the points $(-3, 1)$ and

$$m = \frac{4-1}{7+3} = \frac{3}{10} \rightarrow m = \frac{-10}{3}$$

III. Write the equation of the line (in slope-intercept form) described in each problem.

7. Write the equation of the line that passes through (6,1) and (8,-4).

$$m = \frac{-4-1}{8-6} = \frac{-5}{2} \quad \left| \begin{array}{l} y = mx + b \\ 1 = -\frac{5}{2}(6) + b \\ 1 = -15 + b \end{array} \right. \quad \rightarrow b = 16$$
$$\boxed{y = -\frac{5}{2}x + 16}$$

8. Write the equation of the line that passes through (-2,0) and is perpendicular to the line whose equation is $y = -3x + 7$.

$$m = \frac{1}{3} \quad y = mx + b$$
$$0 = \frac{1}{3}(-2) + b$$
$$0 = -\frac{2}{3} + b$$
$$\frac{2}{3} = b$$
$$\boxed{y = \frac{1}{3}x + \frac{2}{3}}$$

B. Radicals

I. Simplify each expression.

$$9. \sqrt{96} \quad 4\sqrt{6}$$

$$10. 6\sqrt{75} = \frac{6 \cdot 5\sqrt{3}}{30\sqrt{3}}$$

$$11. \sqrt{\frac{12}{5}} \cdot \frac{\sqrt{5}}{\sqrt{5}} = \frac{\sqrt{6}}{5}$$

$$12. \frac{6}{3\sqrt{8}} = \frac{2}{2\sqrt{2}} = \frac{1}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}}$$
$$= \boxed{\frac{\sqrt{2}}{2}}$$

$$13. (2\sqrt{3})(3\sqrt{7})$$
$$\boxed{6\sqrt{21}}$$

$$14. (3\sqrt{10})^2$$
$$3\sqrt{10} \cdot 3\sqrt{10}$$

$$9. 10$$
$$\boxed{90}$$

Use your calculators to evaluate the following radicals. Round to the nearest hundredth.

$$\sqrt[3]{24} \quad 2.88$$

$$16. \sqrt[5]{1024}$$
$$4$$

$$17. \sqrt[6]{92} \quad 2.12$$

C. Quadratic Equations

I. Factor each polynomial completely.

$$18. \ 6x - 12x^2 \quad (6x(1-2x))$$

$$20. \ x^2 - 14x - 32 \quad (x-16)(x+2)$$

$$22. \ 4x^2 - 4x - 3$$
$$\begin{aligned} & x^2 - 4x - 12 \\ & (x-\frac{6}{4})(x+\frac{2}{4}) \\ & (x-\frac{3}{2})(x+\frac{1}{2}) \\ & (2x-3)(2x+1) \end{aligned}$$

$$19. \ 16x^2 - 25 \quad (4x-5)(4x+5)$$

$$21. \ x^2 - 9x + 20 \quad (x-5)(x-4)$$

$$23. \ 9x^2 - 13x + 4$$
$$\begin{aligned} & x^2 - 13x + 36 \\ & (x-\frac{9}{4})(x-\frac{4}{4}) \\ & (x-1)(9x-4) \end{aligned}$$

24. $\frac{6x^2 - 13x + 6}{x^2 - 13x + 36}$

$$\begin{aligned} & (x - \underline{\frac{9}{6}})(x - \underline{\frac{4}{6}}) \\ & (x - \frac{3}{2})(x - \frac{2}{3}) \end{aligned}$$

26. $4x^2 + 21x + 5$

$$\begin{aligned} & x^2 + 21x + 20 \\ & (x + \underline{\frac{20}{4}})(x + \underline{\frac{1}{4}}) \\ & (x + 5)(4x + 1) \end{aligned}$$

$$\begin{aligned} & x^3 - 27 \\ & (x - 3)(x^2 + 3x + 9) \end{aligned}$$

25. $\frac{x^4 + 5x^2 - 6}{(x^2 + 6)(x^2 - 1)}$

$$(x^2 + 6)(x - 1)(x + 1)$$

27. $\frac{(x^5 - 3x^3) + (x^2 - 3)}{x^3(x^2 - 3) + 1(x^2 - 3)}$

$$\begin{aligned} & (x^3 - 3)(x^3 + 1) \\ & (x^2 - 3)(x + 1)(x^2 - x + 1) \end{aligned}$$

$$\begin{aligned} & x^3 + 27 \\ & (x + 3)(x^2 - 3x + 9) \end{aligned}$$

II. Find the roots of the following functions (Remember, roots are x-intercepts).

$$28. y = 7x + 49 = 0$$

$$\begin{aligned} 7x &= -49 \\ x &= -7 \end{aligned}$$

$$30. y = x - 5x^2 = 0$$

$$\begin{aligned} x(1-5x) &= 0 \\ x &= 0, \frac{1}{5} \end{aligned}$$

$$\begin{aligned} 29. y &= (x^3 - x^2) + (4x + 4) = 0 \\ x^2(x-1) + 4(x+1) &= 0 \\ (x-1)(x^2 + 4) &= 0 \\ x-1 &= 0 \\ x &= 1, \pm 2 \end{aligned}$$

$$31. y = 4x - 28x^2 = 0$$

$$\begin{aligned} 4x(1-7x) &= 0 \\ x &= 0, \frac{1}{7} \end{aligned}$$

$$32. y = x^2 + 10x + 21 = 0$$
$$(x+7)(x+3) = 0$$
$$x = -7, -3$$

$$34. y = x^2 - 64 = 0$$
$$(x-8)(x+8) = 0$$
$$x = \pm 8$$

$$33. y = 3x^2 - 2x - 8$$
$$(x-2)(3x+4) = 0$$
$$x = 2, -\frac{4}{3}$$

$$35. y = x^4 - 256 = 0$$
$$(x^2 - 16)(x^2 + 16) = 0$$
$$x = \pm 4, \pm 4i$$

III. Simplify each expression.

36. $\sqrt{-12}$ $2i\sqrt{3}$

39. $i^3 \cdot 3i^3$ $3i^6 = 3i^2$

$3(-1)$
 -3

37. $-5\sqrt{-10} \cdot 3\sqrt{-10}$
 $-5i\sqrt{10} \cdot 3i\sqrt{10}$
 $-15i^2 \cdot 10 = -15(-1) \cdot 10$

40. $4i^3 \cdot 5i^{100}$

$20i^{103} = 20i^3$
 $= 20(-i)$
 $-20i$

38. $-3\sqrt{-48}$
 $-3i\sqrt{48} = \boxed{-12i}$

41. $\sqrt{-42} \cdot 2\sqrt{-6}$

$i\sqrt{42} \cdot 2i\sqrt{6}$
 $2i^2\sqrt{252}$
 $-12\sqrt{7}$

42. $(\sqrt{-4})^4$
 $\sqrt{4})(i\sqrt{4})(i\sqrt{4})(i\sqrt{4})$
 $16i^4 = \boxed{16}$

45. $4(7 - i) - 5(2 - 6i)$
 $28 - 4i - 10 + 30i$

$\boxed{18 + 26i}$

43. $5i \cdot (3i^3)^4$
 $5i \cdot 81i^{12}$
 $405i^{13} = \boxed{405i}$

46. $(10 - 2i)(3 + 4i)$
 $30 + 40i - 6i - 8i^2$
 $30 + 34i + 8$
 $\boxed{38 + 34i}$

44. $(-3 - 10i) - (-5 - 4i)$
 $-3 - 10i + 5 + 4i$
 $\boxed{2 - 6i}$

47. $\frac{12}{(5+i)} \cdot \frac{(5-i)}{(5-i)}$

$\frac{60 - 12i}{25 - 5i + 5i - i^2}$
 $\frac{60 - 12i}{25 + 1} = \frac{60 - 12i}{26}$

$\boxed{\frac{30 - 6i}{13}}$

Simplify each expression.

$$48. \frac{-3x^4y^8z^4}{15x^6y^6} - \frac{x^2z^4}{5x^2}$$

$$49. \frac{(-2a^2b^3)^3}{4a^3b^8} = \frac{-8a^6b^9}{4a^3b^8}$$
$$\boxed{-2a^3b}$$

$$50. \left(\frac{-3^2}{x^5}\right)^{-2} = \left(\frac{-9}{x^5}\right)^{-2}$$
$$= \frac{x^{10}}{(-9)^2} = \boxed{\frac{x^{10}}{81}}$$

$$51. (2x^5y^4)(-4x^3y^9)$$
$$-8x^8y^{13}$$

$$52. (-3h^2k)^3(2h^8k^3)^4$$
$$-27h^6k^3 \cdot 16h^{32}k^{12}$$
$$\boxed{-432h^{38}k^{15}}$$

$$53. \frac{(6r^2t^5)^0(2r^{14}t^{-9})}{(4r^{-3}t^{12})^2}$$
$$\frac{2r^{14}t^{-9}}{16r^{-6}t^{24}} = \frac{2r^{14}r^6}{16t^9t^{24}} = \boxed{\frac{1}{8}}$$

$$54. (x-3)^2$$
$$x^2 - 6x + 9$$

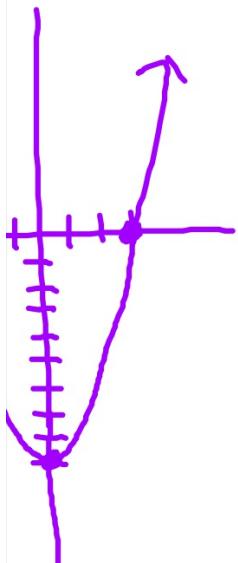
$$55. (3x+7)^2(4x+1)$$
$$(9x^2 + 42x + 49)(4x+1)$$
$$36x^3 + 168x^2 + 196x + 9x^2 + 42x + 49$$
$$\boxed{36x^3 + 177x^2 + 238x + 49}$$

$$56. \frac{x^2-9}{x^2-6x+9}$$
$$\frac{(x-3)(x+3)}{(x-3)^2}$$
$$= \frac{x+3}{x-3}, x \neq 3$$

Graph the following equations on a separate sheet of paper.

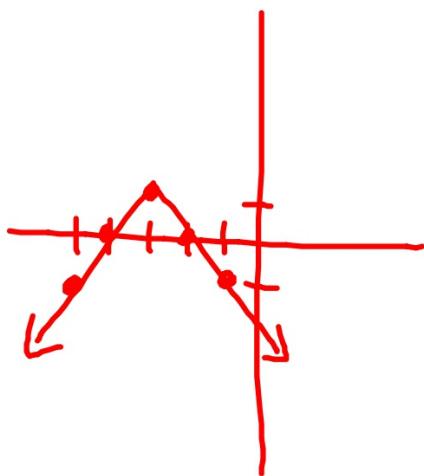
57. $y = x^2 - 9$

(3, 0) (-3, 0)
(0, -9)



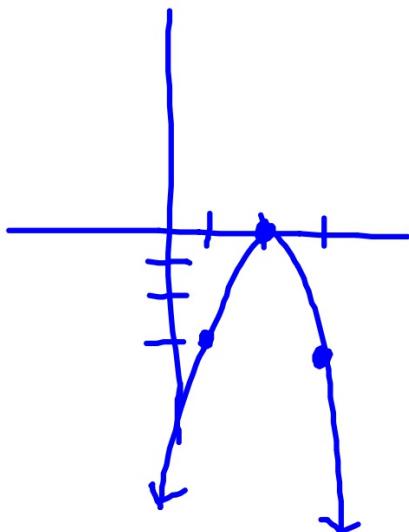
58. $y = -|x + 3| + 1$

Refl. x-axis
L3, U1

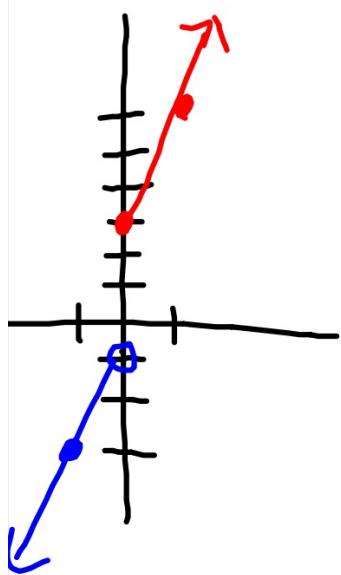


59. $y = -3(x - 2)^2$

Refl. x-axis
Vert. stretch
R2

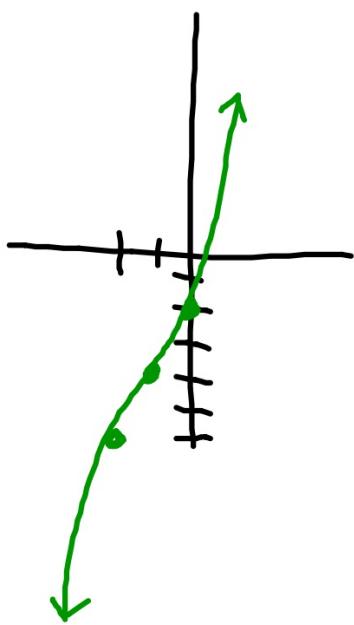


$$60. \ y = \begin{cases} 2x - 1, & x < 0 \\ 3x + 3, & x \geq 0 \end{cases}$$

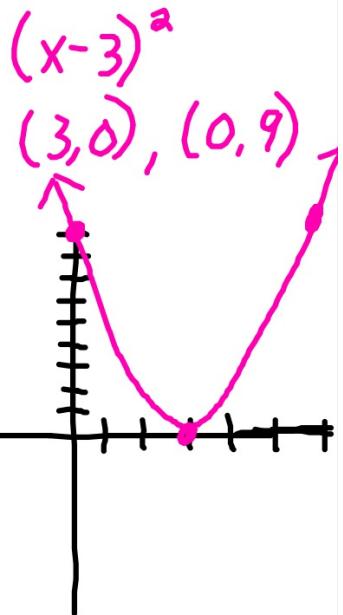


$$61. \ y = 2(x + 1)^3 - 4$$

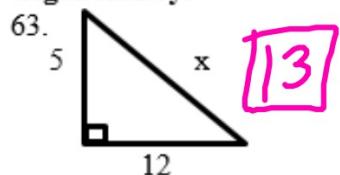
Vert. stretch
L1, D4



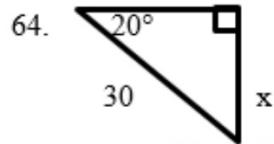
$$62. \ y = x^2 - 6x + 9$$



Solve for the missing pieces of each triangle using Pythagorean Theorem, $30^\circ-60^\circ-90^\circ$, $45^\circ-45^\circ-90^\circ$, or trigonometry.

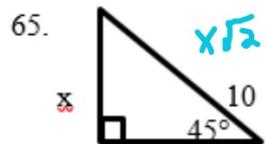


$$\boxed{13}$$



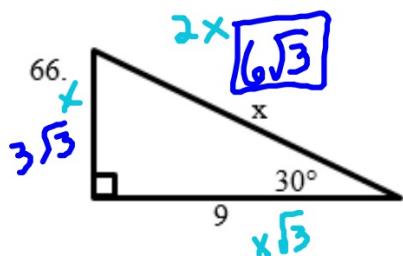
$$\sin 20^\circ = \frac{x}{30}$$

$$x = 10.261$$



$$x\sqrt{2} = 10$$

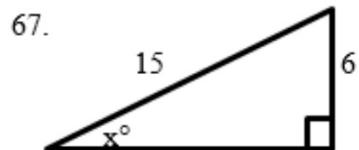
$$x = \frac{10}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{10\sqrt{2}}{2}$$



$$2x \quad \boxed{6\sqrt{3}}$$

$$q = x\sqrt{3}$$

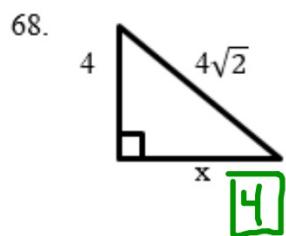
$$x = \frac{q}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \frac{q\sqrt{3}}{3} = 3\sqrt{3}$$



$$\sin X = \frac{6}{15}$$

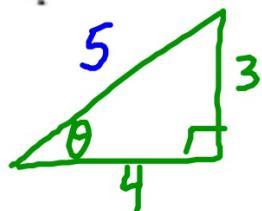
$$X = \sin^{-1}(6/15)$$

$$X = 23.578^\circ$$



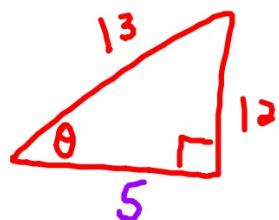
$$\boxed{4}$$

69. If $\tan \theta = \frac{3}{4}$ what would $\cos \theta$ be equal to?



$$\cos \theta = \frac{4}{5}$$

70. If $\sin \theta = \frac{12}{13}$ what would $\tan \theta$ be equal to?



$$\tan \theta = \frac{12}{5}$$