SOLVING EQUATIONS: APPLICATION WORKSHEET

PRACTICE EXERCISES

Answer each of the following questions in the space provided.

1. Volcanoes and geysers illustrate that Earth's interior is very hot. The formula $T = 10d + 20$ is used to estimate the temperature, T degrees Celsius, at a depth of d kilometers.

   a. Determine the temperature in a mine shaft that is 0.5 km below the surface of the earth.

$$T = 10d + 20$$
$$T = 10(0.5) + 20$$
$$T = 5 + 20$$
$$T = 25°$$

∴ The temp is 25°C

   b. At what depth is the temperature 100°C?

$$100 = 10d + 20$$
$$100 - 20 = 10d$$
$$\frac{80}{10} = \frac{10d}{10}$$

$d = 8$ ∴ The depth is 8 km

2. The formula for the perimeter P of a rectangle with length L and width W is $P = 2L + 2W$

   a. Determine the perimeter of a field that is 200 m long and 100 m wide.

$$P = 2\ell + 2w$$
$$P = 2(200) + 2(100)$$
$$P = 400 + 200$$
$$P = 600$$

∴ The perimeter is 600m

   b. Determine the width of a field having a perimeter of 450 m and a length of 135 m.

$$450 = 2w + 2(135)$$
$$450 = 2w + 270$$
$$450 - 270 = 2w$$
$$\frac{180}{2} = \frac{2w}{2}$$
$$90 = w$$

∴ The width is 90m

3. The exact equation for converting Celsius temperatures to Fahrenheit is $F = 1.8C + 32$, where C represents a temperature reading in degrees Celsius and F represents the equivalent reading in degrees Fahrenheit.

   a. Convert 3°C to Fahrenheit.

$$F = 1.8C + 32$$
$$F = 1.8(3) + 32$$
$$F = 5.4 + 32$$
$$F = 37.4°F$$

∴ 37.4°F

   b. Convert 75°F to Celsius.

$$75 = 1.8C + 32$$
$$75 - 32 = 1.8C$$
$$\frac{43}{1.8} = \frac{1.8C}{1.8}$$
$$23.9 = C$$

∴ 23.9°C

4. Scientists can determine the length of a giant squid by measuring the diameter of the suction-pod scars left on its prey. The formula $L = 180D$ gives the length, L, of a squid in centimeters from the diameter, D, of its suction pods in centimeters.

a. A sperm whale was found with suction-pod scars that measured 3.5 cm in diameter. How many metres long was the squid that made these scars?

$L = 180D$

$L = 180(3.5)$

$L = 630$ cm

∴ The length of the squid is 630 cm

b. The longest squid, to date, was found in New Zealand. It was 9.72 m long. What was the diameter of its suction pods?

$L = 180D$

$\dfrac{972}{180} = \dfrac{180D}{180}$

$5.4 cm = D$

L ↑ must be in cm
x 100
= 972 cm

∴ The diameter of the suction pods is 5.4 cm

5. Oil is being drained from a tank so that the amount of oil (R litres) remaining after a given time (t seconds) is given by the equation $R = -10t + 500$.

a. How many litres of oil remain in the tank after 20 s?

$R = -10t + 500$

$R = -10(20) + 500$

$R = -200 + 500$

$R = 300$

∴ 300 L of oil remains

b. How long does it take to drain 100L?

$R = -10t + 500$

$100 = -10t + 500$

$100 - 500 = -10t$

$\dfrac{-400}{-10} = \dfrac{-10t}{-10}$

$40 = t$

∴ It takes 40 s