24E

1)

$$\begin{array}{r} X+4 \\ 2X+2\,\big)\,\overline{2X^2+10X+8} \\ -(2X^2+2X) \\ \hline 8X+8 \\ -(8X+8) \\ \hline 0 \end{array}$$

2)

$$\begin{array}{r} 2X+2 \\ \times\quad X+4 \\ \hline 8X+8 \\ 2X^2+2X \quad \\ \hline 2X^2+10X+8 \end{array}$$

3)

$$\begin{array}{r} 3X-2 \\ X+4\,\big)\,\overline{3X^2+10X-8} \\ -(3X^2+12X) \\ \hline -2X-8 \\ -(-2X-8) \\ \hline 0 \end{array}$$

4)

$$\begin{array}{r} 3X-2 \\ \times\quad X+4 \\ \hline 12X-8 \\ 3X^2-2X \quad \\ \hline 3X^2+10X-8 \end{array}$$

5)

$$\begin{array}{r} 2X+4 \quad R\ 3 \\ 2X-5\,\big)\,\overline{4X^2-2X-17} \\ -(4X^2-10X) \\ \hline 8X-17 \\ -(8X-20) \\ \hline 3 \end{array}$$

6)

$$\begin{array}{r} 2X-5 \\ \times\quad 2X+4 \\ \hline 8X-20 \\ 4X^2-10X \quad \\ \hline 4X^2-2X-20 \\ +3 \\ \hline 4X^2-2X-17 \end{array}$$

7) $X+3$

8)

$$\begin{array}{r} X+3 \\ \times\quad X+3 \\ \hline 3X+9 \\ X^2+3X \quad \\ \hline X^2+6X+9 \end{array}$$

9) $(2^2)^3 = 2^6$

10) $X^{4\cdot 3}Y^{-2\cdot 3}X^{-3}Y^{-5}X^{1} = X^{10}Y^{-11}$

11) $(10)^4 = (10^1)^4$

12) $3A^3B^3 + 6A^4B^3 - 7A^3B^3 =$
$6A^4B^3 - 4A^3B^3$

13) 1.725

14) 7,000

15) $3X^2 + 5X - 16$

16) $X^2 + 6X + 4$

17) $2 \times 2 \times 3 \times 11$

18) $2X$

19) $18 \div 9 = 2$ hours

20) $18 \div 3 = 6$ hours

25A

1) $(X-2)(X+2)$

$$\begin{array}{r} X+2 \\ \times\quad X-2 \\ \hline -2X-4 \\ X^2+2X \quad\quad \\ \hline X^2 \quad\quad -4 \end{array}$$

2) $(X-4)(X+4)$

$$\begin{array}{r} X+4 \\ \times\quad X-4 \\ \hline -4X-16 \\ X^2+4X \quad\quad \\ \hline X^2 \quad\quad -16 \end{array}$$

3) $(X-5)(X+5)$ Continue to check by multiplying.

4) $(Y-12)(Y+12)$

5) $(X-10)(X+10)$

6) $(X-9)(X+9)$

7) $(X-7)(X+7)$

8) $(X-8)(X+8)$

9) $(A-11)(A+11)$

10) $(X-Y)(X+Y)$

11) $(B-2)(B+2)$

12) $(X-3)(X+3)$

13)

$$\begin{array}{r} 65 \\ 65 \\ \hline 4225 \end{array}$$

14)

$$\begin{array}{r} 35 \\ 35 \\ \hline 1225 \end{array}$$

15)

$$\begin{array}{r} 48 \\ 42 \\ \hline 2016 \end{array}$$

16)

$$\begin{array}{r} 85 \\ 85 \\ \hline 7225 \end{array}$$

25B

1) $(X-1)(X+1)$

$$\begin{array}{r} X+1 \\ \times\quad X-1 \\ \hline -X-1 \\ X^2+X \quad\quad \\ \hline X^2 \quad\quad -1 \end{array}$$

2) $(X-6)(X+6)$

$$\begin{array}{r} X+6 \\ \times\quad X-6 \\ \hline -6X-36 \\ X^2+6X \quad\quad \\ \hline X^2 \quad\quad -36 \end{array}$$

3) $(Y-4)(Y+4)$ Continue to check by multiplying.

4) $(A-B)(A+B)$

5) $(A-7)(A+7)$

6) $(B-5)(B+5)$

7) $(Y-X)(Y+X)$

8) $(X-2)(X+2)$

9) $(A-12)(A+12)$

10) $4(X^2-Y^2) = 4(X-Y)(X+Y)$

11) $(B-8)(B+8)$

12) $(X-9)(X+9)$

13)

$$\begin{array}{r} 57 \\ 53 \\ \hline 3021 \end{array}$$

14)

$$\begin{array}{r} 75 \\ 75 \\ \hline 5625 \end{array}$$

15)

$$\begin{array}{r} 35 \\ 35 \\ \hline 1225 \end{array}$$

16)

$$\begin{array}{r} 96 \\ 94 \\ \hline 9024 \end{array}$$

25C

1) $(X - 4)(X + 4)$

2)
$$\begin{array}{r} X - 4 \\ \times\ X + 4 \\ \hline 4X - 16 \\ X^2 - 4X \\ \hline X^2 - 16 \end{array}$$

3) $(X - 6)(X + 6)$

4)
$$\begin{array}{r} X - 6 \\ \times\ X + 6 \\ \hline 6X - 36 \\ X^2 - 6X \\ \hline X^2 - 36 \end{array}$$

5)
$$X - 1 \overline{)\ 2X^2 + 3X + 5}$$
$$2X + 5 \text{ R } 10$$
$$-(2X^2 - 2X)$$
$$5X + 5$$
$$-(5X - 5)$$
$$10$$

6)
$$\begin{array}{r} 2X + 5 \\ \times\ X - 1 \\ \hline -2X - 5 \\ 2X^2 + 5X \\ \hline 2X^2 + 3X - 5 \\ + 10 \\ \hline 2X^2 + 3X + 5 \end{array}$$

7) $\pm 2X$

8) $\sqrt{4(10)^2} = \sqrt{400} = \pm 20$

$\pm 2(10) = \pm 20$

9)
$$\begin{array}{r} 45 \\ 45 \\ \hline 2025 \end{array}$$

10)
$$\begin{array}{r} 37 \\ 33 \\ \hline 1221 \end{array}$$

11) $(X - 7)(X - 11)$

12)
$$\begin{array}{r} X - 7 \\ \times\ X - 11 \\ \hline -11X + 77 \\ X^2 - 7X \\ \hline X^2 - 18X + 77 \end{array}$$

13) 2^{25}

14) $Y = 3/2X - 3$
slope = 3/2

15) origin

16) $DX + 3D + 2X + 6$

17)
$$\begin{array}{r} 300{,}000{,}000 \\ \times\ 1000 \\ \hline \$\ 300{,}000{,}000{,}000 \text{ given} \end{array}$$

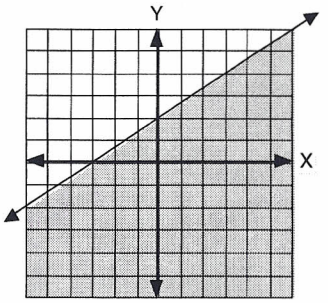
$300 billion is not enough to pay the debt.

18) $5(24Y + 12X = 36$
$12(5Y - 5X = 10)$

$$\begin{array}{r} 120Y + 60X = 180 \\ 60Y - 60X = 120 \\ \hline 180Y = 300 \\ Y = 5/3 \end{array}$$

$5(5/3) - 5X = 10$
$X = -1/3$

$(-1/3, 5/3)$



19) on the graph $(Y \leq 2/3\ X + 2)$

20) yes

25D

1) $(X - 2)(X + 2)$

2)
$$\begin{array}{r} X - 2 \\ \times\ X + 2 \\ \hline 2X - 4 \\ X^2 - 2X \\ \hline X^2 - 4 \end{array}$$

3) $(X - 5)(X + 5)$

4)
$$\begin{array}{r} X - 5 \\ \times\ X + 5 \\ \hline 5X - 25 \\ X^2 - 5X \\ \hline X^2 - 25 \end{array}$$

5)
$$X + 2 \overline{)\ 2X^2 + 7X + 6}$$
$$2X + 3$$
$$-(2X^2 + 4X)$$
$$3X + 6$$
$$-(3X + 6)$$
$$0$$

6)
$$\begin{array}{r} 2X + 3 \\ \times\ X + 2 \\ \hline 4X + 6 \\ 2X^2 + 3X \\ \hline 2X^2 + 7X + 6 \end{array}$$

7) $X + 5$

8) $10^2 + 10(10) + 25 = 225$

$$\begin{array}{r} 10 + 5 \\ \times\ 10 + 5 \\ \hline 50 + 25 \\ 100 + 50 \\ \hline 100 + 100 + 25 = 225 \end{array}$$

9)
$$\begin{array}{r} 65 \\ 65 \\ \hline 4225 \end{array}$$

10)
$$\begin{array}{r} 78 \\ 72 \\ \hline 5616 \end{array}$$

11) $(X + 4)(X - 1)$

12)
$$\begin{array}{r} X + 4 \\ \times\ X - 1 \\ \hline -X - 4 \\ X^2 + 4X \\ \hline X^2 + 3X - 4 \end{array}$$

13) $(7^2)^3 = 7^6$

14) $Y = -2X - 1/2$
slope = -2

15) $A(C + D + E) + B(C + D + E) =$
$AC + AD + AE + BC + BD + BE$

16)
$$\begin{array}{r} 300{,}000{,}000 \\ \times\ 10{,}000 \\ \hline \$\ 3{,}000{,}000{,}000{,}000 \text{ given} \end{array}$$

$3 trillion is not enough to pay the debt.

17 and 18)

Rate	Time
20 mph	1 hr.
10 mph	2 hrs.
5 mph	4 hrs.
4 mph	5 hrs.
1 mph	20 hrs.

Notice that the rate times the time always equals the distance traveled.

19 and 20)

Rate	Time
12 mph	1 hr.
6 mph	2 hrs.
4 mph	3 hrs.
3 mph	4 hrs.
2 mph	6 hrs.
1 mph	12 hrs.

25E

1) $(X - 3)(X + 3)$

2)
$$\begin{array}{r} X - 3 \\ \times\ X + 3 \\ \hline 3X - 9 \\ X^2 - 3X \\ \hline X^2 \quad - \quad 9 \end{array}$$

3) $(X - Y)(X + Y)$

4)
$$\begin{array}{r} X - Y \\ \times\ X + Y \\ \hline XY - Y^2 \\ X^2 - XY \\ \hline X^2 \quad - \quad Y^2 \end{array}$$

5)
$$\begin{array}{r} 2X^2 + X \text{ R } -8 \\ X + 4 \overline{)\ 2X^3 + 9X^2 + 4X - 8} \\ -(2X^3 + 8X^2) \\ \hline X^2 + 4X \\ -(X^2 + 4X \\ \hline 0 - 8 \end{array}$$

6)
$$\begin{array}{r} 2X^2 + X \\ \times\ X + 4 \\ \hline 8X^2 + 4X \\ 2X^3 + X^2 \\ \hline 2X^3 + 9X^2 + 4X \\ - 8 \\ \hline 2X^3 + 9X^2 + 4X - 8 \end{array}$$

7) $2X + 1$

8) $4(10^2) + 4(10) + 1 = 441$

$$\begin{array}{r} 2(10) + 1 \\ \times\ 2(10) + 1 \\ \hline 20 + 1 \\ 400 + 20 \\ \hline 400 + 40 + 1 = 441 \end{array}$$

9)
$$\begin{array}{r} 85 \\ 85 \\ \hline 7225 \end{array}$$

10)
$$\begin{array}{r} 59 \\ 51 \\ \hline 3009 \end{array}$$

11) $(X - 6)(X - 4)$

12)
$$\begin{array}{r} X - 6 \\ \times\ X - 4 \\ \hline -4X + 24 \\ X^2 - 6X \\ \hline X^2 - 10X + 24 \end{array}$$

13) $QX + QY + RX + RY$

14) $\$ 5{,}000{,}000{,}000{,}000 \div 300{,}000{,}000$

$50{,}000 \div 3 = \$16{,}667$ (rounded)

15)
$$\begin{array}{r} \$\ 5{,}000{,}000{,}000{,}000 \\ \times\ .08 \\ \hline \$\ 400{,}000{,}000{,}000.00 \end{array}$$

$ 400 billion in interest each year

16) $300 \div 50 = 6$ hours

17) $300 \div 60 = 5$ hours

18) $6.5 \times 46 = 299$ miles

19) $46 + 8 = 54$ mph
$299 \div 54 = 5.54$ hrs. (rounded)

20) $4R - 32R = 36R + 8XR$
$R - 8R = 9R + 2XR$
$1 - 8 = 9 + 2X$
$-16 = 2X, \quad X = -8$

26A

1) $(X^2 - 3)(X^2 + 3)$

2) $(X^2 - Y^2)(X^2 + Y^2)$
$(X - Y)(X + Y)(X^2 + Y^2)$

3) $2X(X^2 - 8)$

4) $(X^4 - Y^2)(X^4 + Y^2)$
$(X^2 - Y)(X^2 + Y)(X^4 + Y^2)$

5) $2X(X^2 + 5X + 6)$
$2X(X + 3)(X + 2)$

6) $5X(X^2 + X - 6)$
$5X(X + 3)(X - 2)$

7) $X(2X^2 + 11X + 5)$
$X(2X + 1)(X + 5)$

8) $3X(X - 4)$

9) $2X(X^2 - 9)$
$2X(X - 3)(X + 3)$

10) $5X^2(X^2 - 4X - 5)$
$5X^2(X - 5)(X + 1)$

11) $4X(X^2 + 4X - 12)$
$4X(X + 6)(X - 2)$

12) $2(X^4 - 16)$
$2(X^2 - 4)(X^2 + 4)$
$2(X - 2)(X + 2)(X^2 + 4)$

13) $X(X^2 + 5X + 4)$
$X(X + 4)(X + 1)$

14) $3X(X^2 + 2X - 3)$
$3X(X + 3)(X - 1)$

15) $X(2X^2 + 7X - 4)$
$X(2X - 1)(X + 4)$

16) $4X(X^2 - 4)$
$4X(X - 2)(X + 2)$

26B

1) $X^2(X^2 - 9)$
$X^2(X - 3)(X + 3)$

2) $3X(X^2 - 25)$
$3X(X - 5)(X + 5)$

3) $4X^2(X^2 - 1)$
$4X^2(X - 1)(X + 1)$

4) $5X(X^4 - 1)$
$5X(X^2 - 1)(X^2 + 1)$
$5X(X - 1)(X + 1)(X^2 + 1)$

5) $-2(X^2 + 8X + 15)$
$-2(X + 3)(X + 5)$

6) $3X(X^2 + 3X - 10)$
$3X(X + 5)(X - 2)$

7) $5X(X^2 - X - 6)$
$5X(X - 3)(X + 2)$

8) $X(X^2 + 11X + 30)$
$X(X + 6)(X + 5)$

9) $-4(X^2 + 7X + 10)$
$-4(X + 5)(X + 2)$

10) $-3X(X^2 + 8X + 12)$
$-3X(X + 6)(X + 2)$

11) $2X(X^2 - 4X - 5)$
$2X(X - 5)(X + 1)$

12) $X^3(5X^2 - X - 6)$
$X^3(5X - 6)(X + 1)$

13) $-3X(X^2 + 4X - 12)$
$-3X(X + 6)(X - 2)$

14) $X^2(X^2 + 3X - 4)$
$X^2(X + 4)(X - 1)$

15) $4X(X^2 - 9)$
$4X(X - 3)(X + 3)$

16) $2X^2(X^2 - 16)$
$2X^2(X - 4)(X + 4)$