21A

1) same, different

2) negative reciprocal

3) Y = 3X + 2, m = 3
(0) = 3(0) + b
b = 0

4) Y = 3X

5) on the graph

6) Y = 2X - 1, m = 2
(1) = 2(3) + b
b = -5

7) Y = 2X - 5

8) on the graph

9) Y = -X + 4
m = 1 (negative reciprocal)
(5) = 1(-1) + b
b = 6

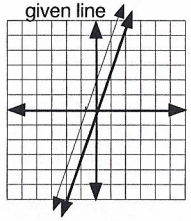
10) Y = X + 6

11) on the graph

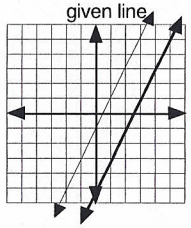
12) graph Y = X + 3
test points: (0, 0) (-1, 3)
(different test points may also be used)
Y ≤ X + 3
(0) ≤ (0) + 3 (3) ≤ (-1) + 3
0 ≤ 3, yes 3 ≤ 2, no
solid line

13) graph Y = -2X - 1
test points: (0, 0) (-1, -2)
Y < -2X - 1
(0) < -2(0) - 1 (-2) < -2(-1) - 1
0 < -1, no -2 < 1, yes
dotted line

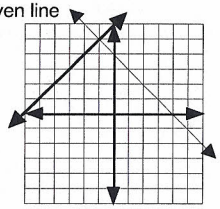
#5 given line



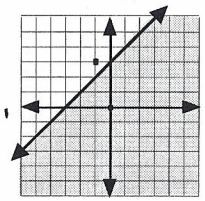
#8 given line



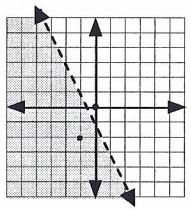
given line #11



#12



#13



21B

1) parallel

2) perpendicular

3) Y = 1/2 X - 3
m = -2 (negative reciprocal)
(-1) = -2(4) + b
b = 7

4) Y = -2X + 7

5) on the graph

6) Y = -3X
m = 1/3 (negative reciprocal)
(3) = 1/3 (-1) + b
b =10/3

7) Y = 1/3 X + 10/3

8) on the graph

9) Y = 1/3 X + 4, m = 1/3
(-2) = 1/3 (-2) + b
b = -4/3

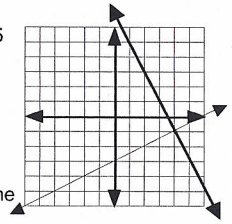
10) Y = 1/3 X - 4/3

11) on the graph

12) graph Y = 2X + 4
test points: (0, 0) (-2, 2)
Y > 2X + 4
(0) > 0(0) + 4 (2) > 2(-2) + 4
0 > 4, no 2 > 0, yes
dotted line

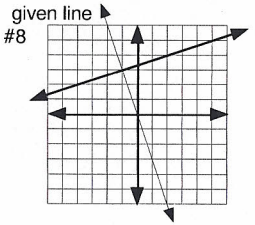
13) graph Y = -4X - 2
test points: (0, 0) (-3, 0)
Y ≤ -4X - 2
(0) ≤ -4(0) - 2 (0) ≤ -4(-3) - 2
0 ≤ -2, no 0 ≤ 10, yes
solid line

#5

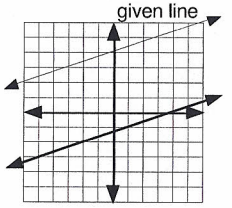


given line

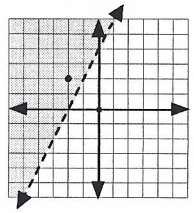
#8 given line



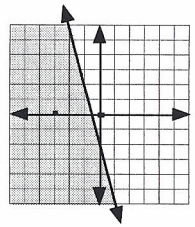
#11 given line



#12



#13



## 21C

1) $Y = X - 3,\ m = 1$
$Y = X + b \Rightarrow 0 = 1(1) + b$
$-1 = b$

2) $Y = X - 1$

3) $-X + Y = -1$

4) on the graph

5) $[2Y = -3X + 4]\ 1/2 \Rightarrow Y = -3/2\ X + 2$

6) (0, 0), (4, 0)

7) $Y > -3/2\ X + 2$ $\qquad (0) > -3/2\ (4) + 2$
$(0) > -3/2\ (0) + 2$ $\qquad 0 > -6 + 2$
$0 > 2$, no $\qquad 0 > -4$, yes

8) on the graph - dotted line

9) $m = \frac{Y_2 - Y_1}{X_2 - X_1} = \frac{0 - 3}{0 - 2} = \frac{3}{2} = m$

$Y = 3/2X + b \Rightarrow (0) = 3/2(0) + b$

$b = 0$

10) $Y = 3/2X$

11) $[-3/2\ X + Y = 0]2 \Rightarrow -3X + 2Y = 0$

12) on the graph

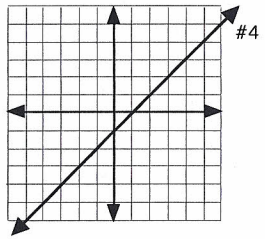
13 -15)

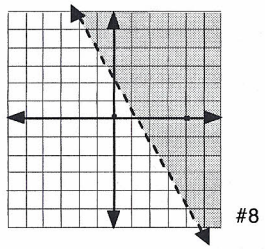

$T_E = T_G + 1$
$R_E = R_G$
$T_E + T_G = 5$

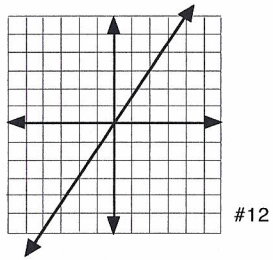
$(T_G+1)+T_G = 5$ $\qquad T_E = (T_G+1)$
$2T_G = 4$ $\qquad T_E = 2+1$
$T_G = 2$ $\qquad T_E = 3$

$D_G + D_E = 260$
$R_GT_G + R_ET_E = 260$
$R(2) + R(3) = 260$
(same rate)
$5R = 260$, $\quad R = 52$

$D_E = (52)(3) = 156$, $\quad D_G = (52)(2) = 104$




16) $\frac{3\ \text{mi.}}{1} \times \frac{1\ \text{mi.}}{1} \times \frac{5280\ \text{ft.}}{1\ \text{mi.}} \times \frac{5280\ \text{ft.}}{1\ \text{mi.}} \times$
$\frac{1\ \text{yd.}}{3\ \text{ft.}} \times \frac{1\ \text{yd.}}{3\ \text{ft.}} = 9{,}292{,}800\ \text{yd.}^2$

17) $\frac{88\ \text{gal.}}{1} \times \frac{4\ \text{qts.}}{1\ \text{gal.}} \times \frac{.95\ \text{l}}{1\ \text{qt.}} = 334.4\ \text{l}$

18) $\frac{24}{24 + 52 + 64} = .17 = 17\%$

19) $\frac{52}{140} = .37 = 37\%$

20) $\frac{64}{140} = .46 = 46\%$

## 21D

1) $[2Y = -6X + 10] \div 2$ $\qquad Y = 1/3X + b$
$Y = -3X + 5$ $\qquad (0) = 1/3(-1) + b$
$m = 1/3$ (negative reciprocal) $\qquad 1/3 = b$

2) $Y = 1/3X + 1/3$

3) $[Y = 1/3X + 1/3]\ 3$
$3Y = X + 1$
$-X + 3Y = 1$

4) on the graph

5) $Y = 3X + 1$

6) (0, 0), (-2, 0)

7) $Y < 3X + 1$ $\qquad (0) < 3(-2) + 1$
$(0)\ ,\ 3(0) + 1$ $\qquad 0 < -5$
$0 < 1$, yes $\qquad$ no

8) on the graph - dotted line

9) $m = \frac{Y_2 - Y_1}{X_2 - X_1} = \frac{2 - (-2)}{5 - (-3)} = \frac{4}{8} = \frac{1}{2} = m$

$Y = 1/2X + b \Rightarrow (2) = 1/2(5) + b$

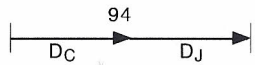
$b = -1/2$

10) $Y = 1/2X - 1/2$

11) $[-1/2X + Y = -1/2]2 \Rightarrow -X + 2Y = -1$

12) on the graph

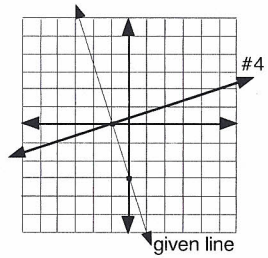
13 -15)

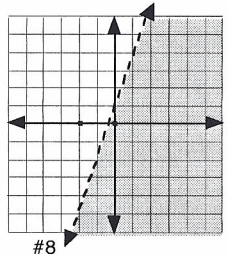


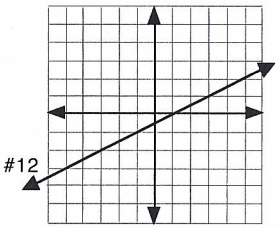

$T_C = 5$
$T_J = 2/3$
$R_C = 3R_J$

$D_C + D_J = 94$
$R_CT_C + R_JT_J = 94$
$(3R_J)(5) + (R_J)(2/3) = 94$
$15\ 2/3\ R_J = 94, \quad R_J = 6$

$R_C = 3R_J$
$R_C = 3(6) = 18$




16) $\frac{14{,}500\ \text{in.}}{1} \times \frac{1\ \text{in.}}{1} \times \frac{1\ \text{in.}}{1} \times \frac{1\ \text{ft.}}{12\ \text{in.}} \times$
$\frac{1\ \text{ft.}}{12\ \text{in.}} \times \frac{1\ \text{ft.}}{12\ \text{in.}} = 8.39\ \text{ft.}^3$

17) $\frac{50\ \text{oz.}}{1} \times \frac{1\ \text{lb.}}{16\ \text{oz.}} \times \frac{.45\ \text{kg}}{1\ \text{lb.}} = 1.4\ \text{kg}$

18) $\frac{M_M}{1260} = \frac{24}{140}$, $\quad M_M = \frac{1260(24)}{140} = 216\ \text{g}$

19) $\frac{M_C}{1260} = \frac{52}{140}$, $\quad M_C = \frac{1260(52)}{140} = 468\ \text{g}$

20) $\frac{M_O}{1260} = \frac{64}{140}$, $\quad M_O = \frac{1260(64)}{140} = 576\ \text{g}$

## 21E

1) $2Y = X$ $\quad Y = 1/2\ X + b$
$Y = 1/2\ X \quad (-3) = 1/2\ (-2) + b$
$m = 1/2 \quad -2 = b$

2) $Y = 1/2\ X - 2$

3) $2Y = X - 4$
$-X + 2Y = -4$ or $X - 2Y = 4$

4) on the graph

5) $-Y = 2X \Rightarrow Y = -2X$

6) (0, 1), (-1, 0)

7) $Y \le -2X \quad 0 \le -2(-1)$
$1 \le 0 \quad 0 \le 2$
no yes

8) on the graph - solid line

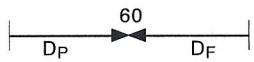
9) $m = \frac{Y_2 - Y_1}{X_2 - X_1} = \frac{4 - (-3)}{4 - (-1)} = \frac{7}{5} = m$
$Y = 7/5\ X + b \Rightarrow (4) = 7/5\ (4) + b$
$20/5 = 28/5 + b$
$b = -8/5$

10) $Y = 7/5\ X - 8/5$

11) $[-7/5\ X + Y = -8/5]\ 5 \Rightarrow -7X + 5Y = -8$

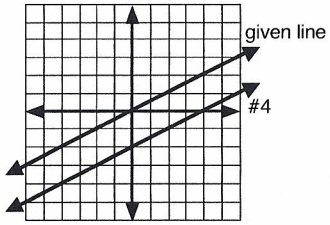
12) on the graph

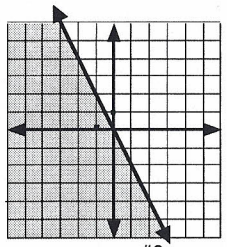
13 -15)

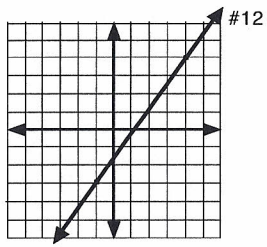



$R_P = 4$
$T_P = 12$
$R_F = 8$

$D_P + D_F = 60$
$R_PT_P + R_FT_F = 60$
$(4)(12) + (8)(T_F) = 60$
$48 + 8T_F = 60$
$8T_F = 12$
$T_F = 1\ 1/2$




16) $\frac{7.6\ \text{m}^3}{1} \times \frac{1\ \text{m}}{1} \times \frac{1\ \text{m}}{1} \times \frac{100\ \text{cm}}{1\ \text{m}} \times$
$\frac{100\ \text{cm}}{1\ \text{m}} \times \frac{100\ \text{cm}}{1\ \text{m}} = 7.6 \times 10^6\ \text{cm}^3$

17) $\frac{620\ \text{km}}{1} \times \frac{.62\ \text{mi}}{1\ \text{km}} = 384.4\ \text{mi.}$

18) $\frac{24}{24 + 5 + 35} = \frac{24}{64} = 37.5\%$

19) $\frac{5}{64} = 7.8\%$

20) $\frac{35}{64} = 54.7\%$

## 22A

1) $d = \sqrt{\Delta X^2 + \Delta Y^2}$ or $d = \sqrt{(X2 - X1)^2 + (Y2 - Y1)^2}$

2) $\left(\frac{X_1 + X_2}{2}, \frac{Y_1 + Y_2}{2}\right)$

3) on the graph

4) $(AB)^2 = [(1) - (-2)]^2 + [(5) - (3)]^2 = (3)^2 + (2)^2 = 13$
$AB = \sqrt{13}$

5) $(BC)^2 = [(3) - (1)]^2 + [(-2) - (5)]^2 = (2)^2 + (-7)^2 = 53$
$BC = \sqrt{53}$

6) $(DE)^2 = [(-4) - (-1)]^2 + [(-3) - (-1)]^2 = (-3)^2 + (-2)^2 = 13$
$DE = \sqrt{13}$

7) on the graph

8) $(AB)^2 = [(3) - (-4)]^2 + [(2) - (4)]^2 = (7)^2 + (-2)^2 = 53$
$AB = \sqrt{53}$

9) $(BC)^2 = [(5) - (3)]^2 + [(-3) - (2)]^2 = (2)^2 + (-5)^2 = 29$
$BC = \sqrt{29}$

10) $(DE)^2 = [(-5) - (2)]^2 + [(-2) - (-3)]^2 = (-7)^2 + (1)^2 = 50$
$DE = \sqrt{50} = 5\sqrt{2}$

11) on the graph

12) $\left(\frac{(-6) + (4)}{2}, \frac{(2) + (-3)}{2}\right)$ midpoint = (-1, -1/2)

13) $\left(\frac{(-2) + (4)}{2}, \frac{(4) + (-3)}{2}\right)$ midpoint = (1, 1/2)

14) $\left(\frac{(-2) + (3)}{2}, \frac{(-2) + (4)}{2}\right)$ midpoint = (1/2, 1)

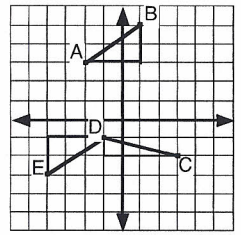
15) on the graph

16) $\left(\frac{(0) + (5)}{2}, \frac{(0) + (1)}{2}\right)$ midpoint = (5/2, 1/2)

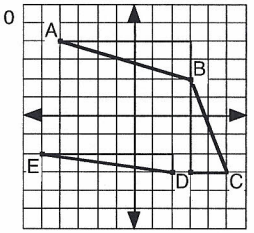
17) $\left(\frac{(-3) + (-4)}{2}, \frac{(5) + (-1)}{2}\right)$ midpoint = (-7/2, 2)

18) $\left(\frac{(0) + (0)}{2}, \frac{(0) + (-3)}{2}\right)$ midpoint = (0, -3/2)

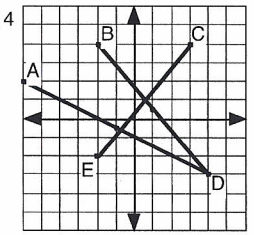
#3-6




#7-10




#11-14




#15-18