Exercise 3.4

1) $(-2.1)^2 = (-2.1)(-2.1)$ → positive

2.1×2.1 — 2 decimal places

$21 + 42 = 4.41$

4.41

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2) $(-0.9)^3 = (-0.9)(-0.9)(-0.9)$

→ negative

0.9×0.9 — 2 decimal places

$81 + 00 = 0.81$

0.81×0.9 — 3 decimal places

$729 + 000 = 0.729$

−0.729

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3) $-1.5^2 = -(1.5)(1.5)$

→ negative

1.5×1.5 — 2 decimal places

$75 + 15 = 225$

−2.25

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4) $1.5(3.2)^3 = (1.5)(3.2)(3.2)(3.2)$

→ positive

1.5×3.2 — 2 decimals

$30 + 45 = 480$

4.80×3.2 — 3 decimals

$960 + 1440 = 15360$

15.360×3.2 — 4 decimals

$30720 + 46080 = 491520$

49.152

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5) $(-1.2)^2(1.1)^3$

look at each separately

→ $(-1.2)^2 = (-1.2)(-1.2)$ → positive

1.2×1.2

$24 + 12 = 144$

→ 1.44

continued above

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5) → $(1.1)^3 = (1.1)(1.1)(1.1)$ → positive

1.1×1.1

$11 + 11 = 121$

→ 1.21

1.21×1.1

$121 + 1210 = 1331$

→ 1.331

plug back into the expression

$(-1.2)^2(1.1)^3 = (1.44)(1.331)$

→ positive

1.331×1.44

$5324 + 53240 + 133100 = 191664$

1.91664

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6) $-2.1^2(0.2)^2$

look at each separately

→ $-2.1^2 = -(2.1)(2.1)$ → negative

2.1×2.1

$21 + 420 = 441$

→ −4.41

→ $(0.2)^2 = (0.2)(0.2)$ → positive

0.2×0.2

$04 + 000 = 0.04$

plug back into the expression

$-2.1^2(0.2)^2 = (-4.41)(0.04)$

→ negative

4.41×0.04

$1764 + 00000 = 01764$

−0.1764

Exercise 3.4 continued

7) $1.1 - 5.6(1.3)$

$= 1.1 - 7.28$

$= \boxed{-6.18}$

Side work

5.6×1.3

168

56

$728 \rightarrow 7.28$

$7.28 - 1.10 = 6.18$ (mixed signs → neg.)

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8) $2.4 - 3.2 + 4.5$

$3.2 - 2.4 = 0.8$

$-0.8 + 4.5$

$4.5 - 0.8 = 3.7$

$\boxed{3.7}$

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9) $7.2 \div 0.5(1.1)$

$= 14.4 \cdot (1.1)$

$0.5\overline{)7.2} \rightarrow 14.4$

$5\overline{)72.0}$, -5, 22, -20, 20

$14.4 \times 1.1 = 15.84$

$144 + 144 = 1584$

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10) $2(0.8)^2 - 6.3 \div 0.3$

$= 2(0.64) - 6.3 \div 0.3$

$= 1.28 - 21$

mixed signs → negative

$21.00 - 1.28 = 19.72$

$\boxed{-19.72}$

Side work

$(0.8)^2 = (0.8)(0.8)$

$0.8 \times 0.8 = 0.64$

$2(0.64) = 1.28$

$3\overline{)63.0} = 21$

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11) $(4.1 - 3.6)^2 + 4 \cdot 0.02$

$= (0.5)^2 + 4 \cdot 0.02$

$= 0.25 + 4 \cdot 0.02$

$= 0.25 + 0.08$

$= \boxed{0.33}$

Side work

$4.1 - 3.6 = 0.5$

$(0.5)^2 = (0.5)(0.5)$

$0.5 \times 0.5 = 0.25$

$4 \cdot 0.02 = 0.08$

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12) $(4.7 - 1.2)^2 + 4 \div 0.2$

$= (3.5)^2 + 4 \div 0.2$

$= 12.25 + 4 \div 0.2$

$= 12.25 + 20$

$= \boxed{32.25}$

side work

$4.7 - 1.2 = 3.5$

$(3.5)^2 = (3.5)(3.5)$

$3.5 \times 3.5 = 12.25$

$4 \div 0.2$: $2\overline{)40} = 20$

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13) Exact Area: $A = \pi r^2$

$= \pi (3)^2$

$= \boxed{9\pi \text{ m}^2}$

Approximate Area: $9\pi \approx 9(3.14)$

$\approx \boxed{28.26 \text{ m}^2}$

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14) Exact Area: $A = \pi \left(\frac{d}{2}\right)^2$

$= \pi \left(\frac{7}{2}\right)^2$

$= \boxed{\pi \frac{49}{4} \text{ in}^2}$

Approximate Area: $A \approx (3.14)\left(\frac{49}{4}\right) \text{ in}^2$

$\approx (3.14)(12.25) \text{ in}^2$

$\approx \boxed{38.4650 \text{ in}^2}$

Side work

$12.25 \times 3.14 = 38.4650$

Exercise 3.4 continued

15) Exact Area: $A = \pi\left(\frac{6}{2}\right)^2 \text{ ft}^2$

$= \boxed{\pi\, 9 \text{ ft}^2}$

Approximate Area: $A \approx 9(3.14) \text{ ft}^2$

$\approx \boxed{28.26 \text{ ft}^2}$

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16) $\frac{62+77+75+81}{4} = \frac{295}{4}$

$$\begin{array}{r} 73.75 \\ 4\overline{)295.00} \\ \underline{28} \\ 15 \\ \underline{12} \\ 30 \\ \underline{28} \\ 20 \end{array}$$

$\boxed{73.75}$

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17) $\frac{88+81+85}{3} = \frac{254}{3}$

$$\begin{array}{r} 84.\overline{66} \\ 3\overline{)254.000} \\ \underline{24} \\ 14 \\ \underline{12} \\ 20 \\ \underline{18} \\ 20 \\ \underline{18} \\ 2 \end{array}$$

← repeating

$\boxed{84.\overline{66}}$

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19) $\sqrt{121} = 11$

20) $\sqrt{64} = 8$

21) $\sqrt{225} = 15$

22) $-\sqrt{144} = -12$

23) $-\sqrt{196} = -13$

24) $-\sqrt{1600} = -40$