Drill 8

1 D In order to solve this problem, re-write the equation in slope-intercept form:

$3x - 7y = 28 \rightarrow y = \frac{3}{(7)}x - 4$

Therefore, the slope of this line is $\frac{3}{7}$. In order for a line to be perpendicular, it must have a slope that is the negative reciprocal of the slope of the given line. For (A), the line is $3x - 7y = 28$, so it is eliminated. Choice (B) has a positive slope, so it cannot be correct. Eliminate it as well.

Choice (C) has a slope that is the opposite sign of the equation in the problem, but it is not the reciprocal. Eliminate it. Choice (D) has a slope that is $-\frac{7}{3}$, which is the negative reciprocal of the original line, making (D) the correct answer.

2. D Draw both lines on an x, y-coordinate plane and solve. If line p has a slope of 0 and a y-intercept of 4, then it is a horizontal line that lies on $y = 4$. If line q has a slope that is undefined and an x-intercept of 4, then it is a vertical line that lies on $x = 3$. These lines, therefore, intersect at point (3, 4).

Now draw a line from point (3, 4) to (0, 0) to form a right triangle with sides of 3 and 4. Therefore, the length of the hypotenuse is 5, making (D) correct.

3. **B** This question is straightforward, but takes a bit of work, as to find the average, you'll first have to find the slope for each of the lines. Since you are given both end points of each line, the origin and the end point written on the graph, apply each set of points to your slope formula, $m = \frac{y_2 - y_1}{x_2 - x_1}$. Line *OA*'s slope = –4, line *OB*'s slope = 2, line *OC*'s slope = 1, line *OD*'s slope = –1, and line *OE*'s slope = –3. Now find the average of the slopes: $\frac{(-4+1+2+-1+-3)}{5} = -1$. Thus, (B) is the correct answer.

4 **D** Two strategies could be used to solve this problem: Plug in values for x and y, or re-write the equations in the answer choices in slope-intercept format and use process of elimination.

To plug in, use point (5,2) for line *d* and (0,3) for line *e* to find the following:

A) line *d*: 5(5) + 2(2) = 10 → NOT true
   line *e*: 4(0) + (3) = 6 → NOT true
B) line *d*: 5 + 5(2) = 15 → True
   line *e*: 3(0) - 3 = 6 → NOT true (careful! Make sure to check all five answer choices)
C) line *d*: -3(5) + 4(2) = 10 → NOT true
   line *e*: 2(0) + 2(3) = 6 → True (careful! Make sure to check all five answer choices)
D) line *d*: 2(5) – 4(2) = 2 → True
   line *e*: 3(0) + 6(3) = 18 → True

Thus, the correct answer is (D).

5. **C** First, plug in 6 into the expression for *f*: d(6) = $f(\frac{1}{2}(6) - 1) = f(2)$. Then find 2 on the x-axis in the graph provided. Draw a line up until you hit the $f(x)$ line. Draw another line horizontally to the y-axis. The y value for $f(2)$ is 3, so (C) is correct.

6. A Use the slope formula to find the equation of line k: $m = \frac{y_2 - y_1}{x_2 - x_1}$, so $m = \frac{\frac{31}{7} - \left(-\frac{4}{7}\right)}{9 - 0} = \frac{5}{9}$.

You already know the y-intercept of line l from the point $(0, -\frac{4}{7})$, so the equation of line l is $y = \frac{5}{9}x - \frac{4}{7}$. To find the point of intersection, put the non-y sides of the equations equal to each other and solve:

$$\frac{5}{9}x - \frac{4}{7} = -\frac{4}{7}x + \frac{5}{9}$$
$$\frac{71}{63}x = \frac{71}{63}$$
$$x = 1$$

Only choice (A) has an x value of 1, but if needed, you can then plug $x = 1$ into the equation for either line and solve for y.

Another way to find the point of intersection is to graph both lines on your calculator. You'll be able to see that the lines intersect right at $x = 1$, which eliminates all answers other than (A).

You can also use Process of Elimination to Ballpark a few answers away. The y-intercept of line l is $(0, -\frac{4}{7})$, so $(0, \frac{5}{9})$ won't be on line k; eliminate choice (B). The y-intercept of line m is given by the b term: $(0, \frac{5}{9})$. $(0, -\frac{4}{7})$ will therefore not be on line m; eliminate choice (D). Finally, use the given equation of line m and Plug In the Answers. Making $x = 1$ will be much easier than making $x = -\frac{1}{63}$, so test choice (A). When $x = 1$, $y = -\frac{1}{63}$ on line m, so choose (A).