Chapter 4 Review

MPM2D

Name: ANSWERS

Section 1: Solving Equations

Remember the steps for solving equations:

1. Eliminate fractions by multiplying all terms by a common denominator
2. Eliminate brackets using the distributive law
3. Collect like terms on each side of the equation
4. Isolate the variables on one side of the equation
5. Solve for the variable.

1. Solve for the unknown variable in each equation

a) $8 + m = -2$

$m = -2 - 8$

$m = -10$

b) $k - 7 = -11$

$k = -11 + 7$

$k = -4$

c) $3x = 18$

$x = \frac{18}{3}$

$x = 6$

d) $\frac{h}{5} = -4$

$h = -4(5)$

$h = -20$

e) $2y - 7 = 13$

$2y = 13 + 7$

$2y = 20$

$y = \frac{20}{2}$

$y = 10$

f) $4 + 5x = -21$

$5x = -21 - 4$

$5x = -25$

$x = \frac{-25}{5}$

$x = -5$

g) $7w - 4 + w + 12 = 0$

$8w + 8 = 0$

$8w = -8$

$w = \frac{-8}{8}$

$w = -1$

h) $5 + 11x = 1 + x$

$11x - x = 1 - 5$

$10x = -4$

$x = -4/10$

$x = -2/5$

i) $5(x + 2) = 10$

$5x + 10 = 10$

$5x = 10 - 10$

$5x = 0$

$x = 0/5$

$x = 0$

j) $4 - (3p - 2) = p - 10$

$4 - 3p + 2 = p - 10$

$6 + 10 = p + 3p$

$16 = 4p$

$\frac{16}{4} = p$ → $4 = p$

k) $3 + (h - 2) = 5 + 3h$

$3 + h - 2 = 5 + 3h$

$3 - 2 - 5 = 3h - h$

$-4 = 2h$

$\frac{-4}{2} = h$

$-2 = h$

l) $\frac{1}{2}(u - 5) = 2u + 5$

$\frac{u - 5}{2} = 2u + 5$

$u - 5 = 2(2u + 5)$

$u - 5 = 4u + 10$

$-15 = 3u$

$-5 = u$

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4.8 + 5.2

m) $2(x-8) = -4(2x-1)$

$2x-16 = -8x+4$

$2x+8x = 4+16$

$10x = 20$

$x = \frac{20}{10}$

$x = 2$

n) $(y+1)-(y-9) = 2(5y-6)-8$

$y+1-y+9 = 10y-12-8$

$10 = 10y-20$

$10+20 = 10y$

$30 = 10y$

$\frac{30}{10} = y$

$3 = y$

o) $\frac{5}{9}(x-3) = 10$

$\frac{5(x-3)}{9} = 10$

$5(x-3) = 90$

$x-3 = \frac{90}{5}$

$x-3 = 18$

$x = 21$

p) $-3 = \frac{5x+4}{7}$

$-3(7) = 5x+4$

$-21 = 5x+4$

$-21-4 = 5x$

$-25 = 5x$

$\frac{-25}{5} = x$

$-5 = x$

q) $\frac{3x+2}{2} - \frac{x+1}{3} = x$

$3\cancel{6}\left(\frac{3x+2}{\cancel{2}}\right) - \cancel{6}^{2}\left(\frac{x+1}{\cancel{3}_{1}}\right) = 6x$

$3(3x+2) - 2(x+1) = 6x$

$9x+6-2x-2 = 6x$

$7x-6x = -4$

$x = -4$

r) $\frac{x+3}{4} = \frac{x-5}{6}$

$6(x+3) = 4(x-5)$

$6x+18 = 4x-20$

$6x-4x = -20-18$

$2x = -38$

$x = -38/2$

$x = -19$

s) $2(n-6) = -4(2n-1)$

$2n-12 = -8n+4$

$2n+8n = 4+12$

$10n = 16$

$n = \frac{16}{10}$

$n = \frac{8}{5}$

t) $3(2x-5) - x = 4 + (3x+7)$

$6x-15-x = 4+3x+7$

$5x-3x = 11+15$

$2x = 26$

$x = \frac{26}{2}$

$x = 13$

u) $7 = \frac{6x+8}{4}$

$4(7) = 6x+8$

$28 = 6x+8$

$28-8 = 6x$

$20 = 6x$

$\frac{20}{6} = x$

$\frac{10}{3} = x$

Section 2: Modeling With Formulas

2. Rearrange the following formulas to isolate the indicated variable.

a) $A = P + I$ *for* P

$A-I = P$

b) $v = u + at$ *for* a

$v-u = at$

$\frac{v-u}{t} = a$

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c) $P = 2(l + w)$ *for* l

$\frac{P}{2} = l + w$

$\frac{P}{2} - w = l$

d) $v = \frac{d}{t}$ *for* t

$v(t) = d$

$t = \frac{d}{v}$

e) $E = mv^2$ *for* v

$\frac{E}{m} = v^2$

$\sqrt{\frac{E}{m}} = v$

f) $d = \frac{1}{2}at^2$ *for* t

$2d = at^2$

$\frac{2d}{a} = t^2$

$\sqrt{\frac{2d}{a}} = t$

3. The power, P, in an electric ciruit is related to the current, I, and resistance, R, by the formula $P = I^2R$

a) Find the power, in watts, when the current is 0.5 amperes and the resistance is 600 ohms:

$P = (0.5)^2(600)$

$= 150$

150 watts

b) What is the resistance of a circuit that uses 500 watts of power with a current of 2 amperes?

$R = \frac{P}{I^2}$

$= \frac{500}{(2)^2}$

$= \frac{500}{4}$ $= 125$

125 ohms

c) The resistance in a circuit is 4 ohms. The same circuit uses 100 watts of power. Find the current in the circuit:

$I = \sqrt{\frac{P}{R}}$

$I = \sqrt{\frac{100}{4}}$

$I = \sqrt{25}$

$I = 5$

5 amperes

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Section 3: Modelling With Alebra

4. **Write an algebraic equation to model each situation.**

a) Four times a number is twenty $4x = 20$

b) The square of a number is twenty-five $x^2 = 25$

c) Ten decreased by a number is two $10 - x = 2$

d) A number divided by five is ten $\frac{x}{5} = 10$

e) There are 16 more white keys than black keys on a full-sized piano keyboard. There are 88 keys on a piano. $x + (x+16) = 88$

f) Brad has $12 more than John. Together they have $84 $x + (x+12) = 84$

Section 4: Applications

5. **Jennifer is twice as old as Peter. The difference between their ages is 15 years. What is Peters age?**

Jennifers age = $2x$

Peters age = x

$2x - x = 15$

$x = 15$

Peter is 15

6. **Sven sells hamburgers at a ballpark. He earns $7.50/h, plus $0.40 for each hamburger he sells.**

a) How much will Sven earn in a 3 hour shift if he sells 24 hamburgers?

t = hours

x = hamburgers

Earnings $= 7.50t + 0.40x$

$= 7.50(3) + 0.40(24)$

$= 22.50 + 9.60$

$= 32.10$

He will earn $32.10

b) How many hamburgers must Sven sell to earn $100 in a 6.5 hour shift?

$100 = 7.50(6.5) + 0.4x$

$100 = 48.75 + 0.4x$

$51.25 = 0.4x$

$128.1 = x$

Sven will have to sell 129 hamburgers.

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7. **International basketball competitions are played on a rectangular court where the length is 2 m less than twice the width. If the perimeter of the court is 86 m, what are the dimensions of the court?**

length = $2w-2$

width = w

Perimeter = $2l+2w$

$86 = 2(2w-2)+2w$

$86 = 4w-4+2w$

$86 = 6w-4$

$90 = 6w$

$15 = w$

Length $= 2(15)-2$

$= 30-2$

$= 28$ m

Width = 15 m

8. **The sum of three consecutive numbers is 42. Find the numbers.**

$x+(x+1)+(x+2) = 42$

$x+x+1+x+2 = 42$

$3x+3 = 42$

$3x = 39$

$x = 39/3$

$x = 13$

The numbers are 13, 14, and 15.

For more practice complete the Practice Test on pg. 232