16. Cars The power P that must be delivered by a car engine varies directly as the distance d that the car moves and inversely as the time t required to move that distance. To move the car 500 m in 50 s, the engine must deliver 147 kilowatts (kW) of power. How many kilowatts must the engine deliver to move the car 700 m in 30 s?

PRACTICE AND PROBLEM SOLVING

Given: y varies directly as x. Write and graph each direct variation function.

17. $y = 4$ when $x = 8$ **18.** $y = 12$ when $x = 2$ **19.** $y = -15$ when $x = 5$

20. Medicine The dosage d of a drug that a physician prescribes varies directly as the patient's mass m, and $d = 100$ mg when $m = 55$ kg. Find d to the nearest milligram when $m = 70$ kg.

21. Nutrition The number of Calories C in a horned melon varies directly as its weight w, and $C = 25$ Cal when $w = 3.5$ oz. How many Calories are in the horned melon shown on the scale? Round to the nearest Calorie.

12.35 oz

22. Agriculture The number of bags of soybean seeds N that a farmer needs varies jointly as the number of acres a to be planted and the pounds of seed needed per acre p, and $N = 980$ when $a = 700$ acres and $p = 70$ lb/acre. Find N when $a = 1000$ acres and $p = 75$ lb/acre.

23. Physics The heat Q required to raise the temperature of water varies jointly as the mass m of the water and the amount of temperature change T, and $Q = 20{,}930$ joules (J) when $m = 1$ kg and $T = 5°C$. Find m when $Q = 8372$ J and $T = 10°C$.

Given: y varies inversely as x. Write and graph the inverse variation function.

24. $y = 1$ when $x = 0.8$ **25.** $y = 1.75$ when $x = 6$ **26.** $y = -2$ when $x = 3$

27. Entertainment The number of days it takes a theater crew to set up a stage for a musical varies inversely as the number of workers. If the stage can be set up in 3 days by 20 workers, how many days would it take if only 12 workers were available?

Determine whether each data set represents a direct variation, an inverse variation, or neither.

28.

x	5	6.25	10
y	5	4	2.5

29.

x	5	7	9
y	3	5	7

30.

x	8	14	24
y	12	21	36

31. Chemistry The volume V of a gas varies inversely as the pressure P and directly as the temperature T. A certain gas has a volume of 20 L, a temperature of 320 K, and a pressure of 1 atm. If the gas is compressed to a volume of 15 L and is heated to 330 K, what will the new pressure be?

Tell whether each statement is sometimes, always, or never true.

32. Direct variation is a linear function.

33. A linear function is a direct variation.

34. An inverse variation is a linear function.

35. In a direct variation, $x = 0$ when $y = 0$.

36. The graph of an inverse variation passes through the origin.