

$$1. \quad \frac{7}{16} = 16 \overline{) 0.4375} = 43.75\%$$

$$2. \quad \frac{2}{5} + \frac{1}{4} \div \frac{1}{5}$$

$$\frac{8}{20} + \frac{5}{20} \div \frac{1}{5}$$

$$\frac{13}{20} \div \frac{1}{5}$$

$$\frac{13}{20} \cdot \frac{5}{1} = \frac{13}{4} \cdot \frac{1}{1} = \frac{13}{4}$$

$$3. \quad m = \frac{3 - (-2)}{1 - 3} = \frac{3 + 2}{-2} = \frac{5}{-2} = -\frac{5}{2}$$

$$4. \quad \frac{1}{2}x - 5$$

$$\frac{1}{2}x - 5 \quad \frac{1}{2}x - 5$$

$$\frac{1}{4}x^2 - \frac{5}{2}x - \frac{5}{2}x + 25$$

$$\frac{1}{4}x^2 - \frac{10}{2}x + 25$$

$$\frac{1}{4}x^2 - 5x + 25$$

$$5. \quad 3x - 5y = -4$$

$$-5y = -3x - 4$$

$$y = \frac{3}{5}x - \frac{4}{5}$$

Since the slope =  $\frac{3}{5}$ ,

the perpendicular slope =  $-\frac{5}{3}$

$$6. \quad 3x - 7 > 5x + 6$$

$$-2x - 7 > 6$$

$$-2x > 13$$

$$x < -\frac{13}{2}$$

$$\begin{aligned}
7. \quad y &= \frac{k}{x} & y &= \frac{108}{x} \\
18 &= \frac{k}{6} & 2 &= \frac{108}{x} \\
k &= 108 & 2x &= 108 \\
& & x &= 54
\end{aligned}$$

$$8. \quad \frac{a^2 b^{-3}}{a^{-3} b^2}^{-2} = \frac{a^{-4} b^6}{a^6 b^{-4}} = \frac{b^{10}}{a^{10}} = \frac{b}{a}^{10}$$

$$9. \quad \frac{(x-1)(x-1)}{(x-1)(x+1)} \cdot \frac{(x-2)}{(x-2)(x-1)}$$

$$\frac{\cancel{(x-1)}\cancel{(x-1)}}{\cancel{(x-1)}(x+1)} \cdot \frac{\cancel{(x-2)}}{\cancel{(x-2)}\cancel{(x-1)}}$$

$$\frac{1}{(x+1)}$$

$$\begin{aligned}
10. \quad & x^3 + x^2 - ax^2 - ax \\
& x(x^2 + x - ax - a) \\
& x[(x^2 + x) + (-ax - a)] \\
& x[x(x+1) - a(x+1)] \\
& x(x-a)(x+1) \text{ These three are the factors}
\end{aligned}$$

$$\begin{aligned}
11. \quad & \frac{12\sqrt{45} - 8\sqrt{80}}{12\sqrt{9 \cdot 5} - 8\sqrt{16 \cdot 5}} \\
& \frac{36\sqrt{5} - 32\sqrt{5}}{4\sqrt{5}}
\end{aligned}$$

$$\begin{aligned}
12. \quad A &= \frac{1}{2}h(a+b) \\
2A &= h(a+b) \\
\frac{2A}{(a+b)} &= h \\
h &= \frac{2A}{(a+b)}
\end{aligned}$$

$$\begin{aligned}
 13. \quad & 3x + y = -1 \\
 & x + 2y = 3 \\
 & -2(3x + y) = -2(-1) \\
 & \underline{x + 2y = 3} \\
 & -6x - 2y = 2 \\
 & \underline{x + 2y = 3} \\
 & -5x = 5 \\
 & x = -1
 \end{aligned}$$

$$\begin{aligned}
 14. \quad & 2x^2 - 3x = 2 \\
 & 2x^2 - 3x - 2 = 0 \\
 & (2x + 1)(x - 2) = 0 \\
 & 2x + 1 = 0 \quad x - 2 = 0 \\
 & 2x = -1 \\
 & x = -\frac{1}{2} \quad x = 2 \\
 & \text{answer: } -\frac{1}{2}, 2
 \end{aligned}$$

$$\begin{aligned}
 15. \quad & \frac{1}{x-4} - \frac{1}{x-2} = \frac{1}{4} \\
 & \text{LCD: } 4(x-4)(x-2) \\
 & \frac{1}{x-4} - \frac{1}{x-2} = \frac{1}{4} \cdot 4(x-4)(x-2) \\
 & 4(x-2) - 4(x-4) = (x-4)(x-2) \\
 & 4x - 8 - 4x + 16 = x^2 - 6x + 8 \\
 & 8 = x^2 - 6x + 8 \\
 & x^2 - 6x = 0 \\
 & x(x-6) = 0 \\
 & x = 0 \quad x - 6 = 0 \\
 & \quad \quad \quad x = 6 \\
 & \text{answer: } x = 0 \text{ and } x = 6
 \end{aligned}$$

$$16. \quad \frac{\sqrt{10}}{\sqrt{3x}} \cdot \frac{\sqrt{3x}}{\sqrt{3x}} = \frac{\sqrt{30x}}{3x}$$

17.

$$\begin{aligned}
 x &= \frac{-2 \pm \sqrt{4 - 4(2)(-1)}}{4} \\
 &= \frac{-2 \pm \sqrt{4 + 8}}{4} \\
 &= \frac{-2 \pm \sqrt{12}}{4} = \frac{-2}{4} \pm \frac{2\sqrt{3}}{4} \\
 &= \frac{1}{2} \pm \frac{\sqrt{3}}{2} \\
 x &= \frac{1}{2} + \frac{1}{2}\sqrt{3} \text{ and } x = -\frac{1}{2} - \frac{1}{2}\sqrt{3}
 \end{aligned}$$

$$\begin{aligned}
 18. \quad \log \sqrt{\frac{z^3}{xy}} &= \log \frac{z^3}{xy}^{\frac{1}{2}} = \frac{1}{2} \log \frac{z^3}{xy} \\
 &= \frac{1}{2} (\log z^3 - (\log x + \log y)) \\
 &= \frac{1}{2} (3 \log z - \log x - \log y) \\
 &= \frac{3}{2} \log z - \frac{1}{2} \log x - \frac{1}{2} \log y
 \end{aligned}$$

$$19. \quad \frac{1}{8}^{-\frac{2}{3}} = 8^{\frac{2}{3}} = (\sqrt[3]{8})^2 = 2^2 = 4$$

$$\begin{aligned}
 20. \quad \log_a 7 - \log_a 20 + 2 \log_a 4 \\
 \log_a 7 - \log_a 20 + \log_a 4^2 \\
 \log_a 7 - \log_a 20 + \log_a 16 \\
 \log_a \frac{7(16)}{20} = \log_a \frac{112}{20} = \log_a \frac{28}{5}
 \end{aligned}$$

$$\begin{aligned}
 21. \quad \log_2 \frac{1}{16} &= \\
 \log_2 \frac{1}{16} &= x \\
 2^x &= \frac{1}{16} \\
 x &= -4 \\
 \log_2 \frac{1}{16} &= -4
 \end{aligned}$$

22.  $y = \log_3(x + 1)$   
 $3^y = x + 1$

y-intercept means find the point where the graph crosses the y-axis

This is when  $x = 0$

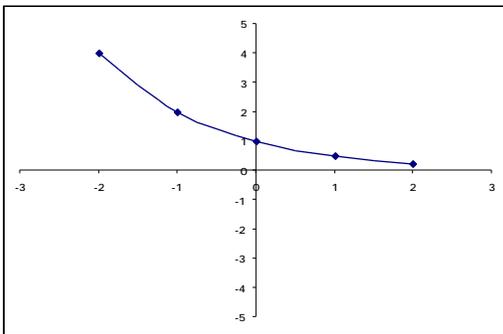
Put 0 in for x and find y.

$$3^y = 0 + 1$$

$$3^y = 1, \text{ therefore } y = 0 \text{ since } 3^0 = 1$$

The graph crosses the y-axis at  $(0, 0)$  so therefore the y-intercept = 0

23.  $y = 2^{-x}$



x	y
-2	4
-1	2
0	1
1	0.5
2	0.25

24.  $\log_3 x = 2$   
 $3^2 = x$   
 $x = 9$

25. let  $x$  and  $y$  be the two numbers.

$$x + y = \frac{3}{2}$$

$$x - y = \frac{1}{2}$$

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

$$2x = 2$$

$$x = 1, \quad 1 - y = \frac{1}{2}$$

The smaller of the two is  $\frac{1}{2}$

26.

	Present	Three years ago
Bob	$25 + x$	$25 + x - 3 = 22 + x$ and $2(x - 3)$
Jane	$x$	$x - 3$

$$22 + x = 2(x - 3)$$

$$22 + x = 2x - 6$$

$$28 + x = 2x$$

$$28 = x$$

Jane is 28 years old at the present time.

27. Paul: 5 hours alone

Sally: 3 hours alone

Together:  $t$  hours

$$\frac{1}{5}(t) + \frac{1}{3}(t) = 1$$

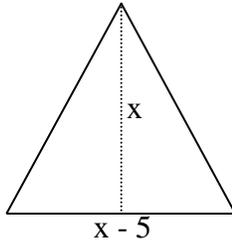
LCD is 15, therefore multiply both sides by 15

$$3t + 5t = 15$$

$$8t = 15$$

$$t = \frac{15}{8} = 1\frac{7}{8} \text{ hours}$$

28.



$$A = \frac{1}{2}bh$$

$$18 = \frac{1}{2}(x - 5)(x)$$

$$36 = x^2 - 5x$$

$$x^2 - 5x - 36 = 0$$

$$(x - 9)(x + 4) = 0$$

$$x - 9 = 0 \text{ and } x + 4 = 0$$

$$x = 9 \text{ and } x = -4$$

Since we cannot have a negative length,  
 $x = 9$ , and the base =  $9 - 5 = 4$  inches.

29.

	distance	rate	time
Car 1	$D_1$	$r + 10$	3
Car 2	$D_2$	$r$	3

Time = 3 hours since they left at  
 2:00 PM and meet at 5:00 PM

Since  $D = rt$

$$d_1 = 3(r + 10) \text{ and } d_2 = 3r$$

Since the towns are 240 miles apart,

$$d_1 + d_2 = 240, \text{ therefore}$$

$$3(r + 10) + 3r = 240$$

$$3r + 30 + 3r = 240$$

$$6r + 30 = 240$$

$$6r = 210$$

$$r = 35 \text{ and } r + 10 = 45$$

The rate of the faster car is 45 mph

30. Let  $c$  = cost of the radio to the dealer  
 $0.55c$  = the markup on the radio  
 $c + 0.55c$  = the amount he sells the radio  
 $c + 0.55c = 30.00$   
 $1.55c = 30.00$   
 $c = 19.35483871$   
Therefore, the radio sells for \$19.35

31.  $I = Prt$   
 $P$  = Principle (Amount invested)  
 $r$  = interest rate (As a decimal)  
 $t$  = time (In years)  
 $x$  = amount invested at 8%  
 $4800 - x$  = amount invested at 9%

Since  $I = Prt$ ,  
 $x(.08)(1)$  = interest earned at 8%  
 $(4800 - x)(.09)(1)$  = interest earned at 9%

$412$  = total interest earned

$$412 = x(.08)(1) + (4800 - x)(.09)(1)$$

$$412 = .08x + (.09)(4800 - x)$$

$$412 = .08x + 432 - .09x$$

$$-20 = -.01x$$

$$x = 2000$$

\$2000 was invested at 8%

\$2800 was invested at 9%

