Name_____ Date_____ Period_____

Worksheet P.4—Equations of Lines

Show all work. No Calculator

1. Write an equation of the (a) vertical line and (b) horizontal line passing through the point $(-7, \pi)$.

2. Write an equation of the line in **general form** passing through the points $(-3, 4)$ and $(5, -1)$. Remember to exclude and fractions in your final answer.

3. Write an equation of the line through the point $\left(4, \frac{1}{2}\right)$ that is (a) parallel to and

   (b) perpendicular to the line $4x - 3y = 6$. Then (c) both the *x*- and *y*- intercepts of the line found in part (b).

4. Find the value of *x* for which line through $(-8, -3)$ and $(x, 4)$ has a slope of 3.

5. Mr. Wenzel leaves school in his truck along Loop 337 at time $t = 0$ traveling at 45 mph.
   (a) Write an expression $d(t)$ for the distance Mr. Wenzel travels from school beginning at $t = 0$ hours.

   (b) Graph $y = d(t)$

   (c) What is the slope of the graph in part (b)? What does it have to do with the truck?

   (d) Create a scenario in which *t* could have negative values.

   (e) Create a scenario in which the *y*-intercept of $y = d(t)$ could be 15.

   (f) Create a scenario in which there would NOT be an orange cone in the back of Mr. Wenzel's truck.

6. The tangent line to the graph of $f(x) = 4x^2$ at $x = -1$ has an equation $y = -8x - 4$.

   (a) Find the coordinate $(x, f(x))$ of the point of tangency.

   (b) Find the equation of the normal line at this point.

   (c) Find the other coordinate where the normal line intersects the function *f*.

   (d) The tangent line of *f* at $x = -1$ is used to approximate $f(-2)$. Find this approximation.

   (e) Is your approximation from part (d) an over or and under approximation of the true value of $f(-2)$? Justify.

Multiple Choice

_____ 7. Which of the following is an equation of the line through $(-3,4)$ with a slope of $\frac{1}{2}$?

(A) $y-4=\frac{1}{2}(x+3)$ (B) $y+3=\frac{1}{2}(x-4)$ (C) $y-4=-2(x+3)$

D) $y-4=2(x+3)$ (E) $y+3=2(x-4)$

_____ 8. Which of the following is an equation of the vertical line through $(2,-4)$?

(A) $y=-4$ (B) $x=-2$ (C) $y=4$ (D) $x=0$ (E) $x=2$

_____ 9. Which of the following is the *x*-intercept of the line $y=2x-5$?

(A) $x=-5$ (B) $x=5$ (C) $x=0$ (D) $x=\frac{5}{2}$ (E) $x=-\frac{5}{2}$

_____ 10. Which of the following is an equation of the line through $(-2,-1)$ parallel to the line $y=-3x+1$?

(A) $y=-3x+5$ (B) $y=-3x-7$ (C) $y=\frac{1}{3}x-\frac{1}{3}$ (D) $y=-3x+1$ (E) $y=-3x-4$

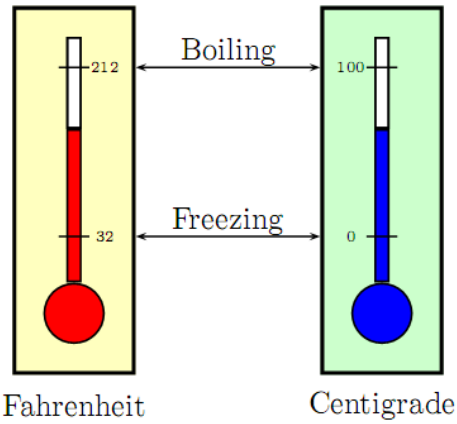
_____ 11. Find the *x*-intercept of the straight line passing through the point $(4,5)$ and parallel to $y+3x=1$.

(A) $\frac{17}{4}$ (B) 6 (C) $\frac{17}{3}$ (D) $-\frac{7}{3}$ (E) $-\frac{17}{3}$

_____ 12. Find the *y*-intercept of the straight line passing through the point $(5,3)$ and perpendicular to $y+2x=1$.

(A) $-\frac{1}{2}$ (B) $\frac{11}{2}$ (C) $\frac{1}{2}$ (D) 0 (E) $-\frac{11}{2}$

_____ 13. There is a linear relationship $T_F = mT_C + b$ between the temperature T_F on the Fahrenheit scale and its equivalent T_C on the Centigrade scale. As the thermometers show, water freezes at $32^\circ F$ and boils at $212^\circ F$, whereas it freezes at $0^\circ C$ and boils at $100^\circ C$. Convert $-5^\circ C$ to its Fahrenheit equivalent.



(A) $\approx 23^\circ F$ (B) $\approx 24^\circ F$ (C) $\approx 20^\circ F$ (D) $\approx 22^\circ F$ (E) $\approx 21^\circ F$